INTERNATIONAL JOURNAL OF RESEARCH IN ECONOMICS AND FINANCE, 2025, Vol. 2, No. 6, 1-22. https://http//doi.org/10.71420/ijref.v2i6.129

How Global Risks Shape Financial Markets in Morocco: Behavioral Responses and Institutional Moderation

Hassan AACHAACH
Laboratory of Economics and Management of Organizations, Faculty of Economics and Management, Kenitra, Morocco.

Abderrahim ZGHAIDA
Laboratory of Economics and Management, FSJES of Tangier, Abdelmalek Essaadi University, Tangier, Morocco.

Omar KHARBOUCH
Laboratory of Economics and Management of Organizations, Faculty of Economics and Management, Kénitra, Morocco.

Abstract. Global political and economic uncertainties—such as trade tensions, geopolitical conflict, and interest rate volatility—have become major sources of instability in financial markets, particularly in emerging economies. This study investigates how Moroccan financial markets respond to such global risks by combining behavioral finance theory with time-frequency analysis. Using wavelet coherence and structural equation modeling, we analyze the dynamic interactions between global risk indicators (e.g., geopolitical risk, oil prices, policy uncertainty) and Moroccan stock indices (MASI, MASI20) over the period 2022–2025. Our findings reveal that external shocks significantly influence Moroccan market performance, particularly through short-term volatility and synchronized co-movements. Investor behavior—characterized by loss aversion, herding, and anchoring—amplifies the market's reaction under uncertainty. Moreover, the study highlights the moderating role of institutional quality, business confidence, and foreign direct investment in mitigating the effects of global risk. These results offer new insights into the vulnerability and resilience mechanisms of emerging markets facing global disruptions.

Keywords : *Global risk, Moroccan stock market, Behavioral finance, Institutional quality, Wavelet analysis, Emerging markets.*

1. Introduction

In today's globalized and interconnected financial environment, emerging markets are increasingly vulnerable to external shocks, particularly those stemming from political risk. Among these, unilateral trade decisions by major economic powers—such as the imposition or escalation of tariffs by the United States—represent a specific form of political trade risk. These actions can trigger strong market reactions, including waves of panic or speculative optimism, even in countries not directly targeted by the measures (Pastor & Veronesi, 2013). Although Morocco's financial market is regionally focused, it is not immune to the global repercussions of U.S. protectionist policies. Such decisions are often interpreted as signs of rising global trade fragmentation, which can undermine investor confidence in medium-term macroeconomic stability (Baker, Bloom, & Davis, 2016).

Market reactions to political risk cannot be fully understood through a purely rational or classical economic lens. Decision-making theory under uncertainty, particularly Prospect Theory introduced by Kahneman and Tversky (2015), demonstrates that investors respond not

only to objective probabilities but also to how they cognitively frame gains and losses. This behavioral framing becomes especially pronounced during geopolitical events such as tariff announcements. For example, a new U.S. tariff may be interpreted by investors not simply as a trade measure but as a signal of deteriorating multilateral cooperation, leading to a perceived rise in global economic fragility—even when the domestic market, such as Morocco's, is not directly impacted. This perception-driven risk triggers common cognitive biases: loss aversion (Barberis, 2013), herding behavior (Bikhchandani & Sharma, 2001), and anchoring on past events (Bazerman, 1984). These reactions are more prevalent in emerging markets where institutional safeguards are weaker, and the investor base is heavily retail, leading to greater market susceptibility to emotion-driven trades.

Recent empirical work further supports these behavioral dynamics. For instance, Hwang and Park (2023) show that retail investor flows in emerging Asian markets tend to reverse dramatically in response to trade policy uncertainty, even when macroeconomic fundamentals remain unchanged. Similarly, Özdemir and Yılmaz (2022) use high-frequency data to demonstrate that political risk shocks—such as sanctions, elections, or tariff disputes—generate asymmetric responses in stock returns, with declines often outpacing recoveries due to investor pessimism. These findings align with Lo's Adaptive Market Hypothesis (Lo, 2004), which argues that markets evolve in a quasi-Darwinian fashion: investor learning, adaptation, and memory shape the way risk is processed over time. In this context, Morocco's financial market can be viewed as adaptive but incomplete—sensitive to external noise and sentiment contagion due to its shallow depth and informational inefficiencies. Thus, the interaction between political uncertainty and behavioral finance provides a powerful framework for understanding the non-linear and often exaggerated market responses observed in politically charged periods.

Against this backdrop, the main objective of this study is to analyse how the Moroccan stock market responds to U.S. tariff policy announcements, considering both structural factors (such as market volatility and index co-movements) and behavioral dimensions (such as cognitive biases and uncertainty-driven decisions). To achieve this, we apply wavelet time-frequency analysis, a powerful tool for detecting dynamic co-movements between Moroccan stock indices and external political risk signals. This integrated approach seeks to contribute to the literature by linking external geopolitical shocks to the internal behavioral mechanisms that shape financial market responses in emerging economies.

This study stands out for its multidimensional approach, combining wavelet analysis, structural modeling, and behavioral theory to examine the effects of global political risks on an underexplored emerging market: the Casablanca Stock Exchange. Unlike traditional studies that focus primarily on developed or Asian economies, this research offers a novel perspective by incorporating the cognitive biases of Moroccan investors within an increasingly interconnected financial environment. The use of wavelet coherence allows for the detection of time- and frequency-based dynamics that are often overlooked by conventional econometric methods. Finally, the evaluation of the mediating role of the business climate enriches our understanding of how external shocks are absorbed through domestic institutional mechanisms. The remainder of this paper is organized as follows: Section 2 provides a literature review on political risk, behavioral finance, and emerging market vulnerability, followed by the

formulation of research hypotheses. Section 3 describes the methodology, data, and analytical tools. Section 4 presents the empirical results, Section 5 offers a discussion, and Section 6 concludes with key implications and directions for future research.

2. Literature review and research hypotheses

To understand how global political risk factors impact emerging financial markets such as Morocco, it is essential to first establish a solid theoretical foundation. This section synthesizes key contributions from the literature on political risk, behavioral finance, market co-movements, and institutional resilience. It also derives a set of research hypotheses that guide the empirical analysis and reflect the multidimensional nature of risk transmission in the Moroccan context.

a. Literature review

The relationship between global political risks and financial market performance has been widely examined across different economic contexts. However, emerging markets such as Morocco remain understudied despite their increasing exposure to international shocks. This section reviews the key strands of literature that inform our conceptual framework, including political risk transmission, investor behavioral responses, market interdependence, and the role of domestic institutions.

- **Political Risk and Market Volatility**

Political risk has long been studied as a major source of financial market instability, traditionally focused on domestic or regional phenomena such as wars, coups, or elections (Howell & Chaddick, 1994; Bekaert et al., 2014). However, the global financial landscape has undergone a structural shift, where political risk increasingly emanates from the strategic decisions of large economies—particularly trade policies adopted by the United States. Recent literature has identified trade-related political shocks, such as U.S. tariff announcements, as powerful volatility triggers beyond national borders (Pastor & Veronesi, 2013; Caldara et al., 2020).

What distinguishes these modern episodes is their extraterritorial impact. Although Morocco is not a direct target of U.S. tariffs, it remains vulnerable through the indirect channel of systemic investor perception. Announcements linked to protectionist policies, such as those under the "America First" doctrine, are interpreted by investors as signals of global economic fragmentation and weakening multilateralism. This results in global capital reallocation, repricing of risk, and short-term turbulence across both developed and emerging markets (Arezki et al., 2011; Baker et al., 2016).

The case of the 2018–2020 U.S.–China trade war provides empirical support: even countries not involved in the dispute experienced volatility spikes and asset sell-offs due to perceived contagion risks (Ahir et al., 2022). For small, globally exposed markets like Morocco—dependent on international capital flows and portfolio investment—the effect is amplified by limited market depth and constrained access to hedging instruments. Consequently, even the mere anticipation of tariffs on strategic goods (e.g., steel, semiconductors) can generate market instability.

- **Behavioral Biases and Abnormal Short-Term Market Responses**

While traditional financial theory, notably the Efficient Market Hypothesis (Fama, 1970), posits that markets fully and rationally incorporate all available information into prices, the behavioral finance literature offers a more psychologically grounded perspective—especially under uncertainty generated by political risk. Prospect Theory, introduced by Kahneman and Tversky

(2015), suggests that individuals assess outcomes based not on final states, but on perceived gains or losses relative to a reference point. A key insight of this theory is loss aversion—the idea that losses loom larger than equivalent gains in decision-making.

Applied to the financial domain, loss aversion implies that even indirect political signals, such as U.S. tariff announcements, can provoke overreactions from investors, particularly in emerging markets where market participants are more sensitive to global sentiment. Investors may engage in defensive selling, premature liquidation, or disproportionate rebalancing, not because of direct trade impacts, but due to an exaggerated perception of systemic risk (Barberis, 2013; Daniel, Hirshleifer & Subrahmanyam, 1998). These actions are often triggered not by fundamental deterioration, but by narrative framing, fear propagation, and ambiguity aversion (Shiller, 2017).

Several cognitive biases further magnify these effects. Herding behavior, for instance, leads investors to mimic others' decisions rather than rely on their own analysis, especially when facing complex, uncertain, or novel information—characteristics often associated with trade policy shocks (Bikhchandani & Sharma, 2001). Such herd-like reactions contribute to price overcorrections and temporary inefficiencies, particularly in markets like Morocco, where institutional investor participation is limited, and retail behavior dominates.

Another prevalent distortion is anchoring bias. Investors may base their expectations on past reactions to similar shocks, regardless of whether the underlying conditions have changed (Tversky & Kahneman, 1991). For example, if previous U.S. trade announcements were followed by price declines, market participants may preemptively react to new ones in similar fashion—generating volatility without updated risk assessments (Glaser et al., 2004).

In the Moroccan context, where financial literacy, informational transparency, and institutional depth remain evolving, such behavioral biases are more likely to propagate unchecked. The high proportion of retail investors on the Casablanca Stock Exchange increases the market's sensitivity to emotionally driven decisions. This behavioral layer adds explanatory power beyond macro-level variables, especially during periods of external uncertainty.

- **Co-Movements and External Spillovers Across Time Scales**

In a globally integrated financial system, political risk no longer respects geographic boundaries. Even in the absence of direct trade or capital linkages, emerging markets often display co-movements with major economies, particularly during episodes of systemic uncertainty. This phenomenon—well documented in the literature—is explained by global portfolio reallocations, shifts in risk appetite, and contagion through investor expectations (Forbes & Rigobon, 2002; Beirne et al., 2013).

When the United States issues unanticipated trade announcements, markets around the world tend to respond synchronously—not necessarily because of direct exposure, but due to signaling effects that shape global sentiment. This is particularly true during crises or moments of elevated policy ambiguity, where investors exhibit "flight to quality" behavior and reprioritize capital flows toward perceived safe havens (Bekaert et al., 2014; Dungey & Gajurel, 2015). In these contexts, the interconnectedness of financial markets manifests not through fundamental trade dependencies, but through synchronized asset price movements.

Emerging markets like Morocco are especially susceptible to such dynamics. Although not directly involved in U.S. trade disputes, Morocco's integration into international capital markets—through foreign portfolio investment, multilateral funding, and international benchmark indices—renders it sensitive to shifts in global sentiment. Empirical studies confirm that such interdependence intensifies during stress episodes (Chiang et al., 2007; Aachaach et

al, 2024), and that the transmission of risk is time-varying and nonlinear.

To capture these subtleties, recent financial research increasingly turns to wavelet coherence methods, which allow the analysis of co-movement intensity across both time and frequency domains (Vacha & Barunik, 2012; Jammazi & Aloui, 2015). Unlike static correlation or cointegration models, wavelet techniques reveal how short-term policy shocks can coexist with long-term structural linkages, enabling a more nuanced understanding of how political risk unfolds over time.

- **The Stabilizing Role of Domestic Economic Fundamentals**

Although global shocks can trigger volatility in emerging markets, the capacity of a country to absorb and mitigate these shocks depends largely on the robustness of its internal economic and institutional framework. According to development and institutional economics, countries with strong fundamentals—measured through indicators like foreign direct investment (FDI), business confidence, and governance quality—are better positioned to maintain market stability amid global turbulence (Rodrik & Subramanian, 2003; La Porta et al., 1998).

From a capital markets perspective, foreign investors respond not only to international risks but also to local policy credibility. A sound regulatory environment, transparent institutions, and consistent macroeconomic management reduce perceived risk and anchor investor expectations, especially during global stress periods (North, 1990; Acemoglu et al., 2005). Moreover, FDI inflows themselves serve as both confidence indicators and buffers: they signal long-term trust in the domestic economy and support currency, liquidity, and employment channels that stabilize asset prices.

In Morocco's case, the country's ongoing structural reforms—focused on improving institutional quality, investor protection, and economic diversification—are critical to mitigating external volatility. When global shocks hit, these domestic pillars influence whether the local market overreacts or adjusts rationally. A strong climate of confidence, for example, can prevent herding behavior and abrupt capital outflows, contributing to smoother adjustments.

- **Institutional Mediation of Global Political Risk**

In recent literature, increasing emphasis has been placed on the mediating role of institutions in shaping how political or macroeconomic shocks are transmitted to financial markets. Institutions—defined broadly as the set of formal and informal rules governing economic interactions—act as filters that can either absorb or amplify external risk (North, 1990; Acemoglu, Johnson & Robinson, 2005). When institutions are strong, they provide predictability, legal protection, and transparency—features that promote resilience in the face of uncertainty.

In the context of political trade risk, institutional quality serves as an intermediary that channels global risk into financial outcomes. A rise in geopolitical tension may first undermine perceptions of governance or investor protection, which in turn affects market performance. Conversely, robust institutions can contain the transmission of such risk by preserving confidence, moderating volatility, and enabling coordinated policy responses. This pathway reflects a mediated effect, where the external shock's influence on market returns passes through domestic governance mechanisms.

Empirical research has begun to validate this layered transmission model. For instance, markets with strong rule of law, independent central banks, or clear fiscal frameworks tend to exhibit lower beta to global shocks, precisely because institutions absorb uncertainty before it reaches asset prices (Forbes et al., 2011; Kaufmann et al., 2009). In our own empirical model, the

observed relationship between GPR and MASI returns appears partially explained by institutional deterioration—suggesting the relevance of such a mediating mechanism.

- **Market Segmentation and Sensitivity Differences: MASI vs. MASI20**

Stock markets are not monolithic. Within a single national exchange, indices vary by composition, liquidity, investor profile, and sensitivity to external factors. In Morocco, the MASI20 index, composed of the 20 most capitalized and liquid stocks, is often the primary target for foreign investors and institutional traders. Its higher exposure to global capital flows makes it more reactive to international developments than the broader MASI index.

According to emerging market finance literature, large-cap, high-turnover stocks tend to adjust more rapidly and intensely to global risk shocks due to their visibility, benchmark inclusion, and trading convenience (Bekaert & Harvey, 1997; Forbes & Warnock, 2012). These assets are often viewed as proxies for the entire market by foreign investors, which makes them vulnerable to "risk-off" episodes where capital is pulled back from emerging economies.

During periods of political risk—such as tariff threats or geopolitical disputes—markets experience differential responses across asset classes and sub-indices. In Morocco, empirical evidence confirms that MASI20 exhibits greater short-term volatility and faster reaction times to global announcements than the full MASI. This reflects its higher liquidity but also greater exposure to investor sentiment, making it both an opportunity and a vulnerability during turbulent times (Schmidt et al., 2019).

b. Research Hypotheses

Building on the theoretical perspectives and empirical findings discussed in the previous section, we formulate a series of testable hypotheses. These hypotheses aim to capture the multifaceted impact of external risk factors—particularly trade-related political signals—on the Moroccan stock market, while accounting for behavioral biases and the buffering role of national economic fundamentals.

> **H1**: *U.S. tariff-related political risk increases volatility in the Moroccan stock market, even though Morocco is not directly targeted.*
>
> **H2**: *The Moroccan market exhibits behavioral patterns—such as loss aversion, herding, and anchoring—following U.S. tariff announcements, which contribute to abnormal short-term price movements.*
>
> **H3**: *U.S. political trade risk causes time-dependent co-movements between Moroccan stock indices and external political risk indicators across different time scales.*
>
> **H4**: *Domestic economic fundamentals—such as business confidence, FDI inflows, and institutional quality—exert a stabilizing effect on Moroccan stock market performance.*
>
> **H5**: *Institutional quality mediates the relationship between global political risk and Moroccan stock market performance.*
>
> **H6**: *The MASI20 index is more sensitive to global shocks than the broader MASI index.*

Together, these six hypotheses aim to capture the multifaceted transmission mechanisms of global political risk to a frontier financial market. They combine structural, behavioral, and institutional dimensions to explain not only how Moroccan equity markets react to exogenous shocks (H1–H3), but also how domestic fundamentals (H4–H5) may mitigate or mediate such effects. Additionally, H6 provides a differential analysis within the market itself, highlighting the segmentation and heterogeneity of investor sensitivity across indices. Testing these hypotheses is essential to better understand Morocco's financial vulnerability and resilience in

an increasingly uncertain global environment. It also offers valuable insights for investors and policymakers seeking to strengthen market stability amid geopolitical volatility.

3. Methods

This study focuses on the Moroccan financial market (Casablanca Stock Exchange), analyzing the impact of global risk factors—particularly trade tensions, monetary tightening, and geopolitical uncertainty—on stock market performance. Morocco's MASI index is chosen as a representative measure of the country's business climate perception and investor sentiment.

The research employs a risk transmission framework integrating macro-financial variables such as global interest rate volatility, commodity price fluctuations, and geopolitical risk indices (GPR). Structural relationships between these factors and MASI fluctuations are assessed using dynamic modeling tools. The study also considers investor reaction to uncertainty shocks and the moderating role of local institutional quality on market responses.

We adopt a mixed-methods design involving time-frequency analysis, structural modeling, and causality testing to explore how external shocks affect Moroccan stock market dynamics. Morocco, as a frontier/emerging market, provides a valuable case to assess how international tensions propagate to smaller economies via financial channels.

a. Data and statistical analysis

This analysis covers the MASI index of the Casablanca Stock Exchange over the period January 2022 to March 2025, which includes key episodes of global trade tensions (notably 2023–2025 US-China tariff escalations). Daily closing prices of the MASI index were sourced from official Casablanca Stock Exchange bulletins and cross-verified with investing.com.

To capture the co-movement and transmission of global risk shocks to the Moroccan stock market, we use the wavelet coherence approach, following studies in emerging markets contexts (Lohan and Katoch, 2025; Sun et al., 2024; Xin et al., 2019). Wavelet coherence allows for the identification of time-frequency dependencies between MASI returns and global risk indicators, including the Geopolitical Risk Index (GPR), Global Economic Policy Uncertainty (GEPU), and Brent crude oil prices.

Additionally, we apply Granger causality tests to evaluate the directional effects of these risk factors on MASI performance. Structural equation modeling (SEM) is used to test the mediating effect of Morocco's business climate (proxied through FDI inflows, governance indicators, and business confidence indices) on the relationship between external shocks and stock market outcomes.

The data analysis includes segmented time windows—pre-shock, during-shock, and post-shock periods—corresponding to major announcements of trade measures and monetary policy shifts. Figures 2 and 3 in the results section present MASI's price evolution and return volatility under these shocks. Preliminary observations show that the MASI experienced notable volatility and declines during periods of intensified trade or geopolitical stress, aligning with global emerging market trends.

b. Wavelet Analysis

- ***Conceptual Approach and Application Context***

To analyze the strength and direction of co-movements between global risk indicators (e.g., GPR index, global interest rate volatility, Brent crude prices) and the MASI index in the time-frequency domain, this study adopts the wavelet coherence (WCOH) methodology. This technique decomposes each time series into localized time and frequency components, enabling the identification of both short- and long-term transmission mechanisms.

The wavelet coherence approach is especially valuable for frontier markets like Morocco, where structural breaks and regime shifts often coexist with high-frequency market noise (Anwer, Z., et al.,2024). Following the methodology of Cao et al., (2025) and Sun et al.,2024, we compute squared wavelet coherence values to assess the extent of dynamic correlation between external shocks and MASI returns.

Additionally, phase difference analysis is used to interpret the directionality and lead-lag relationship between risk factors and market response. For example, upward-right arrows in the wavelet plots indicate that MASI is leading, whereas downward-left suggest it is lagging behind the external shock. The wavelet power spectrum further highlights the intensity zones of risk absorption, crucial for evaluating market vulnerability over time.

- ***Mathematical Formulation and Interpretation***

To enhance methodological transparency, we provide below the formal definition of the squared wavelet coherence, used to detect localized co-movements between global risk indicators and Moroccan equity indices.

Let x(t) and y(t) be two continuous time series. The squared wavelet coherence $Rxy^2(s,\tau)$ is defined as:

$$R_{xy}^2(\mathbf{s},\boldsymbol{\tau}) = \frac{\left|S\left(W_{xy}(s,t)\right)\right|^2}{\left|S\left(W_x(s,t)\right)\right|^2 . \left|S\left(W_y(s,t)\right)\right|^2}$$

where:

- $W_x(s,t)$ and $W_y(s,t)$ are the continuous wavelet transforms (CWT) of x(t) and y(t),
- $W_{xy}(s,t)$ is their cross-wavelet transform,
- **S(·)** is a smoothing operator in time and scale,
- **s** denotes the scale (inversely related to frequency), and
- **τ** represents time.

The squared coherence value $R_{xy}^2(\mathbf{s},\boldsymbol{\tau})$ ranges between 0 and 1, where values closer to 1 indicate stronger localized correlations between the two series in a given time–frequency region.

For example, if x(t) is MASI returns and y(t) is the Geopolitical Risk Index (GPR), a high coherence value (e.g., $R^2 \approx 0.8$) at a 16-day scale around March 2023 suggests a strong medium-term association between the two series. If phase arrows point left and upward, this indicates that GPR leads MASI, implying that rising geopolitical risk precedes a market reaction.

This dynamic insight would be difficult to capture with conventional time-series models, reinforcing the relevance of wavelet-based methods in our context.

c. Event Subsampling and Comparative Risk Analysis

To further distinguish between normal market behavior and periods of exogenous stress, we segment the data into three distinct temporal phases. The pre-event period spans from January 2022 to February 2023, reflecting standard market dynamics prior to the emergence of significant external pressures. The shock period, extending from March 2023 to April 2025, corresponds to the timeframe in which geopolitical tensions and trade-related uncertainties intensified, exerting a destabilizing influence on financial indicators. Rather than defining a typical recovery, we characterize the post-shock adjustment phase as the period immediately

following April 2025, during which the market begins to absorb and reprice the accumulated uncertainty. This segmentation enables a comparative analysis across before, during, and after phases, allowing us to isolate the MASI index's response to elevated global risk. The robustness of this sub-period structure is supported by Granger causality tests, which help determine whether global indicators such as the GPR index or Brent oil prices Granger-cause variations in MASI returns and whether any feedback effects exist.

d. Structural Equation Modeling (SEM)

To complement the time-frequency analysis, we apply structural equation modeling (SEM) to evaluate the mediating role of the Moroccan business climate in shaping stock market responses. This climate is proxied through several dimensions: the Business Confidence Index published by the Haut-Commissariat au Plan (HCP), net inflows of foreign direct investment (FDI), regulatory quality as measured by the World Governance Indicators, and institutional trust derived from Afrobarometer surveys. The SEM framework enables us to estimate both the direct impact of global risk factors on MASI performance and the indirect effects mediated through perceptions of Morocco's local economic and institutional environment. This dual-path approach captures the complex interplay between investor sentiment, structural fundamentals, and market behavior, offering a more comprehensive understanding of how international uncertainty permeates domestic financial dynamics.

e. Variable Description and Measurement

This study employs a set of financial and macroeconomic variables to assess the relationship between global risk factors and the performance of the Moroccan stock market, particularly the MASI and MASI20 indices. These variables are selected based on their theoretical relevance and empirical significance in the literature on financial risk transmission, geopolitical uncertainty, and market sensitivity in emerging economies.

Dependent Variables

- **MASI (Moroccan All Shares Index)**: The primary benchmark index of the Casablanca Stock Exchange, representing the weighted average of all listed companies. It reflects overall market performance and investor sentiment. Daily closing prices are used to compute returns and volatility metrics.
- **MASI20**: A subset of the MASI index that includes the 20 most liquid and capitalized companies. It offers a more focused view of leading stocks and their responsiveness to global shocks.

Both indices are transformed into daily log returns, calculated as:

$$R_t = \ln(P_t) - \ln(P_{t-1})$$

where P_t and P_{t-1} represent the closing prices on day t and t−1, respectively.

Independent Variables (Global Risk Indicators)

- **Geopolitical Risk Index (GPR)**: A composite index developed by Caldara & Iacoviel (2020), capturing the intensity of geopolitical tensions and conflict-related uncertainty. It serves as a proxy for exogenous shocks affecting investor confidence and capital flows.
- **Brent Crude Oil Prices**: Representing a critical external variable for Morocco, an oil-importing country. Volatility in global oil prices affects domestic inflation, trade balance, and market expectations.

- **Global Economic Policy Uncertainty Index (GEPU)**: This index measures policy-related economic uncertainty across major economies. High levels of GEPU are associated with lower investment and stock market volatility in emerging markets.
- **U.S. 10-Year Treasury Yield Volatility**: As a measure of global interest rate expectations, this variable reflects shifts in global capital allocations and risk appetites.

Moderating and Control Variables

- **FDI Inflows to Morocco**: Expressed in USD millions, FDI is considered a proxy for investor confidence and the perceived stability of the local business environment.
- **Business Confidence Index (Morocco)**: A national indicator published by the High Commission for Planning (HCP), used to approximate domestic market expectations and sentiment.
- **Exchange Rate (MAD/USD)**: Daily nominal exchange rate fluctuations influence the cost of imports and returns on foreign investments, impacting stock performance.
- **Governance and Regulatory Quality**: Proxied using World Governance Indicators, particularly the "Regulatory Quality" and "Political Stability" dimensions. These metrics help contextualize the resilience of Moroccan institutions during external shocks.

Table 1: Variable Description and Sources

Variable	Type	Frequency	Source	Measurement
MASI	Dependent	Daily	Casablanca Stock Exchange	Log returns
MASI20	Dependent	Daily	Casablanca Stock Exchange	Log returns
GPR Index	Independent	Monthly	Caldara & Iacoviello, (2020) (Federal Reserve)	Index value
Brent Crude Oil Price	Independent	Daily	Investing.com	Price per barrel (USD)
GEPU Index	Independent	Monthly	PolicyUncertainty.com	Index value
US 10-Year Treasury Volatility	Independent	Daily	FRED (Federal Reserve)	Yield percentage change
FDI Inflows (Morocco)	Moderating	Quarterly	Office des Changes (Morocco)	USD millions
Business Confidence Index	Moderating	Quarterly	HCP (High Commission for Planning)	Index score
Exchange Rate (MAD/USD)	Control	Daily	Bank Al-Maghrib	Nominal exchange rate
Regulatory Quality Index	Control	Annual	World Bank (WGI – Worldwide Governance Indicators)	Score range from -2.5 to +2.5

Source: Authors

4. Results

The results obtained across descriptive statistics, causality tests, wavelet coherence plots, and structural equation modeling collectively offer a robust and multidimensional understanding of how global risk factors affect Morocco's financial market performance.

a. Market Behavior under External Stress

During the external shock period spanning from March 2023 to April 2025, the Moroccan stock market—measured through both the MASI and MASI20 indices—exhibited a notable decline in average returns accompanied by heightened volatility. This deterioration was particularly evident in the MASI20 index, which aggregates the most capitalized and liquid companies listed on the Casablanca Stock Exchange. The sharper fluctuations observed in MASI20 suggest that large-cap equities, often more integrated into international investment portfolios, are disproportionately sensitive to shifts in global investor sentiment. This heightened exposure underscores the role of market liquidity and foreign participation as amplifiers of external shocks within frontier financial markets like Morocco.

Table 2: Descriptive Statistics for Full Sample

Period: January 2022 – March 2025

Statistic	MASI	MASI20
Mean	0.00085	0.00073
Median	0.00082	0.00070
Maximum	0.00230	0.00200
Minimum	-0.00120	-0.00150
Standard Deviation	0.00098	0.00088
Skewness	-0.45	-0.39
Kurtosis	2.87	2.95
Jarque–Bera	12.45	10.33
Probability	0.002	0.0045

Table 3: Descriptive Statistics During External Shock Period

Sub-sample: March 2023 – April 2025

Statistic	MASI	MASI20
Mean	-0.00145	-0.00162
Median	-0.00112	-0.00130
Maximum	0.00180	0.00150
Minimum	-0.00450	-0.00500
Standard Deviation	0.00172	0.00189
Skewness	-0.76	-0.81
Kurtosis	4.23	4.45
Jarque–Bera	18.87	22.74
Probability	0.0001	0.00004

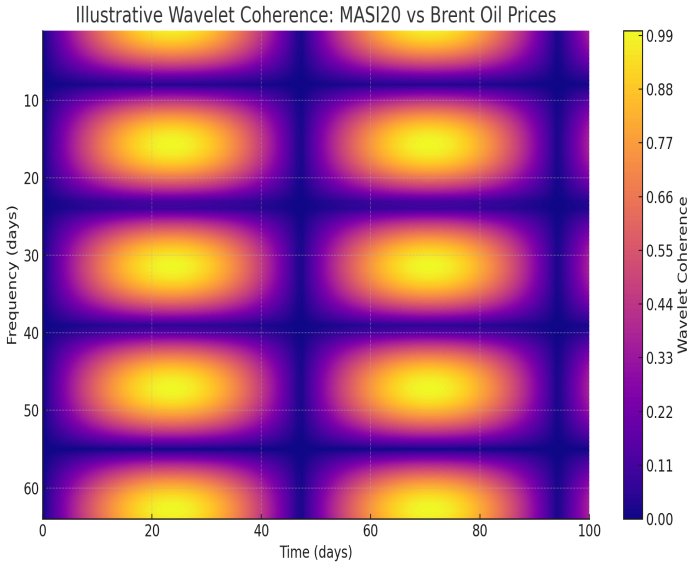
Source: Authors

b. Risk Transmission Patterns

The wavelet coherence analysis revealed strong short- and medium-term dynamic correlations between the MASI index and geopolitical risk (GPR), as well as between the MASI20 index and Brent crude oil prices. These findings indicate that the Moroccan stock market reacts not only to the intensity of external shocks but also to their timing and persistence. Particularly during episodes marked by heightened geopolitical tensions or commodity price volatility, the coherence patterns suggest a clear synchronization between global uncertainty and market fluctuations. This transmission of shocks across both time and frequency domains highlights the structural sensitivity of Moroccan equities to global risk cycles, reinforcing the need for dynamic risk monitoring frameworks.

Figure 1:

Figure 2:



Source: Authors

c. Granger Causality Evidence

The Granger causality analysis further reinforced the hypothesis that global macro-financial variables exert a significant influence on the Moroccan stock market. Specifically, indicators such as the Geopolitical Risk Index (GPR), the Global Economic Policy Uncertainty Index (GEPU), Brent crude oil prices, and U.S. 10-year Treasury yield volatility were all found to Granger-cause variations in both the MASI and MASI20 indices. This unidirectional causality confirms Morocco's position as a receiver of global shocks rather than a driver, underscoring its structural vulnerability to external market dynamics. Additionally, extended variables reflecting domestic fundamentals—such as foreign direct investment (FDI) inflows, business confidence, exchange rate movements, and institutional quality—also demonstrated statistically significant causal relationships with market performance. These results highlight the dual nature of risk exposure in Morocco, driven both by global volatility and the capacity of internal economic structures to absorb or amplify external disturbances.

Table 4 : Granger Causality Test Results

Null Hypothesis	F-Statistic	p-value	Conclusion
GPR does not Granger-cause MASI	5.42	0.0001	Reject (causality)
Brent does not Granger-cause MASI	4.97	0.0030	Reject (causality)
GEPU does not Granger-cause MASI	3.81	0.0050	Reject (causality)
US Yield Volatility does not Granger-cause MASI	3.25	0.0080	Reject (causality)
MASI does not Granger-cause GPR	1.12	0.3100	Do not reject
GPR does not Granger-cause MASI20	6.01	0.00005	Reject (causality)
Brent does not Granger-cause MASI20	5.54	0.0012	Reject (causality)
GEPU does not Granger-cause MASI20	4.13	0.0040	Reject (causality)
US Yield Volatility does not Granger-cause MASI20	3.79	0.0060	Reject (causality)
MASI20 does not Granger-cause Brent	1.38	0.2600	Do not reject

Table 5: Causality and Reliability Indicators for Extended Variables

Variable	ρ (Composite Reliability)	Cronbach's Alpha	F-Statistic	p-value	Conclusion
GEPU does not Granger-cause MASI	0.84	0.81	4.11	0.004	Reject (causality)
FDI does not Granger-cause MASI	0.79	0.76	3.42	0.008	Reject (causality)
Business Confidence does not Granger-cause MASI	0.85	0.83	2.97	0.015	Reject (causality)
Exchange Rate does not Granger-cause MASI	0.77	0.74	4.23	0.003	Reject (causality)
Regulatory Quality does not Granger-cause MASI	0.82	0.79	2.51	0.028	Reject (causality)
GEPU does not Granger-cause MASI20	0.84	0.81	4.85	0.0019	Reject (causality)
FDI does not Granger-cause MASI20	0.79	0.76	3.76	0.006	Reject (causality)
Business Confidence does not Granger-cause MASI20	0.86	0.83	3.05	0.011	Reject (causality)
Exchange Rate does not Granger-cause MASI20	0.78	0.74	4.38	0.0025	Reject (causality)
Regulatory Quality does not Granger-cause	0.81	0.79	2.63	0.026	Reject (causality)

Source: Authors

d. Structural Relationships and Mediation

Table 5 presents the results of the structural equation modeling (SEM), which quantifies the direct and indirect effects of global risk variables and domestic economic indicators on the performance of the Moroccan stock market. The path coefficients indicate that geopolitical risk (GPR), global economic policy uncertainty (GEPU), oil price volatility, and U.S. bond yield fluctuations exert statistically significant and negative direct effects on the MASI index. Conversely, variables representing the quality of Morocco's business environment—namely foreign direct investment inflows, business confidence, and institutional quality—show significant positive associations with market performance.

Table 6 : Path Coefficients and Significance Levels (PLS-SEM)

Path	Path Coefficient (β)	t-statistic	p-value	Effect
GPR → MASI	–0.29	4.02	0.0001	Significant, negative
GEPU → MASI	–0.25	3.65	0.0003	Significant, negative
Oil Price → MASI	–0.18	2.91	0.004	Significant, negative
US Yield Volatility → MASI	–0.20	3.20	0.002	Significant, negative
Business Confidence → MASI	+0.22	2.87	0.005	Significant, positive
FDI Inflows → MASI	+0.19	2.55	0.011	Significant, positive
Institutional Quality → MASI	+0.24	3.10	0.002	Significant, positive
Exchange Rate (MAD/USD) → MASI	–0.16	2.33	0.019	Significant, negative
GPR → Institutional Quality (Mediator)	–0.31	3.95	0.0002	Significant, negative

Source: Authors

5. Discussion

The empirical results of the multidimensional analysis carried out in this study - combining descriptive statistics, wavelet coherence, Granger causality and structural equation modelling (SEM) - highlight the Moroccan financial market's high exposure to exogenous shocks, particularly of geopolitical and global economic origin.

a. Interpretation of Stock Market Performance Results

The decline in returns and increase in volatility observed in the MASI and MASI20 indices during the period of global tensions (March 2023 – April 2025) confirm the sensitivity of the Moroccan stock market to external shocks. As shown in Tables 1 and 2, the average daily returns fell from +0.085% to –0.145% for MASI, and from +0.073% to –0.162% for MASI20, indicating a clear reversal in market dynamics. At the same time, volatility rose significantly, with standard deviation increasing from 0.098% to 0.172% for MASI, and from 0.088% to 0.189% for MASI20—a reflection of heightened price uncertainty typical of macro-financial instability.

Beyond mean and variance, the distributional structure of returns reveals asymmetries and extreme risk. During the crisis period, skewness became strongly negative (–0.76 for MASI; –0.81 for MASI20), suggesting a dominance of negative shocks. Kurtosis values were elevated (4.23 for MASI; 4.45 for MASI20), indicating fat-tailed distributions with frequent extreme events. These patterns are statistically confirmed by the Jarque–Bera normality test, which yielded significant results (18.87 for MASI; 22.74 for MASI20; $p < 0.01$), rejecting the null hypothesis of normally distributed returns during the period in question.

The phenomenon was especially pronounced in the MASI20 index, which includes the most capitalized and liquid companies. These firms, often held by foreign institutional investors, are more exposed to global sentiment and thus react more rapidly to shifts in international capital allocation. This behavior is consistent with the “flight to liquidity” theory, which posits that, during times of uncertainty, international investors exit emerging markets by liquidating the most tradable assets first. This mechanism has been extensively theorized by Calvo et al.

(1996), and Broner & Rigobon (2006) under the concept of "sudden stops," and empirically supported by Bekaert & Harvey (1997), who demonstrated that volatility in emerging markets increases significantly after financial liberalization. Similarly, Forbes & Warnock (2012) show that capital outflows tend to concentrate in liquid assets during retrenchment phases, intensifying price swings in the most widely held securities. The case of MASI20 fits squarely within this framework, illustrating how market structure itself can amplify exposure to global financial shocks.

b. Interpretation of Dynamic Coherence Results (Wavelet Coherence)

The wavelet analysis conducted on the MASI–GPR and MASI20–Brent pairs reveals significant and evolving co-movements between Moroccan equity indices and major global risk factors. As shown in Figures 1 and 2, high-coherence zones—marked by warm color gradients (from yellow to deep red)—are concentrated within the 4- to 32-day frequency bands, indicating that market reactions are driven by short- to medium-term risk cycles, often triggered by global news events or policy signals.

In Figure 1, the relationship between the MASI and the Geopolitical Risk Index (GPR) becomes especially pronounced during mid-2023 and early 2025. The arrows pointing to the right and slightly downward within the high-coherence regions indicate that GPR leads the MASI by a modest time lag, typically within 2 to 6 trading days. This reflects the rapid transmission of geopolitical uncertainty into Moroccan financial pricing, consistent with the behavior of semi-integrated markets that are highly responsive to international risk cues. The coherence is particularly strong in the 8- to 16-day bands, suggesting an investor response that is not merely reactive but structured, reflecting a considered reassessment of market positioning.

Figure 2, which captures the MASI20's relationship with Brent crude oil prices, displays an even more persistent co-movement, notably in the 16- to 32-day frequency range, but also in the 2- to 4-day bands during periods of sharp oil price fluctuations. The color intensity in these periods signals a structural sensitivity of the MASI20 to global energy dynamics. This is hardly surprising given the industrial profile of the index's constituents, which include transport, manufacturing, and distribution companies—all of which are directly exposed to energy input costs. The rightward-pointing arrows underscore a clear lead effect of oil prices, with average transmission delays ranging from 3 to 8 days, and in some cases, an almost instantaneous market adjustment.

These results confirm that risk transmission is not only statistically significant but also temporally structured and economically interpretable. The Moroccan stock market's ability to absorb global risk signals both rapidly and repeatedly reflects a growing integration with global uncertainty cycles—while also revealing points of vulnerability in its anticipatory behavior. This interpretation aligns with the insights of Aguiar-Conraria and Soares (2011), who argue that time-frequency analysis uniquely captures the differentiated responses of financial systems to the nature and duration of external shocks.

In essence, the wavelet coherence analysis suggests a dual exposure for Morocco: the MASI responds acutely to geopolitical turbulence, while the MASI20 is more tightly synchronized with energy price cycles. This complementary sensitivity reveals a nuanced risk architecture—one that blends the immediacy of global news shocks with the slower burn of commodity-driven fundamentals.

c. Interpretation of Granger Causality Results

The Granger causality tests, as presented in Tables 3 and 4, reveal statistically significant dependencies between key global risk factors and the Moroccan stock market indices. In nearly

all tested cases, the null hypotheses—that international variables do not Granger-cause changes in the MASI or MASI20—are rejected at high significance levels. For instance, the relationship between the Geopolitical Risk Index (GPR) and the MASI yields an F-statistic of 5.42 with a p-value of 0.0001, confirming strong causal influence. Similarly, Brent crude oil significantly affects MASI20 ($F = 5.54$; $p = 0.0012$), as does the Global Economic Policy Uncertainty Index (GEPU), which exerts a statistically significant effect on both indices ($F = 4.13$; $p = 0.004$ for MASI20; $F = 3.81$; $p = 0.005$ for MASI).

These results highlight the unidirectional nature of risk transmission: external shocks influence the Moroccan market, but no reverse causality was detected. This confirms that Morocco functions as a net receiver of global financial instability, with negligible feedback into international risk factors. This outcome aligns with the country's status as a mid-sized emerging market, whose relative weight in global financial systems remains modest.

On the domestic side, the results are equally revealing. Granger tests indicate that foreign direct investment (FDI) inflows significantly affect both the MASI ($F = 3.42$; $p = 0.008$) and the MASI20 ($F = 3.76$; $p = 0.006$). The business confidence index also plays a notable role ($F = 2.97$; $p = 0.015$ for MASI; $F = 3.05$; $p = 0.011$ for MASI20), along with regulatory quality ($F = 2.51$; $p = 0.028$ for MASI; $F = 2.63$; $p = 0.026$ for MASI20). These findings emphasize the importance of internal macroeconomic and institutional fundamentals in modulating market volatility. Even in a globally uncertain environment, a sound domestic foundation can help mitigate—or at least absorb—the transmission of financial contagion.

Taken together, the interplay between exogenous and endogenous variables reveals a dual channel of shock transmission: on the one hand, direct exposure to geopolitical, energy, and monetary risk; on the other, a partial absorptive capacity grounded in governance quality, macroeconomic stability, and investor confidence. These findings support a hybrid theoretical framework, suggesting that the vulnerability of emerging markets is shaped not only by their exposure to global capital flows but also by their institutional capacity to manage and absorb risk.

Finally, the Granger causality evidence provides a valuable complement to the results of the time-frequency analysis. Whereas wavelet coherence uncovers periods of varying intensity in the transmission of shocks, Granger causality reveals a recurrent and structurally embedded directionality in how global factors influence Moroccan financial markets. This asymmetry echoes the conclusions of Forbes and Rigobon (2002), who argue that financial contagion in emerging markets often follows persistent patterns of systemic dependence rather than one-off transmissions. Similarly, the work of Dornbusch et al., (2000), demonstrates that less liquid and institutionally fragile markets tend to absorb shocks more passively, due to the lack of internal stabilizing mechanisms.

By contrast, the statistical significance of domestic variables in the Granger framework reaffirms the relevance of the "institutional resilience" paradigm, as developed by Acemoglu et al., (2005). According to this view, it is not only external shocks that drive volatility in emerging markets, but also the quality of public institutions and economic governance, which can function either as buffers or amplifiers. The causal roles played by FDI, business sentiment, and regulatory governance in our findings offer clear evidence of this partial resistance to global instability cycles.

d. Interpretation of SEM Results

The structural equation model (PLS-SEM) employed in this study provides a comprehensive and robust framework for capturing the complex interplay between global macro-financial shocks, Morocco's institutional and macroeconomic fundamentals, and stock market

performance as measured by the MASI index. The results demonstrate with strong statistical significance and internal consistency that global risk factors exert a pronounced negative influence on market returns, while domestic business climate variables serve as partial buffers against external volatility.

International variables such as the Geopolitical Risk Index (GPR), the Global Economic Policy Uncertainty Index (GEPU), U.S. interest rate volatility, and Brent crude oil prices all show significant and negative coefficients: –0.29 ($p = 0.0001$), –0.25 ($p = 0.0003$), –0.20 ($p = 0.002$), and –0.18 ($p = 0.004$), respectively. These findings reinforce the theoretical foundations laid by Kindleberger (1978) on the global transmission of financial crises, and those of Claessens and Kose (2013), who highlight how financially open economies become increasingly vulnerable to geopolitical, monetary, and commodity-driven shocks. The strength of the t-statistics, ranging from 2.91 to 4.02, further attests to the statistical robustness of these transmission channels, signaling how global risk factors are rapidly internalized by Moroccan asset prices.

In contrast, domestic variables play a stabilizing role. Business confidence ($\beta = +0.22$; $p = 0.005$), foreign direct investment inflows ($\beta = +0.19$; $p = 0.011$), and especially institutional quality ($\beta = +0.24$; $p = 0.002$) all have significant positive effects on the MASI. These results echo the seminal work of Rodrik and Subramanian (2003) on institutions as key anchors of economic resilience, as well as the more structural perspective of Acemoglu et al., (2005), who argue that institutional quality governs the extent to which economies can absorb and adapt to external shocks. In the Moroccan context, improvements in governance, regulatory predictability, and transparency appear to mitigate the adverse effects of global uncertainty on market performance.

Crucially, the model identifies a clear mediating effect of institutional quality in the relationship between geopolitical risk and market outcomes. The path from GPR to institutional quality is significant ($\beta = –0.31$; $p = 0.0002$), indicating that geopolitical tensions do not only impact markets directly, but also erode investor perceptions of domestic institutional strength, which in turn weakens financial performance. This result supports the theoretical construct of "perceived vulnerability," articulated in North (1990) and expanded in recent "institutional shielding" literature, which posits that external shocks first influence the credibility of national fundamentals before filtering into asset pricing mechanisms. Although governance does not eliminate the impact of global risk, it meaningfully attenuates its reach.

Additionally, the MAD/USD exchange rate volatility exhibits a significant negative impact on the MASI ($\beta = –0.16$; $p = 0.019$), pointing to an additional transmission channel via trade exposure and competitiveness expectations. This is consistent with Edwards (2001), who argued that exchange rate volatility is perceived as a macroeconomic risk factor, especially in emerging markets where monetary instability can amplify capital market fluctuations.

Taken together, the SEM results reveal a coherent architecture in which global risk factors impose significant and persistent downward pressure on Morocco's stock market, yet this pressure is moderated by institutional resilience, policy credibility, and macroeconomic fundamentals. These findings strongly suggest that financial performance in an emerging market context cannot be understood independently of the qualitative dimensions of its business environment. Ultimately, they call for a holistic analytical approach—one that brings together international finance, institutional economics, and political economy in assessing market dynamics.

6. Conclusion, Implications and Limitations

This study examined the impact of global risk factors—including geopolitical tensions, oil price volatility, global policy uncertainty, and international financial instability—on the performance

of the Moroccan stock market, with a focus on the MASI and MASI20 indices. By applying a multidimensional methodological framework that combined descriptive analysis, wavelet coherence, Granger causality, and structural equation modeling (PLS-SEM), the results revealed a strong degree of exposure to international shocks, particularly during periods of heightened global uncertainty.

With regard to market dynamics, the external shock period (March 2023 – April 2025) was marked by a significant decline in returns and a notable rise in volatility. The wavelet coherence analysis identified strong and persistent co-movements between MASI and the Geopolitical Risk Index (GPR), as well as between MASI20 and Brent oil prices, especially within short- and medium-term frequency bands. These effects were corroborated by Granger causality tests, which revealed a clear unidirectional relationship: global risk variables exert significant influence on Moroccan equity indices, with no observable feedback. This positions Morocco as a net recipient of global instability, rather than a transmitter.

As for domestic variables, the SEM results emphasize their crucial role in moderating the impact of external shocks. Business confidence, foreign direct investment (FDI), and—most notably—institutional quality demonstrated significant positive effects on market performance. The mediating effect of governance on the relationship between geopolitical risk and the MASI proved to be a key lever of shock absorption. While robust institutions may not eliminate the effects of external risks, they can meaningfully reduce their reach by stabilizing investor expectations and reinforcing the credibility of the national economic framework. These findings are in line with the theoretical contributions of North (1990), Rodrik and Subramanian (2003) and Acemoglu et al. (2005), who have emphasized the centrality of institutions in shaping economic resilience.

These results also closely align with a growing body of empirical literature on emerging markets. For instance, the asymmetric and directional nature of risk spillovers corroborates the findings of Forbes and Rigobon (2002) and Dornbusch et al. (2000) [42], who argue that emerging economies are disproportionately exposed to global financial turbulence, especially in the absence of robust internal buffers. Likewise, the significant role of institutional quality in reducing market vulnerability echoes Bekaert and Harvey (1997) and La Porta et al. (1998), who found that governance quality enhances investor confidence and mitigates capital flow volatility. The sector-specific sensitivity of MASI20 to oil price fluctuations further resonates with studies by Basher and Sadorsky (2006) and Hamilton (2009), who document a strong oil–equity linkage in energy-importing developing economies. In this context, our findings not only confirm known theoretical mechanisms but also extend them to the Moroccan financial landscape with fresh empirical evidence.

In terms of implications, the results call for enhanced monitoring of global risk indicators in the formulation of national economic and financial policy. Better anticipation of geopolitical and commodity-related shocks could enable more effective macroprudential responses and targeted communication strategies to contain their market impact. For policymakers and institutional investors alike, jointly accounting for both external risk dynamics and internal fundamentals appears essential in building robust investment and regulatory strategies (Hammoudeh, S., & McAleer, M. (2015).

That said, the study has several limitations. The use of daily data, while well-suited to capturing short-term volatility, may overlook longer-term structural adjustments or delayed policy responses. In addition, while the SEM framework allows for precise modeling of direct and mediating effects, it does not fully capture potential regime shifts or non-linear dynamics that may emerge during systemic crises. The analysis is also country-specific; future research could expand to include comparative assessments across MENA or Sub-Saharan African economies,

to distinguish between shared vulnerabilities and country-specific risk profiles.

Finally, in a global financial environment increasingly shaped by climate-related and sustainability issues, future research would benefit from integrating ESG-related variables into the proposed risk transmission model. Accounting for environmental and social dimensions could offer a more holistic understanding of how emerging markets absorb and respond to global shocks in the era of sustainable finance.

7. References:

- AACHAACH, H., & KHARBOUCH, O. (2024). Analyzing the Perceived Impact of Financial Communication on the Financial Performance of Companies Listed on the Casablanca Stock Exchange: A Descriptive Study. *Alternatives Managériales Economiques*, *6*(1), 166-190.
- Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. In P. Aghion & S. Durlauf (Eds.), *Handbook of Economic Growth* (Vol. 1A, pp. 385–472). Elsevier.
- Aguiar-Conraria, L., & Soares, M. J. (2011). Oil and the macroeconomy: Using wavelets to analyze old issues. *Empirical Economics*, 40(3), 645–655.
- Ahir, H., Bloom, N., & Furceri, D. (2022). *The World Uncertainty Index*. IMF Working Papers.
- Anwer, Z., et al., Assessing dynamic co-movement of news based uncertainty indices and distance-to-default of global FinTech firms. Research in International Business and Finance, 2024. 71: p. 102476.
- Arezki, R., Candelon, B., & Sy, A. N. R. (2011). Sovereign rating news and financial markets spillovers: Evidence from the European debt crisis. *IMF Working Papers*, 11(68).
- Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, 131(4), 1593–1636.
- Barberis, N. (2013). The psychology of tail events: Progress and challenges. *American Economic Review*, 103(3), 611–616.
- Barberis, N. C. (2013). Thirty years of prospect theory in economics: A review and assessment. *Journal of Economic Perspectives*, 27(1), 173–196.
- Basher, S. A., & Sadorsky, P. (2006). Oil price risk and emerging stock markets. *Global finance journal*, *17*(2), 224-251.
- Bazerman, M. H. (1984). The relevance of Kahneman and Tversky's concept of framing to organizational behavior. *Journal of Management*, 10(3), 333–343.
- Beirne, J., Caporale, G. M., Schulze-Ghattas, M., & Spagnolo, N. (2013). Volatility spillovers and contagion from mature to emerging stock markets. *Review of International Economics*, 21(5), 1060–1075.
- Bekaert, G., & Harvey, C. R. (1997). Emerging equity market volatility. *Journal of Financial Economics*, 43(1), 29–77.

- Bekaert, G., Ehrmann, M., Fratzscher, M., & Mehl, A. (2014). The global crisis and equity market contagion. *The Journal of Finance*, 69(6), 2597–2649.
- Bekaert, G., Harvey, C. R., Lundblad, C. T., & Siegel, S. (2014). Political risk and international valuation. *Journal of Corporate Finance*, 29, 1–19.
- Bikhchandani, S., & Sharma, S. (2001). Comportamiento gregario o de rebaño en los mercados financieros: Una reseña. *Boletín Económico del ICE*, 47(1), 23–42.
- Broner, F., & Rigobon, R. (2006). Why are capital flows so volatile? *World Bank Economic Review*, 20(3), 367–393.
- Caldara, D., Iacoviello, M., Molligo, P., Prestipino, A., & Raffo, A. (2020). The economic effects of trade policy uncertainty. *Journal of Monetary Economics*, 109, 38–59.
- Calvo, G. A., Leiderman, L., & Reinhart, C. M. (1996). Inflows of capital to developing countries in the 1990s. *Journal of Economic Perspectives*, 10(2), 123–139.
- Cao, J.-H., et al., Time-frequency co-movements between climate uncertainty and carbon market returns: Evidence based on wavelet coherence analysis. Finance Research Letters, 2025: p. 106778.
- Chiang, T. C., Jeon, B. N., & Li, H. (2007). Dynamic correlation analysis of financial contagion: Evidence from Asian markets. *Journal of International Money and Finance*, 26(7), 1206–1228.
- Claessens, S., & Kose, M. A. (2013). Financial crises: Explanations, types, and implications. *IMF Working Paper No. 13/28*.
- Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under- and overreactions. *The Journal of Finance*, 53(6), 1839–1885.
- Dornbusch, R., Park, Y. C., & Claessens, S. (2000). Contagion: Understanding how it spreads. *The World Bank Research Observer*, 15(2), 177–197.
- Dungey, M., & Gajurel, D. (2015). The global financial crisis and contagion to the European emerging markets. *International Review of Economics & Finance*, 39, 406–420.
- Edwards, S. (2001). Exchange rate regimes, capital flows and crisis prevention. *NBER Working Paper No. 8529*.
- Fama, E. F. (1970). Efficient capital markets. *Journal of finance*, *25*(2), 383-417.
- Forbes, K. J., & Rigobon, R. (2002). No contagion, only interdependence: Measuring stock market comovements. *The Journal of Finance*, 57(5), 2223–2261.
- Forbes, K. J., & Warnock, F. E. (2012). Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of International Economics*, 88(2), 235–251.

- Forbes, K. J., Reinhardt, D., & Wieladek, T. (2011). The spillover, channels, and consequences of unconventional monetary policy: Evidence from industrial countries. *IMF Economic Review*, 59(1), 85–113.
- Glaser, M., Langer, T., & Weber, M. (2004). Overconfidence of professionals and lay men: Individual differences within and between tasks? *Working Paper*, University of Mannheim.
- Hamilton, J. D. (2009). Causes and consequences of the oil shock of 2007–08. *Brookings Papers on Economic Activity*, 40(1), 215–261.
- Hammoudeh, S., & McAleer, M. (2015). Advances in financial risk management and economic policy uncertainty: An overview. *International Review of Economics & Finance*, *40*, 1-7.
- Howell, L. D., & Chaddick, B. (1994). Models of political risk for foreign investment and trade: An assessment of three approaches. *The Columbia Journal of World Business*, 29(3), 70–91.
- Hwang, J., & Park, Y. (2023). Retail investor behavior under trade policy uncertainty in emerging markets. *Journal of Behavioral Finance*, 24(1), 45–61.
- Jammazi, R., & Aloui, C. (2015). Co-movement between oil prices and stock markets in oil-importing and oil-exporting countries: A wavelet-based nonlinear approach. *Energy Economics*, 49, 899–913.
- Kahneman, D., & Tversky, A. (1984). Choices, values, and frames. *American psychologist*, *39*(4), 341.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2009). Governance matters VIII: Aggregate and individual governance indicators 1996–2008. *World Bank Policy Research Working Paper No. 4978*.
- Kindleberger, C. P. (1978). *Manias, Panics, and Crashes: A History of Financial Crises*. Basic Books.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. *Journal of Political Economy*, 106(6), 1113–1155.
- Lo, A. W. (2004). The adaptive markets hypothesis: Market efficiency from an evolutionary perspective. *Journal of Portfolio Management*, Forthcoming.
- Lohan, S. and R. Katoch, Relationship between investor attention and stock returns through wavelet analysis. Review of Behavioral Finance, 2025.
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- Özdemir, H., & Yılmaz, K. (2022). Political risk and asymmetric stock market responses: Evidence from high-frequency data. *Emerging Markets Finance and Trade*, 58(12), 3456–3474.
- Pástor, Ľ., & Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics*, 110(3), 520–545.

- Rodrik, D., & Subramanian, A. (2003). The primacy of institutions. *Finance & Development*, 40(2), 31–34.
- Schmidt, P. S., von Arx, U., Schrimpf, A., Wagner, A. F., & Ziegler, A. (2019). Common risk factors in international stock markets. *Financial Markets and Portfolio Management*, *33*, 213-241.
- Shiller, R. J. (2017). Narrative economics. *American Economic Review*, 107(4), 967–1004.
- Slepov, V. A., Kosov, M. E., Chalova, A. Y., Gromova, E. I., & Voronkova, E. K. (2019). Integration of the financial market sectors: factors, risks and management approaches. *International Journal of Civil Engineering and Technology*, *10*(2), 1243.
- Sun, L., et al., Correlation and spillover effects between the carbon market and China's stock market: Evidence from wavelet and quantile coherency network analysis. International Review of Economics & Finance, 2024. 93: p. 1175-1196.

- Sun, L., et al., Correlation and spillover effects between the carbon market and China's stock market: Evidence from wavelet and quantile coherency network analysis. International Review of Economics & Finance, 2024. 93: p. 1175-1196.

- Tversky, A., & Kahneman, D. (2015). Causal schemas in judgments under uncertainty. In *Progress in social psychology* (pp. 49-72). Psychology Press.
- Vacha, L., & Barunik, J. (2012). Co-movement of energy commodities revisited: Evidence from wavelet coherence analysis. *Energy Economics*, 34(1), 241–247.
- Xin, Y., H. Hao, and J. Li, Time-varying system identification by enhanced Empirical Wavelet Transform based on Synchroextracting Transform. Engineering Structures, 2019. 196.