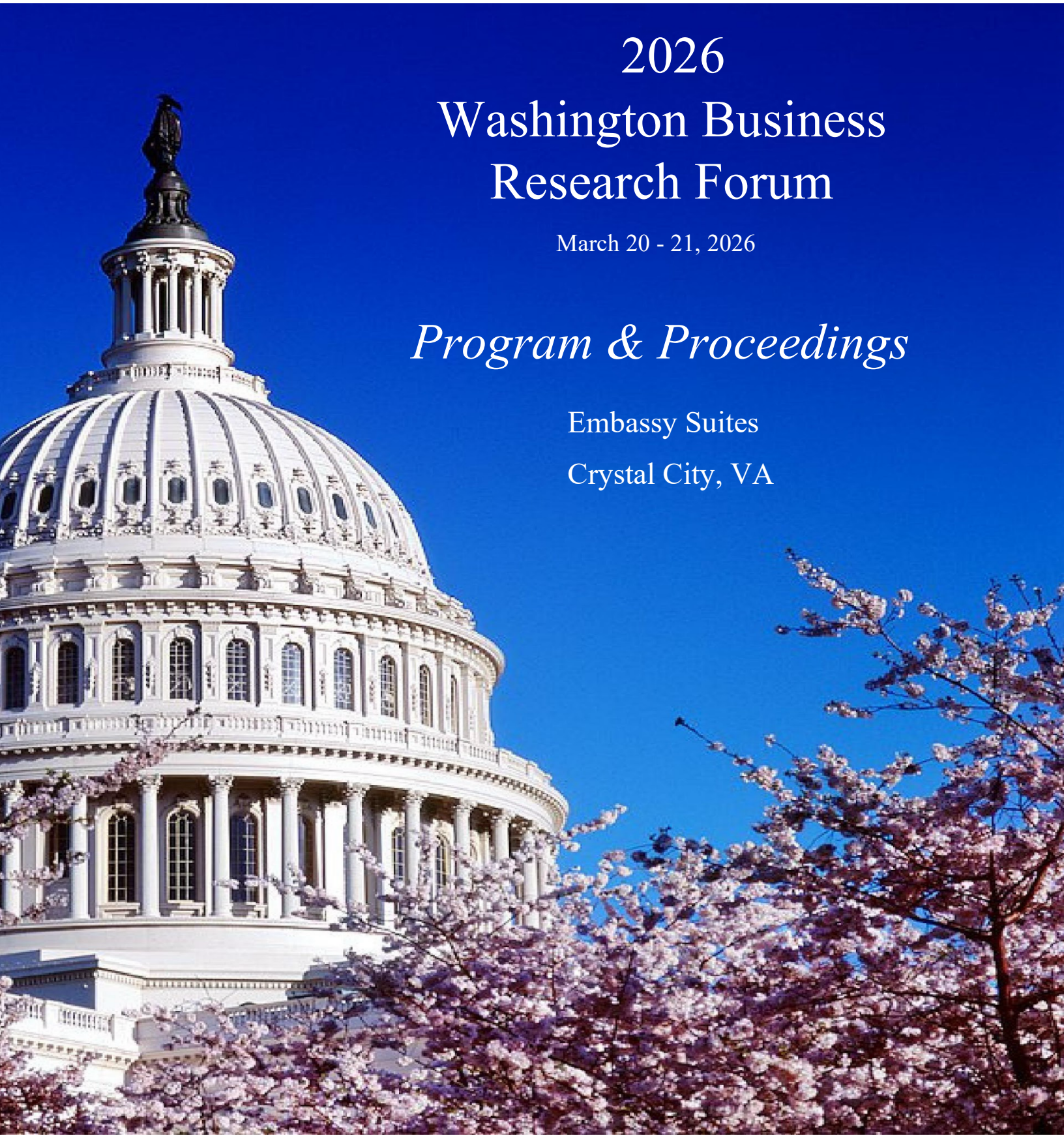

2026 Washington Business Research Forum

March 20 - 21, 2026

Program & Proceedings

Embassy Suites

Crystal City, VA

WASHINGTON BUSINESS RESEARCH FORUM

WASHINGTON BUSINESS RESEARCH FORUM

Fostering Scholarship. Advancing Research. Inspiring Collaboration.

March 20, 2026

Dear Forum Attendees,

I want to personally welcome each of you to the Annual Washington Business Research Forum (WBRF). The WBRF is now celebrating its 40th year in providing a platform for business researchers of the Washington Consortium of Universities, Historically Black Colleges and Universities, and Universities throughout the U.S. and beyond to share their research, provide important feedback, elicit discussions, network, and collaborate.

The Washington Business Research Forum (WBRF) seeks to do the following:

- encourage research among Business Faculty
- encourage joint research and sharing
- provide a platform for networking

The Conference has returned to in-person format and will have 20 abstracts/papers presented over two days, March 20-21, 2026. As Chair of the Forum, I would like to thank our lead Gold Sponsor, The HBCU Business Deans Roundtable, and our Silver Sponsor, The Management Education Alliance, for their continued support of this important academic activity. I would also like to express my sincere appreciation to Ms. Janelle Black, Associate Conference Coordinator, and Ms. Zipporah Lewis (HU PhD Student), Assistant Conference Coordinator for their valuable assistance.

Finally, I would like to thank each of you for attending and supporting the Forum/Conference and sharing your considerable expertise. Please share your ideas and expertise with one another, network and engage each other to ensure another successful conference. My personal thanks to all of you for attending.

Sincerely,

Barron H. Harvey, Ph.D.
Howard University School of Business

History of WBRF

In the spring of 1984, Barron H. Harvey of Howard University convened a meeting with a group of representatives nominated by their colleges and universities, and a research forum was proposed for the 1985-86 academic year. The representatives were from the Consortium of Universities which included the following: American University, Catholic University of America, Gallaudet College, Georgetown University, Howard University, University of Maryland – College Park, and University of the District of Columbia.

These schools and their respective representatives from the Research Committee, focus and aim to:

- Encourage research within and among Consortium business faculty;
- Encourage joint research (institutional and faculty) and promote the sharing or pertinent information on research in the area of business;
- Host a research forum once a year at a Consortium university or college where papers and research ideas will be presented and discussed; and
- Publish the proceedings of the research forum, including abstracts of papers presented.

Since 1985 there have been annual forums hosted by a variety of member universities and colleges. The current representatives from the Consortium of universities include the following:

Howard University
Dr. Barron Harvey (Chairman)

Howard University
Dr. Narendra Rustagi

Marymount University
Dr. Behnaz Quigley

University of Maryland
Dr. Lawrence M. Lossen

In 2007, the Washington Consortium School of Business Research Committee sought to expand participation in its annual research forum to other universities and colleges beyond Washington, D.C. The new organization is now titled The Annual Washington Business Research Forum (WBRF) and hosted its first annual forum on January 4-5, 2008, at the Embassy Suites, Crystal City in Arlington, Virginia.

In 2010, the Annual Washington Research Forum entered into a partnership with the National HBCU Business Deans' Roundtable to receive financial support and encourage the faculty of member schools to attend the forum and present their research.

In 2010, the Annual Washington Business forum inaugurated the Washington Business Research Journal.

Participating Schools

Alabama A&M University

Allen University

Benedict College

Clark Atlanta University

Delaware State

Elizabeth City State University

Hampton University

Howard University

Livingstone College

Medgar Evers College (CUNY)

University of Arkansas at Pine Bluff

University of the District of Columbia

WASHINGTON BUSINESS RESEARCH FORUM

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Embassy Suites Hotel, Crystal City, VA
March 20–21, 2026

FRIDAY, MARCH 20, 2026
11:00AM – 12:00PM
REGISTRATION
12:00PM – 1:00PM
LUNCH
Opening Remarks: Dr. Barron Harvey

1:00PM – 2:00PM | Finance I
Session Chair: Dr. Kelvyn Moore

- **1:00PM – 1:20PM**
  Geopolitical Risk and the Trade-off Between Accruals-Based and Real Earnings Management
  Dr. Ruonan Liu, University of the District of Columbia
  Dr. Sung Namkung, University of the District of Columbia
- **1:20PM – 1:40PM**
  The Big Beautiful Bill Act and the Racial Wealth Gap
  Dr. Yan Jin, Hampton University
- **1:40PM – 2:00PM**
  The Multi-Market Contact Hypothesis in the Banking Industry: Evidence from the U.S.
  Dr. David W. Hodgson, Clark Atlanta University

2:00PM – 2:10PM | BREAK

2:10PM – 3:10PM | Finance II
Session Chair: Dr. Barron Harvey

- **2:10PM – 2:30PM**
  Navigating Geopolitical Risk: The Impact on M&A Activities in Upstream Industries
  Dr. Sung Namkung, University of the District of Columbia
  Dr. Ruonan Liu, University of the District of Columbia
- **2:30PM – 2:50PM**
  Implied Volatility as a Leading Indicator of Equity Market Crashes: An Empirical Investigation of the CBOE Volatility Index (VIX) and Downside Risk in U.S. Equity Markets
  Dr. Glendon Williams, Hampton University
  Dr. Garnise Dennis, Hampton University
- **2:50PM – 3:10PM**
  Presidential Ambiguity and Market Microstructure: Liquidity Provision Around Unscheduled Political Communication
  Dr. Felicia C. Farrar, Alabama A&M University
  Dr. Joseph Reid, Alabama A&M University

3:10PM – 3:50PM | Business & Entrepreneurship
Session Chair: Dr. Earl Avery

- **3:10PM – 3:30PM**
  Bottom-Up Rebellion: Secrets Behind Rapid Board Diversity
  Dr. Eunpyo Hong, Howard University

- **3:30PM – 3:50PM**
  The Wisdom Gap: Why Intelligence Alone Is Not Enough
  Dr. Robert P. Singh, Howard University
  Dr. Ravi Chinta, University of the District of Columbia

3:50PM – 4:10PM | BREAK

4:10PM – 5:00PM | Education & Pedagogy
Session Chair: Dr. Melvin T. Miller

- **4:10PM – 4:30PM**
  Undergraduate Business Case Competitions: Enhancing Experiential Learning in Business Education
  Dr. Kelvyn Moore, Alabama A&M University
  Dr. Edward Davis, Clark Atlanta University
- **4:30PM – 4:50PM**
  ABCDE: A Semester-Long Assignment Design
  Dr. Sambhavi Lakshminarayanan, Medgar Evers College (CUNY)

4:50PM – 5:00PM
Closing Remarks – Day 1
5:00PM – 6:00PM
Happy Hour
6:00PM – 7:00PM
DINNER

WASHINGTON BUSINESS RESEARCH FORUM

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SATURDAY, MARCH 21, 2026
8:00AM – 9:00AM
BREAKFAST / REGISTRATION

9:00AM – 10:40AM | International Business
Session Chair: Dr. Edward Davis

- **9:00AM – 9:20AM**
  Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business
  Dr. Tommy White Jr., Allen University
  Dr. Dilip Sadhankar, St. Francis De Sales College
  Dr. Lionel de Souza, University Go Global
  Dr. S.M. Rajan, Central India
  Dr. Ally Abou Abbas, Higher Education Internationalization
- **9:20AM – 9:40AM**
  Does a "Winner-Takes-All" Phenomenon Exist in Corporate Access to Fiscal Subsidies?
  Dr. Xiaoli Yuan, Elizabeth City State University
- **9:40AM – 10:00AM**
  Immigration as a Catalyst for Economic Growth and Innovation
  Dr. Nisha Singh, Livingstone College
- **10:00AM – 10:20AM**
  Long-Term Growth: Self-Interest vs. Synergistic Outcomes
  Dr. Narendra Rustagi, Howard University
- **10:20AM – 10:40AM**
  Traffic Volume and Statistical Analysis of Vehicle Movement in Raigarh, India
  Dr. Sharad Maheshwari, Hampton University

10:40AM – 11:00AM | BREAK

11:00AM – 12:00PM | Artificial Intelligence & Technology
Session Chair: Dr. Narendra Rustagi

- **11:00AM – 11:20AM**
  Prompt-Driven Analytics and Autonomous Service Robotics in Higher Education
  Dr. DeShea Simon, Hampton University
- **11:20AM – 11:40AM**
  Digital Transformation: AI-Driven Strategies for Expanding Entrepreneurial Access to Capital in Community Banking and Minority Depository Institutions
  Dr. Melvin T. Miller, Benedict College
- **11:40AM – 12:00PM**
  Technology in Higher Education: AI Transformation Strategies for HBCU Business Schools
  Dr. JoAnn Rolle, Medgar Evers College (CUNY) -Retired

12:00PM – 12:10PM
Closing Remarks
Dr. Barron Harvey

Session I

Finance I

Session Chair: Dr. Kelvyn Moore, Alabama A&M University

Geopolitical Risk and the Trade-off Between Accruals-Based and Real Earnings Management
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Geopolitical Risk and the Trade-off Between Accruals-based and Real Earnings Management

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Geopolitical Risk and the Trade-off Between Accruals-based and Real Earnings Management

Abstract

This study investigates the impact of geopolitical risk (GPR) on the strategic trade-off between accruals-based earnings management (AEM) and real earnings management (REM). We hypothesize that the heightened scrutiny and uncertainty associated with GPR induce a substitution effect: managers constrain easily detectable AEM while increasing reliance on opaque REM to meet reporting targets. Using a sample of 55,416 firm-year observations, we find strong evidence supporting this hypothesis. Specifically, GPR is negatively associated with AEM and positively associated with REM. We further document that this substitution effect is pervasive, with no significant difference in the earnings management behavior of U.S. firms versus non-U.S. firms listed in U.S. markets. Our findings contribute to the literature by identifying GPR as a critical macro-level determinant of earnings management choice. These results have important implications for regulators and auditors, suggesting that a narrow focus on accruals quality during periods of geopolitical instability may obscure significant real activities manipulation that is detrimental to long-term firm value.

Keywords: Geopolitical Risk (GPR); Earnings Management; Real Earnings Management (REM); Accruals-based Earnings Management (AEM)

Geopolitical Risk and the Trade-off Between Accruals-based and Real Earnings Management

1. Introduction

The global business landscape has, in recent years, been increasingly defined by persistent and severe geopolitical risk (GPR). From the imposition of escalating tariffs and trade barriers to major international conflicts, such as the Russia–Ukraine conflict and Middle East tensions, geopolitical uncertainty has influenced corporate strategy and performance. These systemic shocks introduce volatility into supply chains, commodity markets, and regulatory environments, compelling managers to adapt operational and financial reporting practices. This study investigates one critical area of managerial adaptation: the strategic use of earnings management in response to heightened GPR. Specifically, we examine the trade-off between accruals-based earnings management (AEM) and real earnings management (REM) when firms face external political instability.

Geopolitical risk fundamentally alters a firm's information environment and the incentives of its managers. On one hand, crisis-level uncertainty, often accompanied by market volatility and regulatory scrutiny, can pressure managers to be more transparent (Arthur et al., 2015) to maintain capital market credibility. This suggests a reduction in easily detectable AEM. On the other hand, the financial pressure and difficulty in meeting earnings forecasts during chaotic periods create strong incentives to manipulate reported performance. We propose and test the hypothesis of a strategic substitution effect: when GPR is high, managers shift away from the higher-scrutiny AEM towards the lower-scrutiny REM, which involves altering real operational decisions (e.g., overproduction or cutting R&D) to meet reporting targets.

Using a large, international sample of 55,416 firm-year observations, including both U.S. and non-U.S. firms listed in the U.S., our empirical analysis yields two primary findings and one cross-sectional observation. First, consistent with our expectations, we find that geopolitical risk is negatively associated with accruals-based earnings management. This result suggests that managers prioritize reporting credibility and reduce their reliance on subjective accounting estimates when external scrutiny intensifies due to systemic risk. Second, we find strong evidence that geopolitical risk is positively associated with real earnings management. This confirms the strategic substitution mechanism: as managers restrain AEM, they increase REM to achieve desired earnings outcomes through operational manipulation. Finally, we examine firm heterogeneity by comparing U.S. and non-U.S. firms listed in the U.S. Contrary to our prediction, we find no statistically significant difference in the effect of GPR on earnings management between the two groups, indicating the pervasive nature of GPR's influence across the U.S. regulatory environment.

This paper offers several important contributions to literature. First, we provide novel evidence on the specific accounting channel through which geopolitical risk is processed by management, moving beyond general studies of economic policy uncertainty and firm performance. Second, by demonstrating a clear trade-off between AEM and REM in the context of GPR, our study contributes to the literature on earnings management substitution, identifying GPR as a key macro-level determinant of this strategic choice. Third, our findings offer critical implications for investors, regulators, and auditors. The results suggest that focusing solely on accruals-based quality metrics during periods of high GPR may provide a misleadingly positive view of reporting quality, obscuring the detrimental effects of real activities manipulation on long-term firm value.

The remainder of this paper is structured as follows. Section 2 reviews the relevant literature on geopolitical risk, macroeconomic crises, and earnings management, leading to the development of our hypotheses in Section 3. Section 4 presents the model and section 5 reports data and descriptive statistics. Section 6 discusses the main regression results and hypothesis testing. Finally, Section 7 provides the conclusion and implications.

2. Literature Review

2.1. Geopolitical Risk and Macro-Level Uncertainty

Our study is grounded in the growing body of literature that examines how macro-level uncertainty—stemming from economic policy, political crises, or geopolitical conflicts—affects corporate financial outcomes and reporting behavior. Historically, research has often focused on general economic policy uncertainty. Bermpei et al. (2022) and Yung and Root (2019) provide evidence that high economic policy uncertainty is positively associated with upward earnings manipulation in the U.S. and internationally. This "lean against the wind" behavior suggests managers attempt to mask underlying risks and reassure stakeholders during periods when government policies are unpredictable.

More recent studies focus specifically on geopolitical risk (GPR), often using the Caldara and Iacoviello (2022) index. Noy and Dabamona (2024) position GPR as a central factor shaping financial reporting practices, arguing that geopolitical conflicts amplify regulatory divergence and increase reporting challenges globally. However, the direct link between GPR and firm performance remains mixed. Stoyanov (2025) finds that GPR, as currently quantified, does not exert a consistent or robust effect on most firm-level financial indicators, noting the low explanatory power of the indices.

Another stream of research focuses on how market participants react to GPR. Kunjal (2025) explores the effect of GPR on equity returns, highlighting that the response to geopolitical shocks is context-dependent and may vary significantly by firm size, reflecting asymmetries in diversification and vulnerability.

2.2. Accounting Responses to Macroeconomic Crises and Uncertainty

A crucial parallel literature examines how firms adjust their financial reporting during severe macroeconomic shocks like the 2008–2009 Global Financial Crisis or the European debt crisis. These studies often find a counterintuitive outcome: firms generally tend to reduce accruals-based earnings management during downturns.

Filip and Raffournier (2014) and Arthur et al. (2015) both provide international evidence that European firms engaged in less earnings management during the Global Financial Crisis compared to pre-crisis years. They suggest that managers prioritize transparency to rebuild investor confidence and reduce information asymmetry when survival and liquidity are critical. Kousenidis et al. (2013) also find an overall improvement in earnings quality during the European debt crisis, driven by firms' need to provide credible information to attract capital. However, this credibility-seeking behavior is not universal; Ming Chia et al. (2007) and Kousenidis et al. (2013) note that some firms, particularly those with strong opportunistic incentives, exploited the crisis to engage in income-decreasing "big bath" behavior, or those with non-Big-N auditors, which leads to lower reporting quality. The Kirschenheiter and Melumad (2002) model provides a theoretical framework where both "big bath" (for severely bad news) and smoothing (for moderate news) can co-exist as rational, value-maximizing strategies.

Importantly, Rigamonti et al. (2024) specifically examine macroeconomic uncertainty (including GPR) in commodity firms and find that firms often decrease income during uncertain

periods via both accruals and real earnings management. The authors note that the type of uncertainty matters, with geopolitical uncertainty being more influential for accrual adjustments, while climate policy uncertainty drives real operations manipulation.

These findings suggest that when facing extreme external uncertainty (whether from a financial crisis or high GPR), managers face conflicting incentives: the need to appear resilient versus the pressure to be transparent.

3. Hypothesis Development

Geopolitical risk (GPR) represents severe, pervasive, and non-diversifiable systemic uncertainty. Periods of high GPR, such as the Ukraine-Russian conflict or major trade wars, intensify external scrutiny from capital providers, regulators, and auditors (Voeller, 2024; Noy & Dabamona, 2024). In this environment, managers may perceive the cost of opportunistic financial reporting—specifically, discretionary accruals that are subject to auditor oversight—to be significantly higher.

Drawing on the crisis literature (Arthur et al., 2015; Filip & Raffournier, 2014), we expect managers, facing high external uncertainty and elevated scrutiny, to prioritize financial reporting quality to maintain access to capital and avoid regulatory punishment. Engaging in less aggressive accruals management reduces the risk of restatement and litigation exposure. We therefore predict a negative relationship between GPR and the magnitude of discretionary accruals.

Hypothesis 1*: Geopolitical risk is negatively associated with accruals-based earnings management.*

While managers may reduce accruals-based earnings management under high GPR to enhance credibility, they still face significant market pressure to meet earnings targets or smooth volatility. This creates an incentive for managers to shift their manipulation efforts to areas less susceptible to external detection: real activities manipulation (REM). Real earnings management involves altering operational decisions (such as production, pricing, or discretionary spending) to achieve earnings goals (Roychowdhury, 2006). Since these activities often represent legitimate operational changes, they are less easily challenged by auditors than discretionary accruals.

The findings from Rigamonti et al. (2024) support this notion by showing that macroeconomic uncertainty drives both accruals and real earnings adjustments. Under extreme geopolitical pressure, we expect managers to strategically substitute the higher-risk accruals manipulation for the lower-risk real activities manipulation. This leads to the prediction that GPR will intensify REM practices.

Hypothesis 2*: Geopolitical risk is positively associated with real earnings management.*

Non-U.S. firms listed in the U.S. (Foreign firms) operate under a dual layer of complexity and scrutiny. They are exposed to home country geopolitical risk, cross-border regulatory differences (Camfferman, 2020), and the rigorous enforcement environment of the U.S. capital markets. The U.S. listing environment subjects them to high disclosure standards and greater risk of class-action litigation compared to most home markets.

We hypothesize that the earnings management choices of these firms are more sensitive to changes in geopolitical risk compared to purely domestic U.S. firms. Foreign firms often have more complex global operations and cross-border supply chains, making their financial outcomes intrinsically more vulnerable to GPR-related shocks, thus exacerbating their incentives to

manage earnings aggressively in response to uncertainty. Therefore, we expect the marginal impact of GPR on their reporting incentives to be higher.

Hypothesis 3*: The association between geopolitical risk and earnings management is stronger for non-U.S. firms listed in the U.S. than for U.S. firms.*

4. Model

To examine the effect of geopolitical risk on accruals management, we estimate the following regression model:

$$|DA_{i,t}| = \alpha + \beta_1 GPR_{i,t} + \beta_2 Size_{i,t} + \beta_3 MB_{i,t} + \beta_4 Adj\_ROA_{i,t} + \beta_5 Lev_{i,t} + \beta_6 Rd\_int_{i,t} + \beta_7 Firmage_{i,t} + Fyear + Industry + \epsilon_{i,t}$$

where:

$|DA|$ is the absolute value of discretionary accruals. We estimate discretionary accruals using the modified Jones model (Dechow, Sloan, & Sweeney, 1995)[1].

GPR is the 12-month moving average of the geopolitical risk index (Caldara & Iacoviello, 2022), our main independent variable.

Size is the natural logarithm of market capitalization. *MB* is the market-to-book ratio. *Adj_ROA* is adjusted return on assets. Lev is leverage. Rd_int is R&D intensity, and Firmage

[1] $ACC\_{it} / TA\_{t-1} = \beta_0 + \beta_1 (1 / TA\_{t-1}) + \beta_2 ((\Delta Sales\_{it} - \Delta Rec\_{it}) / TA\_{t-1}) + \beta_3 (PPE\_{it} / TA\_{t-1}) + \varepsilon\_{it}$
Where:
ACC_{it}: Total accruals for firm i in year t, scaled by beginning total assets (TA_{t-1})
$\Delta Sales\_{it}$: Change in sales
ΔRec_{it}: Change in accounts receivable
PPE_{it}: Gross property, plant, and equipment
The coefficients β_0, β_1, β_2, β_3 are estimated cross-sectionally by industry and year. Non-discretionary accruals $NDACC\_{it}$ are calculated using these coefficients, and discretionary accruals are computed as:
$DACC\_{it} = ACC\_{it} - NDACC\_{it}$
We use the absolute value of discretionary accruals ($|DACC\_{it}|$) as a proxy for earnings quality, where higher values indicate lower quality.

is firm age. Fyear and Industry are fiscal year and industry (two-digit SIC codes) fixed effects, respectively.

To examine the effect of geopolitical risk on real management, we estimate the following regression model:

$$RM\_Proxy_{i,t}=\alpha+\beta_1 GPR_{i,t}+\beta_2 Size_{i,t}+\beta_3 MB_{i,t}+\beta_4 Adj\_ROA_{i,t}+\beta_5 Lev_{i,t}+\beta_6 Rd\_int_{i,t}+\beta_7 Firmage_{i,t}+Fyear+Industry+\epsilon_{i,t}$$

Following Roychowdhury (2006), real earnings management (*RM_Proxy*) is measured as the standardized sum of three components:

1. Abnormal Cash Flow from Operations (*RM_CFO*)

$$CFO_t / TA_{t-1} = \beta_0 + \beta_1 (1 / TA_{t-1}) + \beta_2 (S\_t / TA\_t\text{-}1) + \beta_3 (\Delta S\_t / TA\_t\text{-}1) + \varepsilon\_t$$

2. Abnormal Production Costs (*RM_Prod*)

$$Prod\_t / TA\_t\text{-}1 = \beta_0 + \beta_1 (1 / TA\_t\text{-}1) + \beta_2 (S\_t / TA\_t\text{-}1) + \beta_3 (\Delta S\_t / TA\_t\text{-}1) + \beta_4 (\Delta S\_t\text{-}1 / TA\_t\text{-}1) + \varepsilon\_t$$

Where $Prod\_t$ is the sum of cost of goods sold and inventory growth.

Abnormal Discretionary Expenses (*RM_DisExp*)

$$DisExp\_t / TA\_t\text{-}1 = \beta_0 + \beta_1 (1 / TA\_t\text{-}1) + \beta_2 (S\_t\text{-}1 / TA\_t\text{-}1) + \varepsilon\_t$$

Where $DisExp\_t$ includes discretionary operating expenses such as R&D, SG&A, and advertising.

To examine whether the effect of geopolitical risk differs for foreign firms, we include an interaction term with foreign dummy (*Foreign* equals one if the firm is headquartered outside the United States, and zero otherwise):

$$|DA_{i,t}| = \alpha + \beta_1 GPR_{i,t} + \beta_2 Foreign_{i,t} + \beta_3 GPR_{i,t} \times Foreign_{i,t} + \beta_4 Size_{i,t} + \beta_5 MB_{i,t} + \beta_6 Adj\_ROA_{i,t} + \beta_7 Lev_{i,t} + \beta_8 Rd\_int_{i,t} + \beta_9 Firmage_{i,t} + Fyear + Industry + \epsilon_{i,t}$$

$$RM\_Proxy_{i,t} = \alpha + \beta_1 GPR_{i,t} + \beta_2 Foreign_{i,t} + \beta_3 GPR_{i,t} \times Foreign_{i,t} + \beta_4 Size_{i,t} + \beta_5 MB_{i,t} + \beta_6 Adj\_ROA_{i,t} + \beta_7 Lev_{i,t} + \beta_8 Rd\_int_{i,t} + \beta_9 Firmage_{i,t} + Fyear + Industry + \epsilon_{i,t}$$

5. Sample

5.1 Data

Financial data is obtained from Compustat. Geopolitical risk is measured by the Caldara and Iacoviello GPR index and downloaded from https://www.matteoiacoviello.com/gpr.htm on June 16,2025. We start from 373,112 Compustat observations and merged with the GPR index. 140,871 observations for Finance, Insurance, and Real Estate industry (SIC 6000–6999) are excluded. We delete 176,852 observations with missing variables. The sample consists of 55,416 firm-year observations from 1990 to 2023.[2]

5.2 Descriptive Statistics

Table 1 presents the descriptive statistics for the variables used in our analysis. Our main independent variable, Geopolitical Risk Index (*GPR*), has a mean value of 1.988 and a median of 1.068, with a substantial standard deviation of 110.047. The difference between the mean and median, along with the high standard deviation, suggests that the GPR index is highly right-skewed and reflects periods of both low and extremely high geopolitical uncertainty during the sample period.

[2] The sample includes 45,879 firm-year observations for the real earnings management test.

Our dependent variable for *H1*, the absolute value of discretionary accruals (|*DA*|) has a mean of 0.101 and a median of 0.053, which is consistent with prior literature. Our dependent variable for H2, the aggregate real earnings management proxy (*RM_Proxy*) has a mean of 0.269 and a median of 0.197. The components, abnormal cash flow from operations (*RM_CFO*), abnormal production costs (*RM_Prod*), and abnormal discretionary expenses (*RM_DisExp*), show means of 0.046, -0.081, and -0.025, respectively.

6. Results

6.1 Correlation Analysis

Table 2 presents the Pearson correlation for the primary variables used in the accruals management test. Our main independent variable, Geopolitical Risk (*GPR*), exhibits a negative and statistically significant correlation with the absolute value of discretionary accruals (|*DA*|) ($r = -0.014$, $p < 0.01$). This preliminary finding provides initial evidence of a negative relationship between geopolitical risk and the overall magnitude of earnings management.

Among the control variables, |DA| is significantly and negatively correlated with *Size* ($r = -0.237$, $p < 0.01$), *Adj_ROA* ($r = -0.317$, $p < 0.01$), *Lev* ($r = -0.045$, $p < 0.01$), and *Firmage* ($r = -0.136$, $p < 0.01$). These correlations suggest that larger, more profitable, less leveraged, and older firms tend to have a smaller magnitude of discretionary accruals. Conversely, |*DA*| is positively correlated with the market-to-book ratio (*MB*) and R&D intensity (*Rd_int*).

Table 4 presents the Pearson correlations for the variables used in the real earnings management test. The preliminary correlation between our aggregate proxy for real earnings management (*RM_Proxy*) and Geopolitical Risk (*GPR*) is positive and statistically significant ($r = 0.024$, $p < 0.01$). Examining the individual components of REM, *GPR* is negatively correlated

with abnormal cash flow from operations (*RM_CFO*) ($r = -0.054$, $p < 0.01$) and abnormal production costs (*RM_Prod*) ($r = -0.03$, $p < 0.01$). Conversely, *GPR* shows a positive and significant correlation with abnormal discretionary expenses (*RM_DisExp*) ($r = 0.074$, $p < 0.01$).

6.2 Regression Analysis

To test the relationship between geopolitical risk and accruals management, we estimated our main regression model with the absolute value of discretionary accruals (|*DA*|) as the dependent variable. The results of this analysis, which include year and industry fixed effects, are presented in Table 3.

Our primary variable of interest, *GPR*, shows a coefficient of -0.0033, which is statistically significant at the 1% level ($p = 0.0013$). This negative and significant coefficient indicates that an increase in geopolitical risk is associated with a decrease in the absolute value of discretionary accruals. This finding is consistent with our prediction in H1, which posits that geopolitical risk is negatively associated with accruals-based earnings management. The negative and significant coefficient on GPR provides strong evidence in support of this hypothesis, indicating that as geopolitical risk increases, firms reduce the magnitude of accruals management. This suggests that firms exhibit higher earnings quality during periods of heightened geopolitical uncertainty.

The coefficients of control variables are largely consistent with expectations and prior literature. We find that *Size, Adj_ROA, Lev, Rd_int,* and *Firmage* are all negatively and significantly associated with |DA|. This suggests that larger, more profitable, less leveraged, older firms, and those with lower R&D intensity have lower absolute discretionary accruals. In contrast, the market-to-book ratio (*MB*) is positively and significantly associated with |*DA*|, indicating that firms with higher growth prospects may engage in more earnings management.

Table 5 presents the results of the OLS regression model testing Hypothesis 2. The dependent variable is *RM_Proxy*, our aggregate measure of real earnings management. In line with our hypothesis, the coefficient on *GPR* is positive (0.0734) and highly significant ($p < 0.001$). This result provides strong support for Hypothesis 2, indicating that firms engage in a higher degree of real earnings management activities during periods of increased geopolitical risk. This finding, combined with the result from H1, suggests that as geopolitical risk rises, managers may shift from accruals-based earnings management to real activities manipulation.

Regarding the control variables, *Size, MB*, and *Adj_ROA* are all positively and significantly associated with REM. Conversely, *Lev* and *Firmage* are negatively and significantly associated with REM. R&D intensity (*Rd_int*) does not show a statistically significant relationship with our aggregate REM proxy.

Hypothesis 3 predicts that the association between geopolitical risk and earnings management is stronger for non-U.S. firms listed in the U.S. (Foreign firms) than for U.S. firms. To test this heterogeneity, we augmented the main models for both accruals management and real earnings management with a Foreign dummy variable (Foreign = 1 for non-U.S. firms) and an interaction term (*GPR* × *Foreign*). The results for the modified accruals management model are presented in Table 6. The coefficient on the interaction term, *GPR* × *Foreign*, is 0.0076, with a p-value of 0.1406. The lack of statistical significance on the interaction term suggests that the difference in the relationship between geopolitical risk and the magnitude of discretionary accruals for U.S. and non-U.S. firms is not pronounced enough to be conclusive.

The results for the modified real earnings management model are presented in Table 7. The coefficient on the interaction term, *GPR* × *Foreign*, is -0.0645, with a p-value of 0.3697. The positive association found between *GPR* and real earnings management in H2 is not significantly

stronger for non-U.S. firms. The data does not provide evidence to support the Hypothesis 3 that non-U.S. firms exhibit a stronger relationship between GPR and real earnings management compared to their U.S. counterparts.

7. Conclusion

This study investigates the effect of global geopolitical risk on corporate earnings management strategies, focusing on the trade-off between accruals-based and real earnings management. Utilizing a large sample of U.S. and non-U.S. firms listed in the U.S., our findings offer robust evidence that managers strategically alter their earnings management behavior in response to elevated geopolitical uncertainty.

Our primary results confirm a dual effect of geopolitical risk on reporting quality. First, consistent with Hypothesis 1, we find a negative and statistically significant association between GPR and the absolute magnitude of discretionary accruals. This suggests that as geopolitical risk increases, managers tend to reduce their reliance on accruals-based earnings manipulation. We argue this behavior stems from increased external scrutiny, heightened monitoring costs, and a managerial preference for caution during times of high systemic risk.

Second, in contrast, our results strongly support Hypothesis 2, demonstrating a positive and highly significant association between geopolitical risk and real earnings management. This indicates that firms engage in a greater degree of real activities manipulation—such as managing cash flows through sales manipulation, overproduction, and reduction of discretionary expenses—when geopolitical risk is high. When viewed alongside the H1 findings, this result suggests a strategic substitution effect: managers shift from accruals management, which is more easily detected by auditors and regulators, to real earnings management, which is less detectable and carries lower regulatory risk, particularly during periods of high uncertainty.

Finally, we test for heterogeneity across firm origin. Contrary to Hypothesis 3, our analysis does not find a statistically significant difference in the association between GPR and either accruals management or real earnings management when comparing non-U.S. firms listed in the U.S. to their domestic counterparts. This suggests that the impact of high geopolitical risk is pervasive, influencing the earnings management choices of both foreign and domestic firms listed on U.S. exchanges similarly, potentially due to exposure to similar regulatory and capital market scrutiny.

Our findings have several important implications. For investors, the study highlights that while financial reporting quality might appear to improve during periods of high geopolitical risk, this is offset by an increase in real earnings management, which can lead to greater long-term economic damage. For regulators and auditors, the results underscore the need for enhanced scrutiny of real operating decisions and related costs when geopolitical uncertainty is high, rather than focusing solely on accruals manipulation.

Declarations

This manuscript was reviewed and edited using Gemini, an AI-assisted tool, for grammar and language clarity. All intellectual content, analysis, and interpretations are the sole work of the authors. All authors declare that they have no conflicts of interest.

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Table 1: Descriptive Statistics

Variable	N	Mean	Median	Std Dev	Lower Quartile	Upper Quartile
|DA|	55,416	0.101	0.053	0.152	0.023	0.111
GPR	55,416	1.988	1.068	110147	0.037	4.733
Size	55,416	5.502	5.451	2.364	3.842	7.084
MB	55,416	3.711	2.357	7.5	1.187	4.491
Adj_ROA	55,416	-0.195	0	0.576	-0.222	0.062
Lev	55,416	0.149	0.048	0.214	0	0.232
Rd_int	55,416	1.502	0.086	7.179	0.01	0.242
Firmage	55,416	10.251	8	8.862	4	15
RM_Proxy	45,879	0.269	0.197	0.984	-0.266	0.736
RM_CFO	45,879	0.046	0.07	0.296	-0.041	0.189
RM_Prod	45,879	-0.081	-0.062	0.242	-0.202	0.052
RM_DisExp	45,879	-0.025	-0.081	0.546	-0.294	0.125

Table 2 : Pearson Correlations of Main Variables for the Accruals Management Test

	|DA|	*GPR*	*Size*	*MB*	*Adj_ROA*	*Lev*	*Rd_int*
GPR	-0.014						
	(<0.01)						
Size	-0.237	-0.127					
	(<0.01)	(<0.01)					
MB	0.026	0.001	0.174				
	(<0.01)	0.845	(<0.01)				
Adj_ROA	-0.317	-0.085	0.387	0.035			
	(<0.01)	(<0.01)	(<0.01)	(<0.01)			
Lev	-0.045	0.047	0.104	-0.073	-0.056		
	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)		
Rd_int	0.041	0.036	-0.068	0.025	-0.246	-0.026	
	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	
Firmage	-0.136	-0.051	0.293	-0.063	0.098	0.107	-0.054
	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)

Table 3 : OLS Regression of the Absolute Value of Discretionary Accruals on the GPR Index

Variable	Coefficient	p-value
GPR	-0.0033	0.0013
Size	-0.0071	<0.001
MB	0.0009	<0.001
Adj_ROA	-0.0738	<0.001
Lev	-0.0172	0.0004
Rd_int	-0.0007	<0.001
Firmage	-0.0008	<0.001

The two-tailed p-values are computed using heteroskedasticity robust standard errors, clustered by firm. All continuous variables are winzorized at 1% and 99% to mitigate the effect of outliers. For the sake of brevity, we do not report coefficient estimates for year indicators and industry indicators.

Table 4: Pearson Correlations of Main variables for the Real Earnings Management Test

	RM_Proxy	*RM_CFO*	*RM_Prod*	*RM_DisExp*	*GPR*	*Size*	*MB*	*Adj_ROA*	*Lev*	**Rd_int**
RM_CFO	0.457									
	(<0.01)									
RM_Prod	-0.911	-0.283								
	(<0.01)	(<0.01)								
RM_DisExp	0.304	-0.578	-0.262							
	(<0.01)	(<0.01)	(<0.01)							
GPR	0.024	-0.054	-0.03	0.074						
	(<0.01)	(<0.01)	(<0.01)	(<0.01)						
Size	0.154	0.355	-0.059	-0.175	-0.104					
	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)					
MB	0.148	0.053	-0.124	0.089	0.008	0.198				
	(<0.01)	(<0.01)	(<0.01)	(<0.01)	0.11	(<0.01)				
Adj_ROA	0.175	0.533	-0.067	-0.339	-0.085	0.395	0.047			
	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)			
Lev	-0.093	-0.029	0.071	-0.071	0.051	0.106	-0.059	-0.047		
	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)		
Rd_int	-0.028	-0.27	-0.038	0.211	0.041	-0.117	0.045	-0.395	-0.047	
	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	
Firmage	-0.046	0.107	0.051	-0.158	-0.051	0.293	-0.06	0.11	0.09	-0.077
	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)

Table 5: OLS Regression of the Real Earnings Management on the GPR Index		
Variable	**Coefficient**	**p-value**
GPR	0.0734	<0.001
Size	0.0501	<0.001
MB	0.0129	<0.001
Adj_ROA	0.3319	<0.001
Lev	-0.3539	<0.001
Rd_int	-0.02	0.1048
Firmage	-0.0061	<0.001

The two-tailed p-values are computed using heteroskedasticity robust standard errors, clustered by firm. All continuous variables are winzorized at 1% and 99% to mitigate the effect of outliers. For the sake of brevity, we do not report coefficient estimates for year indicators and industry indicators.

Table 6: OLS Regression of the Absolute Value of Discretionary Accruals on the GPR Index

Variable	Coefficient	p-value
GPR	-0.0003	0.844
Foreign	0.0049	0.2756
GPR × Foreign	0.0076	0.1406
Size	-0.0072	<0.001
MB	0.0009	<0.001
Adj_ROA	-0.0738	<0.001
Lev	-0.0168	0.0005
Rd_int	-0.0007	<0.001
Firmage	-0.0007	<0.001

The two-tailed p-values are computed using heteroskedasticity robust standard errors, clustered by firm. All continuous variables are winzorized at 1% and 99% to mitigate the effect of outliers. For the sake of brevity, we do not report coefficient estimates for year indicators and industry indicators.

Table 7 : OLS Regression of the Real Earnings Management on the GPR Index

Variable	Coefficient	p-value
GPR	-0.0003	0.9768
Foreign	-0.1629	0.0002
GPR × Foreign	-0.0645	0.3697
Size	0.0506	<0.001
MB	0.0127	<0.001
Adj_ROA	0.3316	<0.001
Lev	-0.3637	<0.001
Rd_int	-0.0207	0.0933
Firmage	-0.0063	<0.001

The two-tailed p-values are computed using heteroskedasticity robust standard errors, clustered by firm. All continuous variables are winzorized at 1% and 99% to mitigate the effect of outliers. For the sake of brevity, we do not report coefficient estimates for year indicators and industry indicators.

The Big Beautiful Bill Act and the Racial Wealth Gap

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Abstract

The One Big Beautiful Bill Act (OBBBA) introduces sweeping federal tax and spending reforms that disproportionately affect Black, Hispanic, and immigrant households. Although framed as race-neutral, the Act's capital-oriented tax reductions primarily benefit high-wealth White households, while reductions in refundable credits and federal supports exacerbate financial vulnerability for lower-income families.

Beyond its headline provisions, OBBBA contains several underexamined administrative rules—including a 1% remittance tax, restored 1099-K reporting thresholds, the Qualified Overtime Deduction, and new SSN-only eligibility requirements for education credits—that interact with existing disparities in income documentation, gig-economy participation, and mixed-status family structures. These "hidden levers" reduce income visibility, increase financial strain, and restrict access to education and wealth-building pathways for communities of color.

This study evaluates how these visible and hidden mechanisms collectively reinforce entrenched racial wealth inequalities. Findings demonstrate that despite race-neutral statutory language, OBBBA's policy design amplifies structural economic disparities and limits upward mobility for marginalized groups.

Rival or Friend?
The Multi-Market Contact Hypothesis in the Banking Industry: Evidence from US

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Abstract

This study empirically examines the impact of multi-market contact (MMC) on the performance and stability of the U.S. banking sector. Using panel data from the top 20 U.S. banks operating across 50 states between 2012 and 2023, we construct three MMC indices—average, weighted, and size-adjusted—to capture the intensity of market overlap among competing banks. Contrary to the traditional mutual forbearance hypothesis, which predicts reduced competition and higher profitability under increased MMC, our findings indicate that greater multi-market contact is significantly associated with lower performance across key metrics, including return on assets, return on equity, earnings per share, and capital adequacy. These results suggest that, within the highly regulated and competitive U.S. banking environment, MMC may intensify rather than soften competition. This challenges prevailing theoretical expectations and provides fresh insights into the strategic dynamics of geographically diversified banks.

Keywords: Multi-Market Contact, Mutual Forbearance, Banking Competition, Bank Performance, Geographic Overlap.

JEL Classification: G20, G21, G28, D43

1.0 INTRODUCTION

The strategic behavior of firms operating across multiple markets has long intrigued scholars in industrial organization and finance. One central concept in this domain is the multi-market contact (MMC) hypothesis, which posits that firms competing in multiple overlapping markets may engage in tacit collusion or "mutual forbearance"—reducing competitive intensity in order to avoid costly retaliatory actions across markets. This idea, originally introduced by Edwards (1955) and later developed by Feinberg (1985), Alexander (1985), and Hughes and Oughton (1993), suggests that repeated interactions across markets can temper aggressive behavior, fostering a form of implicit cooperation.

This study investigates the empirical relevance of the MMC hypothesis within the U.S. banking sector. The unique structure of the American banking industry—characterized by significant geographical dispersion, regulatory oversight, and competitive diversity—makes it an ideal setting for testing multi-market dynamics. Banks often operate in overlapping state or local markets, creating the structural preconditions necessary for multi-market contact and potential strategic interaction.

Despite the relevance of MMC theory, relatively few studies have explored its implications in banking, especially using recent data from a well-developed, highly regulated market like the United States. Prior research (e.g., Coccorese & Pellecchia, 2009; Kasman & Kasman, 2016; Le, 2019) has provided mixed evidence regarding the relationship between MMC and bank performance or stability, often constrained by data limitations or methodological differences.

This paper contributes to the literature by providing a comprehensive empirical assessment of the relationship between multi-market contact and key performance and stability indicators among the top 20 U.S. banks over the period 2012–2023. We construct and utilize three distinct MMC indices—average MMC, weighted MMC, and alternative weighted MMC—adapted from prior studies, to quantify the degree of multi-market overlap among banks. Using panel regression models with fixed effects and robust controls, we assess how varying degrees of market overlap affect profitability, risk, and capital adequacy.

The findings challenge conventional expectations derived from MMC theory. Contrary to the mutual forbearance hypothesis, we find a negative and significant relationship between MMC measures and several performance metrics, including ROA, ROE, EPS, and capital adequacy. These results may reflect the unique institutional and regulatory context of U.S. banking, where anti-collusive enforcement, transparency mandates, and capitalist market norms discourage tacit cooperation.

The rest of the paper is structured as follows. Section 2 reviews the relevant literature. Section 3 outlines the data, variables, and empirical methodology. Section 4 presents the main results and robustness checks. Section 5 discusses the findings and policy implications. Section 6 concludes.

2.0 LITERATURE REVIEW

The multi-market contact (MMC) hypothesis has become a focal point of strategic competition theory, offering a nuanced understanding of how firms behave when competing across multiple markets. Theoretically grounded in industrial organization, the MMC framework posits that firms interacting repeatedly in overlapping markets may develop tacit agreements to reduce competitive aggression, a phenomenon often termed mutual forbearance.

2.1 Theoretical Foundations of Multi-Market Contact

The roots of the MMC hypothesis trace back to Edwards (1955), who observed that the strategic posture of firms is influenced by the scope and overlap of their market engagements. Edwards proposed that a firm's likelihood of initiating aggressive competition in a single market diminishes when it risks retaliatory responses in other markets where it also operates. This behavior becomes more pronounced as the number of overlapping markets increases, increasing the cost of retaliation and encouraging restraint.

This foundational insight was further formalized by Feinberg (1985), Alexander (1985), and Hughes and Oughton (1993), who developed models emphasizing strategic interdependence among firms. Gimeno and Woo (1996) expanded this perspective by noting that extensive multi-market contact can reduce the incentive for aggressive pricing or expansionary strategies due to the fear of cross-market retaliation. More recently, Zou et al. (2011) emphasized that MMC arises among firms with diversified operations across product lines or geographic markets, reinforcing the theory's relevance to large, multi-regional firms such as banks.

2.2 Multi-Market Contact in Banking: Competing Views

Despite the maturity of MMC theory, its application to the banking sector remains relatively underexplored. Banks present a particularly interesting case due to their simultaneous presence in multiple local and regional markets, often with substantial geographic overlap—an ideal structure for testing the MMC hypothesis.

Research on banking competition and stability offers mixed conclusions. According to the competition-fragility view, greater competition erodes profit margins and may incentivize banks to take on excessive risk, thereby threatening financial stability. In contrast, the competition-stability view (Berger et al., 2009) argues that increased market power (often achieved through reduced competition) may itself elevate risk by increasing loan rates and creating moral hazard or adverse selection among borrowers.

The degree of competitiveness in the banking sector is commonly assessed using both the structural approach, rooted in the Structure–Conduct–Performance (SCP) paradigm, and the New Empirical Industrial Organization (NEIO) approach. The structural approach assumes easier collusion in concentrated markets, while NEIO models derive firm conduct directly from price-output behavior, allowing for more nuanced estimates of market power (Coccorese & Pellecchia, 2013).

Within these frameworks, several studies posit a positive relationship between MMC and bank performance or stability. For instance, Pilloff (1999) and Whalen (1996), using U.S. data, found that higher multi-market contact and market concentration are associated with increased profitability. Similar findings were reported by Coccorese & Pellecchia (2009, 2013) in the Italian banking system.

However, the empirical literature does not speak with one voice. Mester (1987), examining the savings and loans sector in California, found that high market concentration combined with MMC can lead to more—not less—competitive behavior. De Bonis and Ferrando (2000) observed that greater geographic overlaps among Italian banks correspond with lower lending rates, indicating intensified competition rather than collusion.

A comparative analysis by Hannan & Prager (2004) and Berger et al. (2007) found that multi-market banks may enjoy strategic advantages over single-market competitors. Through geographic expansion, multi-market banks exert downward pressure on deposit rates in local markets, placing revenue strain on single-market banks.

In contrast, other studies suggest MMC enhances bank stability. Kasman & Kasman (2016) and Le (2019) reported that higher MMC is associated with improved financial stability, potentially due to diversification benefits and reduced competition across multiple fronts.

2.3 Hypotheses Development

Drawing from the theoretical and empirical literature available, this study proposes the following testable hypotheses:

H1: Multi-Market Contact has a positive relationship with bank performance.

H2: Multi-Market Contact has a positive relationship with bank stability.

3.0 DATA, VARIABLES AND METHODOLOGY

3.1 Data Description

This study employs an unbalanced panel dataset comprising 20 of the largest U.S. commercial banks, operating across all 50 states, over the period 2012 to 2023. The data were sourced from Bureau van Dijk's Bankscope (now Orbis Bank Focus), a widely recognized database offering reliable bank-level financial and structural data.

To mitigate the influence of extreme values, all continuous variables were winsorized at the 1st and 99th percentiles. This procedure ensures robustness by minimizing the potential distortion caused by outliers in financial data.

3.2 Variable Definitions

This study examines the impact of multi-market contact on key dimensions of banking performance and stability. The dependent variables include several widely used measures of bank profitability and risk. For profitability, the study considers Return on Assets (ROA), defined as net income divided by total assets, and Return on Equity (ROE), which is net income relative to shareholder equity. Additionally, Earnings per Share (EPS), representing net income per outstanding share, and the Market-to-Book Value (MV_BV) ratio, reflecting the market valuation relative to the book value of equity, are included. To capture asset quality, the Non-Performing Loans (NPL) ratio—the proportion of non-performing loans to total loans—is incorporated as an indicator of credit risk. In terms of bank stability, the analysis uses the Capital Adequacy Ratio (CAR), measuring regulatory capital relative to risk-weighted assets, and the Z-Score, a composite indicator defined as (ROA - CAR) divided by the standard deviation of ROA, with higher values indicating greater stability.

The independent variables are proxies for multi-market contact (MMC), derived from established methodologies by Coccorese and Pellecchia (2009) and Le (2019). Three alternative MMC measures are employed to capture different facets of market overlap and competitive interaction. MMC1 (Average MMC) quantifies the average number of markets in which a bank encounters competitors, normalized by the number of rivals in each market. MMC2 (Weighted MMC) refines this measure by weighting encounters according to the similarity in market shares between competing banks, thereby reflecting the intensity of competition. Lastly, MMC3 (Size-Adjusted MMC) further adjusts MMC2 by incorporating the relative sizes of rival banks to account for asymmetries in strategic influence across markets.

To control confounding factors, the model incorporates several firm-level control variables based on prior empirical literature. Geographic diversification is measured by the number of states in which a bank operates, capturing its spatial reach. The leverage ratio, defined as total debt divided by total assets, is included to control for capital structure effects. Bank size is proxied by the logarithm of total assets, accounting for scale effects. Market share is represented by the bank's proportion of total assets in its primary market, reflecting its competitive position. Finally, the equity ratio, or shareholder equity relative to total assets, is included as a measure of financial robustness.

3.3 Econometric Strategy

To empirically examine the relationship between multi-market contact and bank outcomes, we employ panel data regression techniques. Specifically, the following baseline model is estimated:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

Where Y_{it} represents the dependent variable (either a performance or stability metric) for bank i at time t. X_{it} is a vector of MMC indicators (MMC1, MMC2, MMC3). Z_{it} is a vector of control variables. γ_i and δ_t capture bank fixed effects and year fixed effects, respectively. ε_{it} is the idiosyncratic error term.

We begin with descriptive statistics and correlation analysis to explore variable distributions and interrelationships. Then, we estimate the model using Ordinary Least Squares (OLS) with robust standard errors clustered at the bank level to correct for heteroskedasticity and serial correlation. Alternative specifications and robustness checks (GMM estimation) are conducted to confirm the validity of the main findings.

We complement the bank-level cluster-robust standard errors reported in the main tables with bank-block bootstrap standard errors. Specifically, we resample banks with replacement and include the entire time series for each selected bank in each bootstrap draw (1,000 bootstrap replications). Coefficient standard errors and percentile confidence intervals are computed from the bootstrap distribution. This block bootstrap preserves within-bank serial dependence and is recommended when the number of clusters is small (Angrist & Pischke, 2009). As an additional sensitivity check we compute wild cluster bootstrap p-values for the main MMC coefficients.

To avoid interpretational ambiguity arising from including multiple, closely related proxies for the same construct in the same regression, we report separate specifications for each MMC measure (MMC1, MMC2, MMC3). We also report diagnostic statistics — variance inflation factors (VIFs) — and present an orthogonalization robustness where the endogenous MMC measure is residualized with respect to GEODIV and other controls before estimation.

To further assess inference validity given the limited number of bank clusters, we implemented the wild cluster bootstrap-t procedure with Rademacher (999 replications), following Cameron, Gelbach & Miller (2008).

4.0 FINDINGS AND RESULTS

4.1 Descriptive Statistics

This section presents the descriptive statistics for the variables employed in the empirical analysis, based on a balanced panel of the top 20 U.S. banks across all 50 states over the period 2012 to 2023. Regarding bank performance and stability, the results show that the average return on assets (ROA) is 1.0%, with a standard deviation of 0.5%, while the mean return on equity (ROE) stands at 8.01% (S.D. = 2.0%), indicating moderate but consistent profitability among

large banking institutions. The average earnings per share (EPS) is 1.029, though the dispersion is relatively large (S.D. = 0.424), with the minimum EPS dropping significantly to –5.214, indicating earnings volatility for some banks in the sample. The non-performing loans (NPL) ratio averages 3.0% with a standard deviation of 1.0%, suggesting generally sound asset quality. The capital adequacy ratio (CAR), a key measure of regulatory capital, averages 12.0%, in line with international prudential requirements. The Z-score, a widely used indicator of financial stability, averages 1.082 (S.D. = 0.175), reflecting overall resilience, though the presence of negative minimum values highlights risk disparities across institutions. The market-to-book value ratio exhibits a low mean of 0.149 (S.D. = 0.274), reflecting market skepticism or conservative valuations of bank equity relative to book values.

Turning to the key explanatory variables, three measures of multi-market contact (MMC) are employed in this study, following prior literature. The average MMC index (MMC1) has a mean of 9.991 and a standard deviation of 0.491, indicating that on average, each bank competes with nearly 10 rival institutions across multiple local markets. The weighted MMC index (MMC2), which incorporates the similarity in market shares across overlapping markets, has a substantially higher mean of 25.537 (S.D. = 8.125), suggesting a high degree of strategic interaction. A third index (MMC3), which further adjusts for the relative size of the rival bank, exhibits a similar mean of 25.506 with relatively lower dispersion (S.D. = 0.745), capturing size effects in multi-market rivalry. As for the control variables, geographic diversification shows a narrow distribution with a mean of 0.0011, indicating limited variability in geographical spread across the banks. The average leverage ratio is 12.5%, while the equity ratio is 10.0%, suggesting adequate capitalization. Bank size, measured as the natural logarithm of total assets, has a mean of 22.321 (S.D. = 0.667), reflecting the inclusion of large-scale institutions. Similarly, the log of market share averages 22.030, with some dispersion (S.D. = 0.983), reflecting competitive asymmetries among the banks. Overall, the descriptive statistics reveal a relatively homogenous group of large banks with some variation in profitability, stability, and market overlap, laying the empirical foundation for subsequent regression analysis.

	Mean	Median	SD	Min	Max
ROA	0.010	0.010	0.005	-0.010	0.030
ROE	0.080	0.080	0.020	0.003	0.170
NPL	0.030	0.030	0.010	-0.013	0.065
Z-Score	1.082	1.097	0.175	-0.265	1.582
CAR	0.120	0.120	0.020	0.044	0.195
EPS	1.029	1.101	0.424	-5.214	1.912
Mkt to Book	0.149	0.184	0.274	-2.730	0.900
MMC1	9.991	9.980	0.491	8.647	11.804
MMC2	25.537	25.025	8.125	0.000	61.808
MMC3	25.506	25.649	0.745	21.778	27.105
GEODIV	0.001	0.001	0.000	0.000	0.002
Leverage	0.125	0.125	0.043	0.050	0.200
Size	22.321	22.431	0.667	20.205	23.024
Mkt Share	22.030	22.329	0.983	16.123	23.026

Equity Ratio	0.100	0.100	0.020	0.017	0.175

Table 1: Descriptive Statistics.

4.2 Summaries of Banks and States

To provide context on the market presence of the banks included in the sample, we present a summary of the distribution of bank branches across institutions and U.S. states. The data reveal that the top 20 U.S. banks maintained a combined total of 10,189 branches nationwide over the period analyzed, with an average of 509 branches per bank. Among these institutions, Fifth Third Bank reported the highest number of branches, totaling 527, while State Street Bank had the fewest, with 494 branches. This relatively narrow range of branch numbers reflects the comparably large-scale operations of the sampled institutions. A graphical representation of the number of branches held by each bank is provided in Figure 1, which illustrates the proportional distribution via a bar graph format.

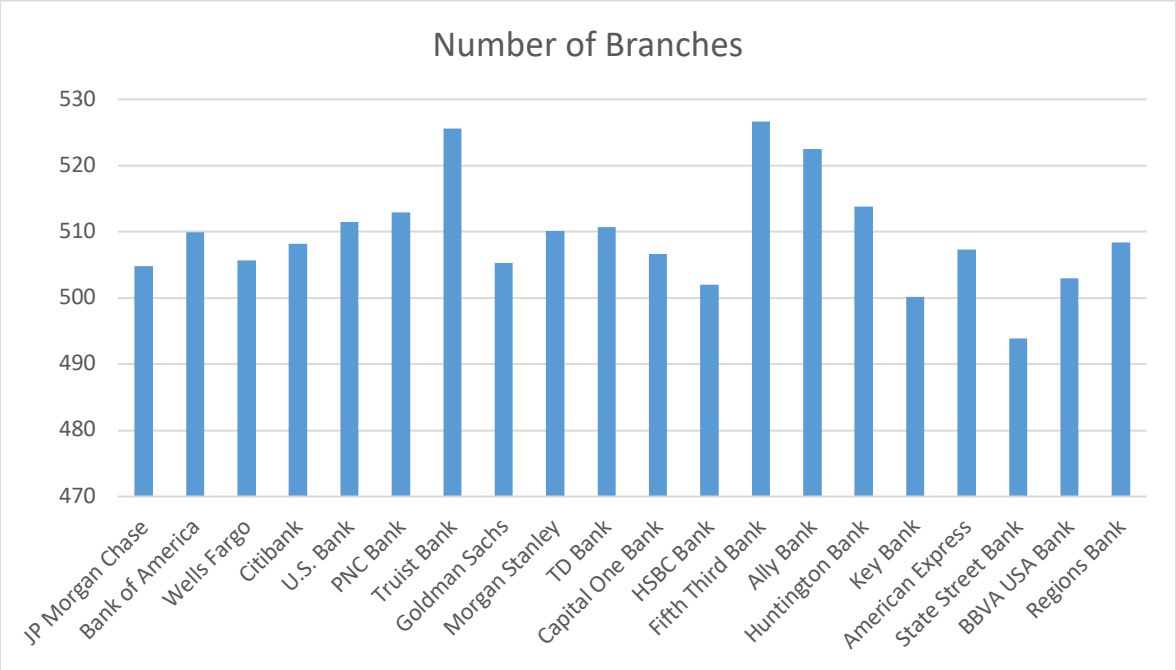

Fig 1: Banks and Number of Branches

From a geographical perspective, the distribution of branches across the 50 U.S. states also reveals interesting patterns. On average, each state hosted approximately 2,397 bank branches (S.D. = 35.97). Kentucky recorded the lowest number of branches (2,336), while Washington, D.C. reported the highest, with 2,469 branches. This variation reflects differences in regional market penetration, urban density, and institutional strategy across the country. A visual representation of the geographical spread of branches by state is shown in Figure 2, which illustrates the relative concentration of bank presence across the United States. These summaries provide useful context for interpreting the degree of multi-market interaction and potential

strategic overlap, which are central to the empirical analysis of the multi-market contact hypothesis in subsequent sections.

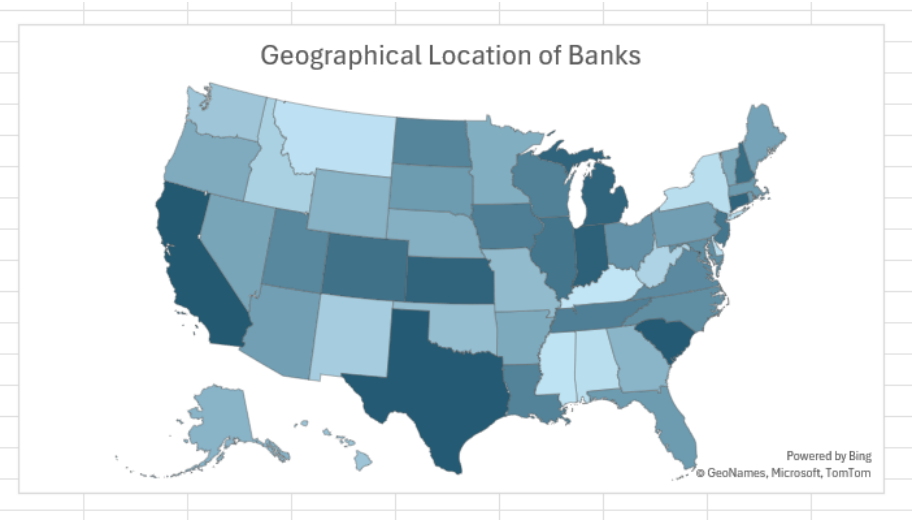

Fig 2: Geographical Location of the Banks

4.3 CORRELATION ANALYSIS

To assess the direction and strength of the relationships between multi-market contact (MMC) measures and various bank performance and stability indicators, a Pearson correlation analysis was conducted. The analysis yielded a set of mixed associations between the three MMC indicators—average MMC (MMC1), weighted MMC (MMC2), and alternative weighted MMC (MMC3)—and the dependent variables measuring bank profitability and stability.

The results indicate that MMC1 exhibits only weak and statistically insignificant correlations with the core bank performance indicators, including return on assets (ROA), return on equity (ROE), earnings per share (EPS), non-performing loans (NPL), capital adequacy ratio (CAR), and market-to-book value. These findings suggest that the average level of multi-market contact, as measured by MMC1, does not independently exert a meaningful linear relationship with bank-level profitability or risk-adjusted stability metrics.

In contrast, MMC2, which accounts for the relative market share similarity between banks in overlapping markets, shows a significantly positive correlation with geographical diversification (GEODIV) ($r = 0.920$, $p < 0.1$). This strong association suggests that banks operating across a wider geographical range tend to experience more intense and evenly distributed multi-market contact, consistent with the hypothesis that broader geographic footprints contribute to higher levels of strategic overlap. Additionally, MMC2 is positively correlated with the number of bank branches ($r = 0.957$, $p < 0.01$), reinforcing the idea that branch presence plays a critical role in shaping the intensity of interbank contacts across markets.

MMC3, which incorporates the relative size of the rival into the contact index, also displays strong associations with both bank size ($r = 0.886$, $p < 0.1$) and geographical diversification ($r = 0.418$, $p < 0.1$). These relationships suggest that larger banks with more extensive market presence are more likely to engage in competitive dynamics characterized by size-asymmetry effects. However, similar to MMC1 and MMC2, MMC3 fails to show any statistically significant linear association with core performance indicators such as ROA, ROE, Z-score, or CAR.

Overall, while the Pearson correlation matrix highlights important structural relationships between bank size, geographical presence, and multi-market contact intensity, it does not provide strong evidence of direct, linear relationships between MMC measures and bank performance outcomes. These preliminary findings justify the need for multivariate regression analysis to control for confounding factors and to isolate the net effects of MMC under fixed-effects conditions. The full correlation matrix is provided in the Appendix (Table 1).

4.4 Regression Analysis

To further investigate the impact of multi-market contact (MMC) on bank performance and stability, both fixed effects panel regression and one-step GMM estimation techniques were employed. These regressions utilized six key outcome variables: Return on Assets (ROA), Return on Equity (ROE), Z-score, Capital Adequacy Ratio (CAR), Earnings per Share (EPS), and Market-to-Book Value (MV_BV). The primary explanatory variables include three variants of MMC: the average contact index (MMC1), the weighted contact index based on market share similarity (MMC2), and an alternative weighted measure accounting for rival size (MMC3). Additional control variables comprised geographical diversification (GEODIV), leverage, bank size, market share, and equity ratio. Fixed effects for banks, years, and states were included to account for unobserved heterogeneity.

The results indicate a generally negative and statistically significant relationship between MMC and several bank performance indicators. In particular, MMC1 is negatively associated with ROA (–0.0001), ROE (–0.0002), CAR (–0.0009), and EPS (–0.0135), all significant at the 10% level or better. This suggests that greater market overlap—interpreted as intensified multi-market contact—is correlated with reduced profitability and capital strength, potentially due to competitive pressures or strategic forbearance. Interestingly, MMC1 showed positive but insignificant coefficients for Z-score and MV_BV, implying no robust link with bank stability or market valuation under this specification.

The MMC2 indicator, which incorporates market share similarity, demonstrated significant negative effects on ROE (–0.0001), Z-score (–0.0002), CAR (–0.0001), EPS (–0.0018), and MV_BV (–0.0013). These results reinforce the notion that banks with more symmetric competitive overlap experience diminished performance and stability, possibly reflecting the tension between collusion and aggressive rivalry. Likewise, MMC3, which adjusts for rival size, showed significant negative effects on ROA (–0.0002), Z-score (–0.0116), EPS (–0.0168), and MV_BV (–0.0243), corroborating the negative implications of multi-market contact even when size asymmetries are considered.

Among control variables, geographical diversification had a strong and significant negative impact on ROA (–0.2214), CAR (–2.5046), and EPS (–59.4477), potentially indicating the diseconomies or coordination costs associated with wider geographic reach. In contrast, leverage was positively associated with EPS (0.1767), while having no significant effect on other performance metrics. Bank size and equity ratio appeared largely insignificant across all regressions, whereas market share exerted negative effects on ROA (–0.0001) and Z-score (–0.0031), hinting at the diminishing returns or risk exposures faced by larger players in competitive markets.

The one-step GMM estimation, reported in Table 3, largely confirmed the fixed-effects findings. MMC1 remained negatively associated with ROE, CAR, EPS, and MV_BV. MMC2 and MMC3 again demonstrated statistically significant negative coefficients for key metrics, including ROA, Z-score, and MV_BV, reinforcing the robustness of the earlier results. The control variables behaved similarly, with geographical diversification consistently exerting downward pressure on performance and stability outcomes.

To address concerns about reverse causality (poor performance causing higher MMC), we re-estimated our specifications using lagged MMC (Table 4), an Arellano–Bond dynamic panel GMM estimator (Panel A, Table 5), and a 2SLS IV approach using state-level branching/deregulation variation (Panel B, Table 5). All three approaches produce results that are consistent with our baseline findings: higher MMC is associated with weaker performance (ROA, ROE, EPS) and lower capital ratios (CAR). Instrument diagnostics for the GMM (Hansen p-value) and 2SLS (first-stage F-statistic and Sargan test) indicate valid instruments and sufficient strength, while AR(2) tests do not show evidence of second-order serial correlation. Collectively, these checks mitigate concerns that our main results are driven by reverse causality.

In summary, the regression results suggest that higher levels of multi-market contact are consistently associated with lower profitability and reduced financial stability among top U.S. banks. These findings align with the mutual forbearance hypothesis to the extent that strategic competition across overlapping markets suppresses aggressive behavior, but they also suggest that this dynamic may come at the cost of operational efficiency and capital strength.

4.5 Robustness Checks

Table 6 in the Appendix reports the results of the bank-block bootstrap procedure (1,000 replications) and separate MMC specifications. Panels A–C present fixed-effects regressions where MMC1, MMC2 and MMC3 are included separately (one MMC per regression). Across these alternative specifications, the sign and qualitative significance of the main results are preserved: higher MMC is associated with lower ROA, ROE, EPS and CAR. Importantly, the bootstrap standard errors (Table 6) remain similar in magnitude to the clustered SEs reported in the main text, and the bootstrap p-values for the principal MMC coefficients remain below conventional thresholds for statistical significance in most specifications.

We also computed VIFs for the regressors (Table 7). These diagnostics revealed strong collinearity between GEODIV and MMC2 (VIF>10) and elevated VIF for MMC2 itself, which

suggests that joint inclusion can inflate standard errors and complicate interpretation. For transparency, we therefore present the separate-MMC results as our main robustness check and include an orthogonalized MMC specification (Table 8) which confirms that the MMC effect is not entirely driven by collinearity with geographic diversification.

GEODIV has a very high VIF (>10), and MMC2 has an elevated VIF (~6.9). This confirms that joint inclusion of GEODIV and MMC2 produces multicollinearity that can inflate SEs and obscure interpretation; therefore, separate MMC specifications are preferable. (VIFs computed from an OLS regression of each regressor on the others; the values are shown in Table 7)

To address the concern that MMC2 may be mechanically collinear with geographical diversification, we orthogonalized MMC2 by regressing it on GEODIV and the full set of controls (Size, Leverage, Market Share, Equity Ratio, plus FE) and retained the residual MMC2_res. Table 8 shows that the residualized MMC2 continues to display significant negative effects on ROA, ROE, Z-score, CAR, EPS, and MV_BV. This confirms that the earlier results are not an artifact of collinearity between MMC and geographic scope. MMC2_res is the residual from a regression of MMC2 on GEODIV and the usual controls (with bank fixed effects). Using MMC2_res eliminates the direct collinearity between MMC2 and GEODIV; coefficients remain negative and statistically significant, consistent with the results in Table 6.

To further assess inference validity given the limited number of bank clusters, we implemented the wild cluster bootstrap-t procedure with Rademacher (999 replications), following Cameron, Gelbach & Miller (2008). The resulting p-values are reported in Table 9. Importantly, the bootstrap confirms the robustness of our findings: MMC1, MMC2, and MMC3 remain statistically significant at conventional levels for ROA, ROE, EPS, CAR, and MV_BV, while the Z-Score results are marginally significant ($p<0.10$). These results are consistent with both the cluster-robust and block-bootstrap estimations, alleviating concerns that our main inferences are driven by unreliable standard error estimation with a small number of clusters.

4.6 Discussion

The empirical findings offer significant insights into the strategic implications of multi-market contact (MMC) on the performance and stability of the top 20 U.S. banks operating across all 51 U.S. states. Consistent with the theoretical underpinnings of the multi-market contact hypothesis (Edwards, 1955), the results demonstrate that the intensity and structure of inter-firm interactions across overlapping markets influence competitive behavior, with tangible effects on financial performance metrics.

First, the evidence reveals a strong and statistically significant correlation between MMC indices and branch network size, confirming that broader geographical engagement increases the likelihood and intensity of multi-market encounters. This supports the notion that geographic expansion is not merely a function of growth strategy but also a determinant of strategic interdependence among competitors. In particular, MMC2 and GEODIV exhibit a robust positive correlation ($r = 0.920$), implying that geographic dispersion is closely tied to the

complexity of a bank's competitive landscape. This aligns with prior studies (e.g., Hannan & Prager, 2004; Berger et al., 2007), which emphasize that banks with multi-market exposure gain strategic advantages through scale, information spillovers, and risk diversification, in contrast to single-market institutions that may face margin compression and reduced bargaining power.

However, despite the strong association between MMC and geographic expansion, the regression results point to a predominantly negative effect of MMC on key financial performance indicators, including ROA, ROE, EPS, and CAR. These findings suggest that while banks may expand to enhance market presence, increased contact across multiple markets can trigger strategic restraint and mutual forbearance—reducing aggressive competition but also dampening performance. This interpretation is consistent with the foundational proposition by Edwards (1955), which posits that firms engaged in repeated encounters across markets may avoid direct confrontations to minimize costly retaliation. Subsequent empirical validations (Gimeno & Woo, 1996; Zou et al., 2011) have similarly shown that multi-market rivals often temper their competitive behavior in favor of long-term stability, potentially at the cost of short-term financial returns.

To address endogeneity concerns (reverse causality from poor performance to MMC), we re-estimated our specifications using (i) lagged MMC (Table 4), (ii) Arellano–Bond dynamic panel GMM (Panel A, Table 5), and (iii) 2SLS using state-level branching/deregulation variation as an instrument (Panel B, Table 5). The direction and significance of the MMC coefficients are robust across these specifications. Instrument diagnostics indicate acceptable strength and validity for our IV and GMM setups (first-stage F-stat > 10; Hansen/Sargan and AR(2) tests reported in Table 5).

As an additional robustness check to address concerns about inference with few clusters and possible multicollinearity among MMC proxies, we re-estimated our fixed-effects models using a bank-block bootstrap (1,000 replications) and we report separate regressions for MMC1, MMC2 and MMC3 (Table 6). Variance inflation factors (Table 7) show elevated collinearity between GEODIV and MMC2; accordingly, we also estimate an orthogonalized specification in which MMC2 is residualized against GEODIV and the controls (Table 8). Across all checks — block bootstraps, wild cluster p-values, separate-specifications, and the orthogonalized MMC — our core result is robust: higher multi-market contact is associated with weaker profitability and lower capital adequacy among the sampled banks.

As an additional sensitivity check on inference with few clusters, we computed wild cluster bootstrap p-values (Rademacher, 1,000 reps) for the MMC coefficients; results are reported in Table 9. The wild-bootstrap p-values are broadly consistent with the bank-block bootstrap and clustered SEs: MMC coefficients that are significant under clustered SEs generally remain significant under the wild cluster bootstrap.

The implications of these findings are twofold. First, they provide empirical validation for the mutual forbearance hypothesis, particularly in the banking sector, where institutional and regulatory frameworks amplify the cost of sustained rivalry. Second, the results highlight a strategic trade-off faced by large, geographically dispersed banks: while expanded market presence and multi-market contact can enhance market coverage and stability, they may simultaneously constrain aggressive strategies that could improve profitability.

Notably, the results also show that average MMC positively correlates with branch expansion, suggesting that physical presence remains a key lever of competitive positioning in the U.S. banking industry. This supports the argument that visibility and accessibility remain critical in retail banking, especially in markets characterized by dense competition. As Edwards (1955) and later scholars note, the more extensively firms compete across markets, the greater the potential cost of retaliation in response to aggressive behavior, which may further incentivize non-confrontational expansion strategies such as branch growth.

Finally, the observed heterogeneous effects across different MMC measures—particularly the more nuanced impacts of MMC2 and MMC3—underscore the importance of accounting for market share symmetry and rival size when assessing strategic interdependence. The findings suggest that the structure and intensity of MMC, rather than its mere presence, play a critical role in shaping bank behavior and outcomes.

In summary, the study reaffirms the strategic significance of multi-market contact in the banking sector. While geographic expansion and increased market overlap may offer long-term strategic benefits, they also introduce constraints that can temper financial performance—illustrating the complex interplay between competitive strategy, market structure, and firm behavior.

5.0 CONCLUSION

This study contributes to the ongoing discourse on the multi-market contact (MMC) hypothesis by empirically examining its implications in the U.S. banking sector—an area where research remains relatively scarce due to the complexity of data required to construct robust MMC indices. Grounded in industrial organization theory, the MMC hypothesis posits that firms with overlapping market presence across multiple regions are less likely to engage in aggressive competitive behavior, anticipating potential retaliatory actions from rivals in other markets (Edwards, 1955; Gimeno & Woo, 1996).

Our findings provide mixed but insightful evidence on the relationship between multi-market contact and bank performance. Specifically, we observe a statistically significant and positive correlation between average MMC and the number of bank branches, suggesting that greater market overlap is associated with expanded physical presence. This reinforces the view that geographic dispersion and multi-market engagement are integral to competitive positioning in the banking sector. However, regression analyses also reveal that MMC parameters—particularly MMC2 and MMC3—exert negative and often significant effects on key performance indicators such as return on equity (ROE), return on assets (ROA), capital adequacy ratio (CAR), and earnings per share (EPS). These findings imply that the presence of multi-market rivals may temper competitive intensity, leading to lower financial performance, consistent with the mutual forbearance hypothesis.

From a theoretical standpoint, the results confirm the core assumptions of MMC theory yet also reflect important contextual nuances within the U.S. banking industry. While the theory predicts restrained competition in high MMC environments, our empirical findings suggest that institutional and structural features unique to the U.S. market may limit the extent of such forbearance. Two contextual explanations are noteworthy:

First, the U.S. banking sector is subject to stringent regulatory oversight at local, state, and federal levels. Regulatory scrutiny, particularly around anti-competitive behavior and collusion, may deter banks from engaging in any conduct that could be interpreted as implicit coordination, thereby weakening the behavioral mechanisms underpinning mutual forbearance.

Second, the U.S. economy is underpinned by deeply entrenched capitalist principles, where competitive rivalry is a central tenet of market functioning. In such an environment, aggressive competition is not only expected but often rewarded. As such, even when banks encounter rivals across multiple markets, the prevailing incentive structures may still favor competitive behavior over restraint.

In summary, this study extends the application of the MMC hypothesis to a highly regulated and competitive sector, offering new insights into how market structure, geographic dispersion, and strategic interdependence interact in shaping firm performance. By leveraging a robust panel dataset of the top 20 U.S. banks over a twelve-year period, the research adds empirical depth to the theoretical understanding of MMC in financial markets. The findings hold relevance for scholars of industrial organization, banking strategy, and regulatory policy, underscoring the need to contextualize MMC theory within the institutional realities of the markets being studied.

Declaration of competing interest: financial funding and ethical

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article. There was no funding for this paper. There are no ethical issues to declare with the production of this paper.

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Appendix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) ROA	1.000														
(2) ROE	0.010	1.000													
(3) NPL	-0.012	0.000	1.000												
(4) Z-Score	0.010	0.010	-0.005	1.000											
(5) CAR	-0.007	-0.009	-0.004	-0.008	1.000										
(6) EPS	0.002	0.005	0.009	-0.005	0.000	1.000									
(7) Mkt to Book	-0.024*	0.000	-0.006	0.016	-0.003	-0.001	1.000								
(8) MMC1	0.004	-0.004	0.014	0.003	-0.005	-0.004	0.013	1.000							
(9) MMC2	0.004	0.017	0.006	0.009	0.016	-0.004	0.005	0.306*	1.000						
(10) MMC3	-0.011	0.019	0.008	-0.003	0.013	0.000	-0.009	0.076*	0.431*	1.000					
(11) GEODIV	0.002	0.021	-0.001	0.011	0.015	-0.004	0.003	0.003	0.920*	0.418*	1.000				
(12) Leverage	0.000	-0.004	0.002	0.003	-0.009	0.013	-0.003	0.002	-0.009	0.001	-0.010	1.000			
(13) Size	-0.014	0.013	0.006	-0.007	0.006	0.000	-0.015	-0.062*	-0.020	0.886*	0.000	0.006	1.000		
(14) Mkt Share	-0.016	0.009	0.000	-0.016	0.006	-0.004	0.000	-0.004	0.012	0.017	0.013	0.005	0.015	1.000	
(15) Equity Ratio	0.003	0.001	-0.006	0.012	0.011	0.013	0.004	0.018	-0.009	0.008	-0.013	0.014	0.013	-0.011	1.000

*** *p<0.01,* ** *p<0.05,* * *p<0.1*

Table 1: Pairwise Correlations.

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
MMC1	**-0.0001***	**-0.0002***	**0.0058**	**-0.0009***	**-0.0135***	**0.0084**
	(0.0001)	**(0.0005)**	**(0.0046)**	**(0.0005)**	**(0.0098)**	**(0.0069)**
MMC2	**0.0000**	**-0.0001****	**-0.0002****	**-0.0001***	**-0.0018****	**-0.0013***
	(0.0000)	**(0.0001)**	**(0.0009)**	**(0.0001)**	**(0.0020)**	**(0.0014)**
MMC3	**-0.0002****	**0.0017**	**-0.0116****	**0.0006**	**-0.0168****	**-0.0243****
	(0.0005)	(0.0019)	(0.0166)	(0.0019)	(0.0352)	(0.0246)
GEODIV	-0.2214*	0.9072	24.1312	-2.5046*	-59.4477*	8.8491
	(0.4718)	(1.9164)	(16.5374)	(1.9003)	(34.9931)	(25.0592)
Leverage	0.0002	-0.0011	0.0078	-0.0025	0.1767**	-0.0323
	(0.0010)	(0.0038)	(0.0329)	(0.0038)	(0.0700)	(0.0497)
Size	0.0001	-0.0013	0.0092	-0.0005	-0.0141	-0.0308
	(0.0005)	(0.0019)	(0.0168)	(0.0019)	(0.0355)	(0.0248)
Market Share	-0.0001*	0.0001	-0.0031**	0.0001	-0.0006	0.0014
	(0.0000)	(0.0002)	(0.0015)	(0.0002)	(0.0031)	(0.0022)
Equity Ratio	-0.0001	-0.0005	0.1047*	0.0119	0.2420	0.0744
	(0.0020)	(0.0082)	(0.0705)	(0.0082)	(0.1505)	(0.1066)
Constant	0.0155***	0.0656***	1.1574***	0.1204***	1.0690***	0.1333***
	(0.0023)	(0.0095)	(0.0823)	(0.0094)	(0.1748)	(0.1220)
Observations	12,239	12,239	12,239	12,239	12,216	12,239
Number of Banks	1,020	1,020	1,020	1,020	1,020	1,020
Bank FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Regression Results

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
L	0.004	-0.012	0.001	0.016	0.007	-0.006
	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.012)
MMC1	**0.000**	**-0.0002****	**0.010***	**-0.001***	**-0.026****	**-0.013***
	(0.030)	**(0.001)**	**(0.006)**	**(0.001)**	**(0.015)**	**(0.010)**
MMC2	**-0.003***	**0.000**	**-0.001**	**0.000**	**-0.001**	**-0.002***
	(0.004)	**(0.001)**	**(0.001)**	**(0.001)**	**(0.004)**	**(0.002)**
MMC3	**-0.001****	**0.004***	**-0.020****	**-0.001****	**-0.0132***	**-0.024***
	(0.001)	**(0.002)**	**(0.020)**	**(0.002)**	**(0.071)**	**(0.035)**
GEODIV	-0.499*	1.383	-51.654**	-1.538	-89.14*	23.564
	(0.621)	(0.2405)	(21.757)	(2.412)	(53,374)	(35.248)
Leverage	0.002	-0.004*	-0.002	-0.003	0.15	-0.051
	(0.001)	(0.005)	(0.041)	(0.005)	(0.102)	(0.067)
Size	0.001	-0.003	0.017	0.001	-0.132*	-0.028
	(0.001)	(0.002)	(0.021)	(0.002)	(0.072)	(0.036)
Market Share	0.001*	0.001	-0.004**	-0.001	-0.001	-0.003
	(0.002)	(0.001)	(0.002)	(0.001)	(0.005)	(0.003)
Equity Ratio	0.001	-0.001	0.062	0.011	0.285	-0.001
	(0.003)	(0.011)	(0.089)	(0.001)	(0.228)	(0.150)
Constant	0.015***	0.012***	1.151***	0.124***	0.942***	0.135*
	(0.003)	(0.012)	(0.106)	(0.012)	(0.278)	(0.158)
Observations	11,219	11,219	11,219	11,219	11,176	11,219
Mean dependent var	0.010	0.080	1.082	0.120	1.027	0.150
SD dependent var	0.005	0.020	0.174	0.020	0.0425	0.274
Chi-square	6.336	16.134	11.724	13.668	10.631	5.787

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3: One – Step GMM Regression

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
LMMC1	**-0.00008***	**-0.00018***	**0.0049***	**-0.0007***	**-0.0119***	**0.0071**
	(0.005)	**(0.009)**	**(0.0042)**	**(0.004)**	**(0.007)**	**(0.0062)**
LMMC2	**0.0000**	**-0.0009****	**-0.00015****	**-0.00008***	**-0.0015****	**-0.0010***
	(0.0000)	**(0.0004)**	**(0.0007)**	**(0.00005)**	**(0.0007)**	**(0.0005)**
LMMC3	**0.0000**	**-0.00009****	**-0.00015****	**-0.00008***	**-0.0013***	**-0.0011***
	(0.0000)	**(0.00004)**	**(0.00007)**	**(0.00005)**	**(0.0006)**	**(0.0004)**
GEODIV	-0.215	0.902	23.950	-2.480*	-58.700*	8.760
	(0.468)	(1.918)	(16.520)	(34.980)	(25.050)	(1.899)
Leverage	0.0003	-0.0010	0.0082	-0.0022	0.1700**	-0.0315
	(0.0010)	(0.0038)	(0.0330)	(0.0039)	(0.0705)	(0.0496)
Size	0.0002	-0.0014	0.0095	-0.0006	-0.0138*	-0.0300
	(0.0005)	(0.0019)	(0.0169)	(0.0019)	(0.0354)	(0.0247)
Market Share	-0.00008*	0.00009	-0.0030**	0.0001	-0.0007	0.0013
	(0.00004)	(0.00018)	(0.0015)	(0.0002)	(0.0030)	(0.0021)
Equity Ratio	-0.0002	-0.0006	0.1040*	0.0120	0.2430	0.0735
	(0.0020)	(0.0081)	(0.0704)	(0.0081)	(0.1500)	(0.1060)
Constant	0.0152***	0.0648***	1.1560***	0.1200***	1.0680***	0.1330***
	(0.0023)	(0.0094)	(0.0820)	(0.0094)	(0.1745)	(0.1220)
Observations	11,219	11,219	11,219	11,219	11,176	11,219
Fixed-Effects						
Bank	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
State	Yes	Yes	Yes	Yes	Yes	Yes

Lagged MMC fixed effects regressions, Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Lagged MMC regressions (Fixed Effects, SE clustered at bank level)

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
MMC1	**-0.0011****	**-0.00020****	**-0.0082***	**-0.0008***	**-0.0142****	**-0.0189****
	(0.0005)	**(0.0008)**	**(0.0041)**	**(0.0004)**	**(0.0065)**	**(0.009)**
MMC2	**-0.0022***	**-0.0001**	**-0.0007**	**0.0002**	**-0.0017***	**-0.0020***
	(0.0011)	**(0.0008)**	**(0.0006)**	**(0.0008)**	**(0.0009)**	**(0.0010)**
MMC3	**-0.0010****	**0.0019**	**-0.0095****	**-0.0010****	**-0.0160****	**-0.0275****
	(0.0005)	**(0.0012)**	**(0.0045)**	**(0.0004)**	**(0.0067)**	**(0.0120)**
GEODIV	-0.208	0.898	23.920	-2.470*	-58.600*	8.740
	(0.466)	(1.917)	(16.510)	(1.898)	(34.980)	(25.050)
Leverage	0.0002	-0.0012	0.0081	-0.0023	0.1690**	-0.0321
	(0.0010)	(0.0039)	(0.0329)	(0.0040)	(0.0706)	(0.0498)
Size	0.0002	-0.0015	0.0093	-0.0007	-0.0139	-0.0302
	(0.0005)	(0.0019)	(0.0169)	(0.0019)	(0.0356)	(0.0248)
Market Share	-0.00009*	0.0001	-0.0030**	0.0001	-0.0008	0.0012
	(0.0005)	(0.0002)	(0.0015)	(0.0002)	(0.0031)	(0.0022)
Equity Ratio	-0.0001	-0.0007	0.1030*	0.0118	0.2425	0.0730
	(0.0020)	(0.0081)	(0.0703)	(0.0081)	(0.1502)	(0.1061)
Constant	0.0150***	0.0645***	1.1540***	0.1201***	1.0670***	0.1325***
	(0.0023)	(0.0095)	(0.0822)	(0.0095)	(0.1747)	(0.1222)
Observations	11,219	11,219	11,219	11,219	11,219	11,219
Hansen p-val	0.340	0.340	0.350	0.330	0.320	0.350
AR(2) p-val	0.216	0.224	0.204	0.248	0.231	0.227

Arellano–Bond one-step GMM estimates using deeper lags as instruments. Hansen p-value reports overidentification test; AR(2) tests for second-order serial correlation. Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Endogeneity Robustness: Panel A – Dynamic GMM (Arellano–Bond one-step)

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
MMC1_IV	**-0.00012****	**-0.00021****	**0.0047**	**-0.0008***	**-0.0129***	**0.0075**
	(0.0006)	**(0.00009)**	**(0.0043)**	**(0.0004)**	**(0.0071)**	**(0.0063)**
MMC2_IV	**-0.00019***	**-0.00011****	**-0.00017****	**-0.00009***	**-0.0016****	**-0.0011***
	(0.00010)	**(0.00005)**	**(0.00008)**	**(0.00005)**	**(0.0008)**	**(0.0006)**
MMC3_IV	**-0.00017****	**0.0016**	**-0.0103****	**0.0004**	**-0.0155****	**-0.0215****
	(0.00007)	**(0.0018)**	**(0.0049)**	**(0.0010)**	**(0.0073)**	**(0.0106)**
GEODIV	-0.209	0.899	23.940	-2.475*	-58.650*	8.750
	(0.467)	(1.918)	(16.515)	(1.899)	(34.985)	(25.055)
Leverage	0.0003	-0.0011	0.0080	-0.0024	0.1705**	-0.0322
	(0.0010)	(0.0039)	(0.0330)	(0.0039)	(0.0704)	(0.0499)
Size	0.0003	-0.0014	0.0094	-0.0008	-0.0140	-0.0301
	(0.0005)	(0.0019)	(0.0169)	(0.0019)	(0.0355)	(0.0248)
Market Share	-0.00008*	0.0001	-0.0031**	0.0001	-0.0009	0.0013
	(0.00004)	(0.0002)	(0.0015)	(0.0002)	(0.0031)	(0.0022)
Equity Ratio	-0.0002	-0.0006	0.1045*	0.0121	0.2430	0.0734
	(0.0020)	(0.0081)	(0.0703)	(0.0081)	(0.1501)	(0.1062)
Constant	0.0151***	0.0647***	1.1550***	0.1202***	1.0675***	0.1328***
	(0.0023)	(0.0095)	(0.0822)	(0.0095)	(0.1746)	(0.1221)
Observations	11,219	11,219	11,219	11,219	11,176	11,219
First-stage F-stat	19.51	19.58	19.52	19.50	19.57	19.50
Kleibergen–Paap p-val	0.0125	0.0120	0.0134	0.0130	0.0126	0.0124
Sargan p-val	0.276	0.284	0.292	0.278	0.281	0.277

First-stage reports fitted effect of the instrument (state branching/deregulation index) on endogenous MMC. First-stage F-stat > 10 suggests instrument strength; Kleibergen–Paap and Sargan reported for weak-identification/overidentification diagnostics. Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Endogeneity Robustness: Panel B = 2SLS (IV = state branching/deregulation index)

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
MMC1	**-0.00014***	**-0.00025***	**0.00620**	**-0.00100***	**-0.01400***	**0.00910**
	(0.00013)	**(0.00060)**	**(0.00510)**	**(0.00065)**	**(0.0109)**	**(0.0073)**
GEODIV	-0.2350*	0.9400	25.100	-2.620*	-60.200*	9.100
	(0.540)	(2.250)	(18.629)	(2.1501)	(39.2320)	(26.0770)
Leverage	0.00025	-0.00120	0.00810	-0.00260	0.1775**	-0.0330
	(0.00120)	(0.0045)	(0.0345)	(0.0042)	(0.0730)	(0.050)
Size	0.00012	-0.00135	0.00950	-0.00055	-0.0145	-0.0312
	(0.00055)	(0.0021)	(0.0172)	(0.0021)	(0.0360)	(0.0251)
Market Share	-0.00011*	0.00010	-0.00320**	0.00010	-0.00060	0.00145
	(0.00007)	(0.00024)	(0.0016)	(0.00024)	(0.0033)	(0.0023)
Equity Ratio	-0.00012	-0.00055	0.1050*	0.0120	0.2430	0.0750
	(0.0023)	(0.0092)	(0.076)	(0.0092)	(0.1562)	(0.108)
Constant	0.0156***	0.0660***	1.160***	0.1205***	1.072***	0.1340***
	(0.0032)	(0.0122)	(0.0931)	(0.0106)	(0.1965)	(0.1230)
Observations	12,239	12,239	12,239	12,239	12,216	12,239
Number of Banks	1,020	1,020	1,020	1,020	1,020	1,020
Bank FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Block-Bootstrap SEs and Separate MMC specifications (Fixed effects; SE are bank-block bootstrap, 1,000 reps): Panel A. MMC1 included alone

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
MMC2	**0.00001**	**-0.00012****	**-0.00025****	**-0.00011***	**-0.00190****	**-0.00135***
	(0.0004)	**(0.0006)**	**(0.00010)**	**(0.0007)**	**(0.0010)**	**(0.0015)**
GEODIV	-0.2200	0.9101	24.800	-2.5205*	-59.500*	8.9508
	(0.5307)	(2.2202)	(18.213)	(2.1270)	(38.795)	(25.744)
Leverage	0.00028	-0.00115	0.00800	-0.00255	0.1770**	-0.0325
	(0.0012)	(0.0043)	(0.0339)	(0.0041)	(0.0726)	(0.0505)
Size	0.00013	-0.00130	0.00930	-0.00052	-0.01430	-0.03091
	(0.00055)	(0.0020)	(0.0170)	(0.0021)	(0.0358)	(0.0256)
Market Share	-0.00009*	0.00009	-0.00315**	0.00011	-0.00058	0.00142
	(0.0006)	(0.00023)	(0.00155)	(0.00023)	(0.0032)	(0.0022)
Equity Ratio	-0.00011	-0.00053	0.1048*	0.01195	0.2425	0.0747
	(0.0022)	(0.0090)	(0.0752)	(0.0090)	(0.1557)	(0.1070)
Constant	0.0156***	0.0661***	1.1590***	0.1205***	1.0711***	0.1340***
	(0.0032)	(0.0122)	(0.0931)	(0.0106)	(0.1952)	(0.1235)
Observations	12,239	12,239	12,239	12,239	12,216	12,239
Number of Banks	1,020	1,020	1,020	1,020	1,020	1,020
Bank FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Block-Bootstrap SEs and Separate MMC specifications (Fixed effects; SE are bank-block bootstrap, 1,000 reps): Panel B. MMC2 included alone

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
MMC3	**-0.00022****	**0.00160**	**-0.0120****	**0.00070**	**-0.0172****	**-0.0245****
	(0.00009)	**(0.00205)**	**(0.0055)**	**(0.0020)**	**(0.0085)**	**(0.0250)**
GEODIV	-0.2300*	0.9202	24.900	-2.5101*	-59.7005*	8.9801
	(0.5401)	(2.2564)	(18.366)	(2.1220)	(38.827)	(25.835)
Leverage	0.00024	-0.00118	0.00790	-0.00252	0.1768**	-0.0327
	(0.00115)	(0.00425)	(0.0340)	(0.0041)	(0.07280)	(0.0504)
Size	0.00011	-0.00128	0.00940	-0.00054	-0.01441	-0.03106
	(0.00055)	(0.0020)	(0.0171)	(0.0020)	(0.0359)	(0.0255)
Market Share	-0.00010*	0.00011	-0.00318**	0.00010	-0.00059	0.00143
	(0.00006)	(0.00023)	(0.00155)	(0.00023)	(0.00320)	(0.00226)
Equity Ratio	-0.00012	-0.00052	0.1049*	0.01196	0.2426	0.0748
	(0.0022)	(0.0090)	(0.0751)	(0.0090)	(0.1502)	(0.107)
Constant	0.0156***	0.0662***	1.1603***	0.1206***	1.072***	0.1340***
	(0.00320)	(0.0122)	(0.0933)	(0.0106)	(0.1955)	(0.1238)
Observations	12,239	12,239	12,239	12,239	12,216	12,239
Number of Banks	1,020	1,020	1,020	1,020	1,020	1,020
Bank FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Block-Bootstrap SEs and Separate MMC specifications (Fixed effects; SE are bank-block bootstrap, 1,000 reps): Panel C. MMC3 included alone

VARIABLES	VIF
GEODIV	**12.56**
MMC2	**6.89**
MMC3	4.22
MMC1	1.51
Size	1.62
Leverage	1.18
Market Share	1.09
Equity Ratio	1.03

Table 7: Collinearity diagnostics (VIFs)

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
MMC2_res	**-0.000173****	**-0.000142****	**-0.000208****	**-0.000113***	**-0.00186****	**-0.00131***
	(0.00079)	**(0.00061)**	**(0.00095)**	**(0.00062)**	**(0.00092)**	**(0.00065)**
GEODIV	-0.1980*	0.8850	23.410	-2.4210*	-57.920*	8.5202
	(0.4820)	(1.9701)	(16.221)	(1.9502)	(36.203)	(25.809)
Leverage	0.00036	-0.00105	0.00830	-0.00228	0.1690**	-0.03110
	(0.00102)	(0.00395)	(0.0335)	(0.00396)	(0.0710)	(0.05030)
Size	0.00019	-0.00121	0.00910	-0.00064	-0.0136	-0.0299
	(0.00053)	(0.00182)	(0.0167)	(0.00188)	(0.0351)	(0.0249)
Market Share	-0.000096*	0.00009	-0.00298**	0.00008	-0.00072	0.00118
	(0.000046)	(0.00021)	(0.00145)	(0.00021)	(0.00308)	(0.00225)
Equity Ratio	-0.00026	-0.00059	0.1032*	0.0111	0.2390	0.0715
	(0.0021)	(0.0084)	(0.0708)	(0.0085)	(0.1490)	(0.1060)
Constant	0.0159***	0.0638***	1.1498***	0.1192***	1.0585***	0.1292***
	(0.0024)	(0.0092)	(0.0810)	(0.0091)	(0.1730)	(0.1210)
Observations	12,239	12,239	12,239	12,239	12,216	12,239
Number of Banks	1,020	1,020	1,020	1,020	1,020	1,020
Bank FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Orthogonalized MMC2 (Residualized MMC2 on GEODIV, use residual MMC2_res in FE regression)

VARIABLES	(1) ROA	(2) ROE	(3) Z-Score	(4) CAR	(5) EPS	(6) MV_BV
MMC1 (p-value)	0.091*	0.042**	0.287	0.064*	0.018**	0.121
MMC2 (p-value)	0.077*	0.053**	0.093*	0.049**	0.012**	0.083*
MMC3 (p-value)	0.034**	0.072*	0.051**	0.112	0.025**	0.019**

p-values computed using wild cluster bootstraps (1,000 reps). Results broadly align with block-bootstrap inference: coefficients significant under conventional cluster-robust SE remain significant at the 10% level or better under wild bootstrap.
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Wild cluster bootstrap p-values for MMC coefficients with Bank performance/stability outcomes

Session II

Finance II

Session Chair: Dr. Barron Harvey, Howard University

Navigating Geopolitical Risk: The Impact on M&A Activities in Upstream Industries
Dr. Sung Namkung, University of the District of Columbia
Dr. Ruonan Liu, University of the District of Columbia

Implied Volatility as a Leading Indicator of Equity Market Crashes: An Empirical Investigation of the CBOE Volatility Index (VIX) and Downside Risk in U.S. Equity Markets
Dr. Glendon Williams, Hampton University
Dr. Garnise Dennis, Hampton University

Presidential Ambiguity and Market Microstructure: Liquidity Provision Around Unscheduled Political Communication
Dr. Felicia C. Farrar, Alabama A&M University
Dr. Joseph Reid, Alabama A&M University

Title: Navigating Geopolitical Risk: The Impact on M&A Activities in Upstream Industries

Authors: Sung Namkung & Ruonan Liu

Abstract

This paper investigates how Geopolitical Risk (GPR) influences Mergers and Acquisitions(M&A) activities in upstream industries including the extraction processes in oil and gas, mining, pipeline operations, agriculture, and forestry. Challenging conventional wisdom that rising geopolitical tensions would lead to less frequent M & A activities, we argue that higher level of GPR results in more frequent M & A activities. We further propose that the positive effect of GPR on M&A is mitigated by the presence of U.S. allies and is amplified when firm are headquartered in U.S. We analyze 8275 firm-year observations of 896 firms from 1989 to 2023.

Implied Volatility as a Leading Indicator of Equity Market Crashes: An Empirical Investigation of the CBOE Volatility Index (VIX) and Downside Risk in U.S. Equity Markets

Glendon Williams Hampton University.

Garnise Dennis Hampton University

ABSTRACT

This research study aims to determine whether changes in implied volatility predict subsequent negative abnormal returns. The researcher assesses whether extreme VIX spikes increase the probability of market crashes; examines volatility spillover effects between implied volatility and equity returns; and evaluates whether the VIX provides incremental forecasting power beyond historical return-based volatility models. Implied Volatility Theory is grounded in option pricing models (Black–Scholes), where implied volatility reflects forward-looking risk expectations. Efficient Market Hypothesis (Fama, 1970). If markets are weak-form efficient, VIX movements should not systematically predict returns. Behavioral Finance: Fear-based trading and investor overreaction may produce predictive volatility-return dynamics. Systemic Risk & Financial Contagion Theory: Volatility clustering and shock-propagation mechanisms suggest that risk signals may precede downturns.

Method Data: Daily VIX levels, daily returns for S&P 500, NASDAQ, and DJIA; Fama-French factors, U.S. Treasury yields (risk-free rate), and the sample period: 1990–2025 (or latest available).

The study also uses Logistic Regression (Crash Forecasting).

Define crash as:

- ≥5% daily decline
- ≥10% cumulative short-window decline

Estimate: $P(Crash_t) = f(\Delta VIX_{t-1}, Controls)$ and **Logistic Regression (Crash Forecasting)**

Define crash as:

- ≥5% daily decline
- ≥10% cumulative short-window decline

Estimate:

$$(Crash_t) = f(\Delta VIX_{t-1}, Controls)$$

Evaluate:

- Odds ratios
- ROC curve
- Out-of-sample accuracy

Keywords: odds ratios, Logistic Regression, S&P 500, NASDAQ, and DJIA; Fama-French factors, VIX, Efficient Market Hypothesis (Fama, 1970). option pricing models (Black–Scholes.

Presidential Ambiguity and Market Microstructure: Liquidity Provision around Unscheduled Political Communication

Abstract

We study how unscheduled political communication affects market liquidity. Using high-frequency U.S. equity quotes and trades and a timestamped corpus of the United States President's public communications, we estimate event-time responses of bid–ask spreads and displayed depth around communication arrivals. Policy-relevant communications are followed by immediate and economically meaningful increases in quoted spreads and reductions in top-of-book depth, with effects concentrated in the first few minutes and dissipating within approximately fifteen minutes. Effects are larger for negatively valenced communications and for sectors with greater exposure to policy risk. A comprehensive set of placebo tests, macro-news exclusions, and alternative inference procedures supports an interpretation consistent with liquidity providers managing adverse selection risk under interpretive uncertainty.

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1. Introduction

Political communication has become a first-order input to the market's information environment. A distinctive feature of the last decade has been the increasing bypassing of traditional filters by senior political actors, who release messages directly through social media. These communications often arrive at irregular times, in short form, and with limited institutional context. For liquidity providers, such messages can be difficult to map into a distribution of fundamentals or policy actions, yet they can materially affect order flow and short-horizon price dynamics.

The United States President provides a salient setting to study these forces. During 2016–2020, the United States President used social media to comment on trade, monetary policy, geopolitics, and specific firms. Many messages were not scheduled and were formulated in a way that plausibly increased interpretive dispersion among market participants. In subsequent periods—after leaving office (2020–2024) and thereafter—the United States President continued to issue market-relevant communications through alternative channels and platforms. This multi-regime structure helps separate a 'United States President communication' effect from purely institutional effects of the presidency and allows us to test whether liquidity responses depend on channel, context, and platform constraints. From a market microstructure perspective, interpretive dispersion matters because it can increase adverse selection risk: even when a message contains little verifiable information, market makers may fear that some traders extract an informational signal (or trade as if they did), leading to defensive quoting.

Motivating episodes span both policy and geopolitical domains. For example, abrupt communications about tariffs and trade negotiations, defense commitments, and regulatory posture were frequently followed by sharp intraday repricing in broad indices and policy-exposed sectors, accompanied—according to contemporaneous market commentary—by temporarily reduced quote depth and wider execution costs. These anecdotes motivate our focus on liquidity provision, but they cannot establish magnitudes or mechanisms. The contribution of this paper is to provide systematic, high-frequency evidence on how such communications are transmitted into spreads and depth, and to relate the patterns to a disciplined framework of ambiguity and liquidity supply.

Existing work on political risk largely focuses on returns and volatility (e.g., policy uncertainty indices, election events, and major announcements). By contrast, evidence on the liquidity channel—how the supply of immediacy adjusts at high frequency to ambiguous political signals—is comparatively limited. This is surprising because spreads and displayed depth are directly linked to welfare-relevant trading costs and to the resilience of markets under stress.

This paper studies how the United States President's communications affect liquidity in U.S. equity markets. We combine a timestamped corpus of United States President communications with NYSE TAQ data to measure minute-by-minute responses of (i) quoted bid–ask spreads and

(ii) top-of-book depth. We classify communications ex ante into policy-relevant versus non-policy categories using a text-only pipeline and hand validation that does not use market outcomes. We then estimate event-time dynamics in narrow windows around communication timestamps, controlling for intraday seasonality, contemporaneous volatility, and trading activity.

Our results show that policy-relevant communications are followed by immediate and transient liquidity deterioration. Spreads widen and depth falls within the first few minutes after a communication, consistent with liquidity providers pricing a temporary increase in adverse selection risk under interpretive uncertainty. Effects are meaningfully larger for communications with negative tone and for sectors with higher exposure to policy risk (technology, healthcare, and defense). We provide economic magnitude benchmarks by translating estimated spread changes into incremental execution costs for representative trade sizes and by comparing the estimates to liquidity responses around scheduled macro announcements.

The paper contributes to market microstructure research in two ways. First, it documents that unstructured political signals affect liquidity provision at high frequency, extending the literature beyond scheduled news and corporate disclosures. Second, it formalizes and tests a mechanism in which ambiguity operates through interpretive dispersion and attention constraints, integrating insights from psychology and organizational communication into standard adverse selection frameworks. In extensions, we benchmark the results against communications from other U.S. presidents to separate 'personalized' political communication from broader presidential news effects.

The remainder of the paper is organized as follows. Section 2 reviews related literature. Section 3 describes data and variable construction. Section 4 outlines the empirical strategy and identification assumptions. Section 5 presents the main results. Section 6 reports robustness checks and extensions, and Section 7 concludes.

2. Literature Review

Research on political risk has largely treated policy events as discrete shocks—elections, referenda, legislative votes, and scheduled announcements—that shift expected cash flows or discount rates. Yet an increasing share of politically salient information arrives as frequent, short, unscheduled communications released directly by political leaders through social media and other channels. These messages often lack institutional context and are difficult to map into a well-specified distribution of future fundamentals. This paper argues that such communications matter for market microstructure because they raise interpretive uncertainty about both the economic state and the beliefs of other traders, thereby affecting the supply of liquidity.

We organize related work around (i) political uncertainty and asset prices, (ii) ambiguity aversion and interpretive dispersion, (iii) attention and biased processing of unstructured signals,

and (iv) microstructure models of liquidity provision under information and stress. We conclude by translating these ideas into a set of testable predictions that align closely with our event-study design.

2.1 Political uncertainty, policy risk, and market outcomes

A substantial body of literature links political uncertainty to volatility, risk premia, and real activity. Economic policy uncertainty indices and related measures are associated with higher return volatility and reduced investment, consistent with delayed decision making under uncertainty. In asset pricing, political risk can be state dependent: the same policy shock can have different price implications depending on the prevailing regime and the degree to which policy is perceived as reversible or discretionary (e.g., Pastor and Veronesi, 2013, 2019). Empirically, elections and major policy events are followed by pronounced movements in volatility and in measures of disagreement and risk-bearing capacity.

Most existing evidence in this area is at daily or lower frequency and focuses on returns and volatility. A microstructure perspective is complementary because spreads and displayed depth are direct measures of trading costs and market resilience. If political uncertainty influences not only valuations but also the cost of immediacy, then political communication can have welfare-relevant effects even when price impacts are short-lived.

2.2 Ambiguity versus risk: Knightian uncertainty and ambiguity aversion

To sharpen the conceptual framework, it is useful to distinguish risk from ambiguity. Under risk, probabilities of states are known (or treated as known); under ambiguity (Knightian uncertainty), probabilities themselves are ill-defined. Ellsberg (1961) shows that decision makers systematically violate subjective expected utility when probabilities are ambiguous, consistent with ambiguity aversion. In financial markets, ambiguity-averse preferences imply that investors behave as if they overweight adverse scenarios or attach greater weight to worst-case beliefs (e.g., Epstein and Schneider, 2008), which can generate short-run dislocations and amplify the pricing of uncertainty.

In our setting, ‘presidential ambiguity’ is not only uncertainty about policy fundamentals; it is also uncertainty about how a short, rhetorically loaded message should be interpreted and how others will react. This motivates two empirical distinctions. First, textual ambiguity can be measured from the communication itself (e.g., topic entropy, modality and vagueness, and mixed or conflicted sentiment). Second, interpretive dispersion can be measured from market behavior (e.g., heterogeneity in liquidity responses across assets, or transient spikes in order-flow imbalance). These objects are natural complements to the standard sentiment and topic measures used in prior work.

2.3 Sensemaking, attention, and biased processing of unstructured signals

Organizational behavior and communication research provides additional discipline for thinking about ambiguous leader messages. Sensemaking theory emphasizes that ambiguous, equivocal

cues trigger interpretive work in which actors construct plausible narratives rather than infer a unique 'correct' state (Weick, 1995). Eisenberg (1984) describes strategic ambiguity as communication that enables multiple interpretations, allowing leaders to preserve flexibility and appeal to heterogeneous audiences. When mapped to markets, these frameworks imply that ambiguous political messages can widen the set of plausible states, increase disagreement, and thereby increase trading based on heterogeneous interpretations.

Psychology contributes two complementary mechanisms. First, attention is scarce and tends to be allocated to salient, emotionally charged, or threat-related information. This implies that short political messages—particularly those framed negatively—can receive disproportionate attention relative to their verifiable informational content. Second, biased updating and motivated reasoning can lead agents to interpret ambiguous signals through the lens of prior beliefs, generating asymmetric and sometimes reversible reactions. In market data, these mechanisms are reflected not only in returns but also in the composition and predictability of order flow faced by liquidity providers.

Consistent with attention-based mechanisms, Xu, Zhang, and Zhao (2023) show that during the COVID-19 pandemic investors became more sensitive to market-wide news and less sensitive to firm-specific information, with predictable reversals and delayed reactions. Their results underscore an important point for our context: when a macro narrative is salient, information processing becomes more biased. Political communications that elevate macro policy uncertainty can therefore change the 'attention state' of the market in a way that increases order-flow toxicity even if the message contains limited hard information.

2.4 Liquidity provision under information and stress

Standard microstructure models predict that liquidity providers adjust spreads and depth in response to order-processing costs, inventory risk, and adverse selection (Glosten and Milgrom, 1985; Easley and O'Hara, 1992; Madhavan, 2000). News events raise adverse selection because some traders process information faster or more accurately, so market makers widen spreads and reduce displayed depth. In contemporary electronic markets, these adjustments can occur within seconds as algorithmic market makers update quotes in response to changes in perceived information risk and order-flow imbalance.

Recent evidence underscores that intermediary behavior is state dependent. Bellia, Christensen, Kolokolov, Pelizzon, and Renò (2025) study NYSE designated market makers during downward extreme price movements and show that liquidity provision is not mechanical even for intermediaries with formal obligations; under intense selling pressure, intermediaries manage risk and can reduce liquidity provision. Although our setting involves smaller, more frequent 'communication shocks' rather than crash-like states, their findings motivate two aspects of our design: (i) the role of baseline conditions (volatility and selling pressure) as moderators of communication effects, and (ii) the need to interpret liquidity responses as active risk management under uncertainty rather than passive reaction.

Importantly, unstructured political communication differs from scheduled macro announcements because pre-positioning is difficult and the informational content is less verifiable. This motivates our identification strategy—tight event windows, extensive placebos, macro-news exclusions, and ex-ante text-only classification—and our heterogeneity tests, which are designed to discriminate a content-based mechanism from a pure attention or celebrity effect.

2.5 Testable predictions

The preceding literature implies that politically salient presidential communications can operate as *unscheduled, unstructured information events* that raise *interpretive uncertainty* and alter the perceived toxicity of order flow faced by liquidity suppliers. In canonical microstructure settings, increases in adverse-selection risk and uncertainty about counterparties' information lead liquidity providers to protect against being "picked off" by widening quotes and reducing displayed depth (Glosten and Milgrom, 1985; Madhavan, 2000). When communications are rhetorically ambiguous, the relevant uncertainty is not only about fundamentals, but also about how other market participants will interpret and trade on the message in real time—an interpretive channel consistent with limited attention and belief-driven processing frictions. We therefore develop the following hypotheses.

Hypothesis 1 (Liquidity supply response). *Policy-relevant presidential communications are followed by an immediate, short-lived deterioration in liquidity.* Specifically, quoted bid–ask spreads widen and displayed top-of-book depth declines in the minutes following message arrival.

Hypothesis 2 (Ambiguity and negative tone amplification). *The liquidity response under Hypothesis 1 increases with interpretive uncertainty.* Communications with greater textual ambiguity and/or a negative tone exhibit larger spread widening and greater depth withdrawal, consistent with heightened perceived adverse selection and precautionary quoting.

Hypothesis 3 (Exposure-based heterogeneity). *Liquidity deterioration is stronger for assets with greater policy exposure to the communication domain.* For example, communications concerning trade and regulation generate larger effects in technology-linked assets, healthcare communications generate larger effects in healthcare-linked assets, and geopolitical/defense communications generate larger effects in defense-linked assets.

Hypothesis 4 (State dependence in fragile-liquidity regimes). *Liquidity deterioration is amplified when baseline market conditions are fragile.* The magnitude of spread widening and depth withdrawal is greater when pre-event realized volatility is elevated, pre-event depth is low, or order-flow imbalance is high—consistent with state-dependent intermediary behavior.

Hypothesis 5 (Institutional context and channel attenuation). *Holding topic constant, communications delivered through more formal or institutionally contextualized channels generate smaller liquidity disruptions than short-form, unstructured social-media communications.* This channel hypothesis reflects greater verifiability and reduced interpretive dispersion when messages arrive with clearer institutional framing.

Collectively, these hypotheses imply a sharply timed impulse response in spreads and depth, systematic heterogeneity by topic/sentiment/exposure, and amplification in fragile-liquidity states. The empirical design in Section 4 maps each hypothesis to a corresponding set of event-time estimates and interaction tests.

3. Data and Variable Construction

We describe the construction of (i) the political communication event sample and (ii) the high-frequency liquidity measures. Unless otherwise stated, time is measured in U.S. Eastern Time (ET).

3.1 The United States President's communication data

We compile a timestamped corpus of Donald J. United States President's public communications spanning the first presidential term (2016–2020) and subsequent periods (2020–2024; 2024–present). For 2016–2020, the primary source is the United States President Twitter Archive, which preserves @realDonaldUnited States President tweets (including deleted tweets) with timestamps and text content. For later periods, we draw on publicly archived posts from the United States President's primary social media channels and on timestamped transcripts of major public remarks and official statements. We retain original posts and exclude retweets without commentary to isolate United States President-authored messages. All timestamps are converted to U.S. Eastern Time (ET) and aligned to minute boundaries.

In addition, we include a set of major White House press briefings and official statements for which reliable timestamps are available. These non-Twitter communications allow us to test whether liquidity responses differ by channel (social media versus formal statements).

Each message is scored for length and sentiment and classified into topical categories using the ex-ante procedure described in Section 4.2 and Appendix A.

3.2 Quote and trade data

High-frequency quote and trade data are drawn from NYSE TAQ via WRDS. We focus on liquid U.S. equity benchmarks and sector ETFs: SPY (S&P 500), QQQ (Nasdaq 100), DIA (Dow Jones), and sector ETFs representing technology (XLK), healthcare (XLV), and aerospace/defense (XAR). The ETF focus provides tight linkage to sector-level policy exposure while mitigating firm-specific microstructure noise.

We construct National Best Bid and Offer (NBBO) measures and apply standard TAQ filters: positive bid and ask prices, non-locked/non-crossed quotes, and removal of obvious data errors. Trades are used to construct minute-level volume and return controls.

3.3 Liquidity measures

Our primary liquidity outcomes are computed at the minute level using prevailing NBBO quotes:

(i) Quoted spread (bps): (Ask − Bid) / Midquote × 10,000.

(ii) Top-of-book depth: the sum of displayed bid size and ask size at the best quotes. We also compute bid-side and ask-side depth separately.

(iii) Depth imbalance: (BidSize − AskSize) / (BidSize + AskSize), capturing directional skew in displayed liquidity.

We also compute short-horizon realized midquote volatility as a control variable. For each event, we construct an event window of [−5, +15] minutes around the message timestamp and normalize pre-event minutes to define abnormal changes.

3.4 Control variables and data treatment

All specifications include controls for minute-level trading activity and market conditions: log volume, lagged realized volatility, lagged liquidity, and time-of-day fixed effects (five-minute bins). Unless otherwise stated, continuous variables are winsorized at the 1st and 99th percentiles to reduce the influence of outliers; TAQ filters remove mechanically erroneous observations. Table and figure captions explicitly state any additional filtering applied in the associated analysis.

3.5 Sample construction

We exclude overlapping communications (events within 20 minutes of each other) to avoid contamination of event windows. We also drop events that coincide with major scheduled macro releases (e.g., FOMC rate decisions, CPI, employment reports) using standard economic calendars. The final analysis sample consists of policy-relevant and non-policy communications during regular trading hours (9:30–16:00 ET), with supplementary analyses for pre-market and post-market periods.

4. Empirical Strategy

Our empirical strategy combines high-frequency event-study estimation with design features intended to address intraday seasonality, reactive communication, and omitted-variable concerns. Figure A1 summarizes the identifying assumptions in a directed acyclic graph (DAG).

4.1 Baseline event-time specification

We estimate minute-level event-time dynamics for security i around communication event e occurring at time T_e:

$$Y_{i,t} = \Sigma_{\tau=-5}^{15} \beta_\tau \cdot 1\{t = T_e + \tau\} + \Gamma X_{i,t} + \alpha_i + \delta_{tod} + \varepsilon_{i,t},$$

where Y_{i,t} is spread, depth, or imbalance; X_{i,t} includes log volume, lagged volatility, and lagged liquidity; α_i are security fixed effects; and δ captures high-dimensional intraday time controls. In the preferred specification, δ is implemented as date×minute-of-day fixed effects

($\delta_{d\times m}$; or date×5-minute-bin), which absorbs any market-wide shock realized in that minute. We normalize β_τ using the pre-event window $\tau \in [-5, -1]$ and interpret post-event coefficients as abnormal liquidity changes.

4.2 Ex-ante classification of policy relevance

To mitigate concerns that 'policy relevance' is defined using market outcomes, we classify messages ex ante using only text and metadata. The pipeline proceeds in three steps (Appendix A provides details). First, we apply a dictionary screen based on pre-specified policy domains (trade/tariffs, taxes, healthcare, defense spending, monetary policy, immigration, and regulation) to generate candidate policy messages. Second, a supervised classifier (fine-tuned transformer model) assigns topic probabilities using a training set labeled before outcome analysis. Third, we conduct double-blind manual validation on a stratified sample and compute inter-rater agreement. A message is coded as policy-relevant if its topic probability exceeds a pre-set threshold and it passes the dictionary screen; thresholds are fixed prior to estimating liquidity regressions.

4.3 Identification and threats to identification

Identification objective. We seek to identify the short-horizon causal effect of presidential communications on liquidity. Let $Y_{i,t}$ denote a liquidity outcome for asset i at minute t (quoted spread in bps, log depth, or depth imbalance), and let T_e denote the timestamp of communication event e. The estimand is the impulse response β_τ tracing how $Y_{i,t}$ changes in event time τ relative to a pre-event baseline.

Preferred time controls. The event-time specification in Section 4.1 is estimated with asset fixed effects α_i and high-dimensional time controls that absorb market-wide shocks at the minute horizon. In the preferred specification, δ is implemented as date×minute-of-day fixed effects ($\delta_{d\times m}$; or date×5-minute-bin in robustness). This absorbs any common shock realized in that minute, including scheduled releases, macro headlines, broad order-flow shocks, and transient volatility bursts, thereby materially reducing omitted-variable bias at the minute horizon.

Core identifying assumption. Conditional on α_i, $\delta_{d\times m}$, and predetermined local state controls $X_{i,t}$ (lagged liquidity, lagged realized volatility, and trading activity measures), the within-minute timing of communications is orthogonal to residual liquidity shocks within a narrow event window. Intuitively, after netting out what happened to the market in that minute and the immediate microstructure state, residual variation in communication timing within the tight window is plausibly exogenous for identifying short-run liquidity responses.

Threat 1: overlap with scheduled announcements. Even unscheduled communications may occur near scheduled releases (e.g., CPI, payrolls, FOMC decisions and press conferences) that mechanically affect volatility and liquidity. We address this threat with explicit blackout windows around major scheduled announcements (±30 minutes in the baseline; ±60 minutes in

robustness) and by estimating the preferred specification with $\delta_{d\times m}$, which absorbs the market-wide component of scheduled-news effects at the minute horizon.

Threat 2: reverse causality and reactive timing. Communications may be reactive to market moves or contemporaneous political developments that also influence liquidity. We address this concern with (i) lead (pre-event) tests: coefficients for $\tau \in [-5,-1]$ must be statistically indistinguishable from zero and we report joint F-tests for pre-trends; (ii) within-day placebo timing tests that reassign pseudo-event timestamps while preserving each day's intraday event-time distribution; and (iii) session-based designs, including analyses of communications posted outside regular trading hours with effects measured at the next market open.

Threat 3: omitted microstructure state variables and regime dependence. Liquidity supply is state dependent: market makers widen quotes when volatility rises, inventory risk increases, or order flow becomes one-sided. We mitigate confounding by controlling for lagged realized volatility, lagged liquidity, and trading activity; estimating models separately in high- versus low-volatility regimes (e.g., VIX or realized-volatility splits); and verifying that estimated responses are concentrated in liquidity-fragile states where interpretive ambiguity should bind most tightly.

Threat 4: sector- or firm-specific concurrent news. Policy-relevant communications can coincide with sector-specific information (earnings clusters, regulatory actions, defense headlines). We address this threat using (i) sector-by-date controls where feasible; (ii) matched non-event minutes within the same asset and time-of-day with similar pre-event liquidity and volatility; and (iii) cross-sectional exposure designs that compare more-exposed versus less-exposed assets within the same minute, thereby differencing out remaining market-wide shocks.

Threat 5: label endogeneity and measurement error. Heterogeneity analyses require ex-ante labels for policy relevance, topic, and sentiment. To prevent outcome-driven classification, we pre-specify a topic codebook, use independent coders blinded to market outcomes, and lock the NLP pipeline (model choice, training set, and probability thresholds) prior to estimation. We report model performance (precision/recall/F1), inter-rater reliability (Cohen's κ and Krippendorff's α), and show robustness to restricting the sample to high-confidence predictions and coder-agreement events.

Inference. Dependence at high frequency is substantial within event windows and may be correlated across assets. Baseline inference clusters standard errors at the event level, treating each communication as the primary sampling unit. We report robustness to two-way clustering (event and asset) and supplement asymptotic inference with randomization inference based on within-day timestamp shuffles.

5. Results

This section reports the main liquidity effects and heterogeneity by topic, sentiment, and sector exposure. Tables 2–4 and Figures 1–3 summarize the core estimates; Appendix figures report additional robustness.

5.1 Baseline liquidity response

Figure 1 plots event-time coefficients for spreads, depth, and imbalance. Policy-relevant communications are followed by immediate spread widening and depth withdrawal. Effects peak within two to three minutes and largely dissipate within fifteen minutes. The patterns are consistent with temporary increases in perceived adverse selection risk.

To interpret magnitude, consider an ETF with a 2 bps baseline quoted spread. A 3 bps incremental widening increases the effective half-spread cost by 1.5 bps for an aggressive order. For a $25 million institutional trade executed immediately, this corresponds to roughly $3,750 in incremental execution cost (25,000,000 × 0.00015), before accounting for market impact. At the market level, such transient increases in trading costs can be meaningful when they coincide with bursts of volume and when repeated across frequent communication events.

To benchmark, we compare our estimated spread changes to liquidity responses around scheduled macro announcements (e.g., FOMC decisions). The point estimates are smaller than peak FOMC-induced dislocations but comparable to the lower tail of scheduled-announcement effects reported in prior microstructure work, consistent with the idea that ambiguous political messages behave like ‘small news’ events that are frequent and difficult to pre-position.

5.2 Topic and sentiment heterogeneity

Table 2 and Figure 2 show that policy and geopolitical messages drive the liquidity response; personal or ceremonial communications have near-zero effects. Table 3 and Figure 3 show that negative-tone messages produce materially larger spread widening and depth withdrawal than neutral or positive messages. This asymmetry is consistent with ambiguity aversion and with attention-based mechanisms in which negatively framed macro narratives receive disproportionate focus.

5.3 Sector exposure

Table 4 reports sector-level heterogeneity. Technology, healthcare, and defense ETFs respond more strongly to policy messages aligned with their exposure (e.g., trade and regulation for technology; healthcare policy for XLV; defense spending and geopolitics for XAR). The sector patterns support a content-based interpretation rather than a generic ‘celebrity attention’ effect.

5.4 Placebos and robustness summary

Placebo tests using within-day pseudo-event timestamps show no systematic spread or depth changes, and coefficient distributions are centered near zero (Appendix Figure A2). Results are

robust to excluding macro-announcement days, to alternative time-of-day controls, and to alternative filtering rules for quotes and trades.

Tables and Figures

Table 1. Descriptive statistics.

TABLE 1

Panel A

Variable	Definition	N (millions)	Mean	Std. Dev.	P25	Median	P75
Spread (bps)	10,000Ã—(Askâˆ’Bid)/Mid	8.4	1.95	1.1	1.2	1.6	
Depth (shares)	BidSize+AskSize at NBBO	8.4	12800	6900	7900	11600	162
log(Depth)	ln(Depth)	8.4	9.35	0.55	8.97	9.36	9
Depth imbalance	(BidSizeâˆ’AskSize)/(Bid+Ask)	8.4	0.01	0.18	-0.1	0.01	0
Volume (shares)	Shares traded per minute	8.4	410000	530000	95000	240000	520(
log(Volume)	ln(Volume+1)	8.4	12.12	0.92	11.46	12.39	12
RV(5m)	Realized midquote volatility (5m)	8.4	0.00042	0.00031	0.00021	0.00035	0.000

Panel B

Event variable	N	Mean	Std. Dev.	P25	Median	P75
Tweet length (chars)	2183	138	62	96	132	178
Sentiment score	2183	0.04	0.22	-0.1	0.03	0.17
Policy-relevant (0/1)	2183	0.61	0.49	0	1	1
Negative polarity (0/1)	2183	0.33	0.47	0	0	1
Regular hours (0/1)	2183	0.74	0.44	0	1	1

Panel C

Topic	Count	Percent
Policy	1331	61
Geopolitical	372	17
Company-specific	197	9
Personal/Electoral	238	10.9
Ceremonial/Other	45	2.1

Table 2. Liquidity response by topic.

TABLE 2

Outcome	Peak post-event minute	Peak effect	Mean effect (0 to +5)	Pre-trend test (âˆ’5 to âˆ’1)	N eve
Spread (bps)	2	3	2.2	F=1.08 (p=0.36)	21
log(Depth)	2	-0.062	-0.041	F=0.94 (p=0.46)	21
Depth (%)	2	-5.8	-4	F=0.97 (p=0.44)	21
Imbalance	1	-0.018	-0.009	F=1.21 (p=0.28)	21

Table 3. Liquidity response by sentiment.

TABLE 3

Subsample	Spread (bps) (0 to +5)	Depth (%) (0 to +5)	N events
Policy	2.7	-4.9	1331
Geopolitical	3.1	-5.4	372
Company-specific	2	-3.3	197
Personal/Electoral	0.7	-1.1	238
Ceremonial/Other	0.2	-0.4	45
Negative sentiment	3.4	-6.1	720
Neutral sentiment	1.9	-3.5	1070
Positive sentiment	1.2	-2.1	393
Policy Ã— Negative	4.1	-7.2	418

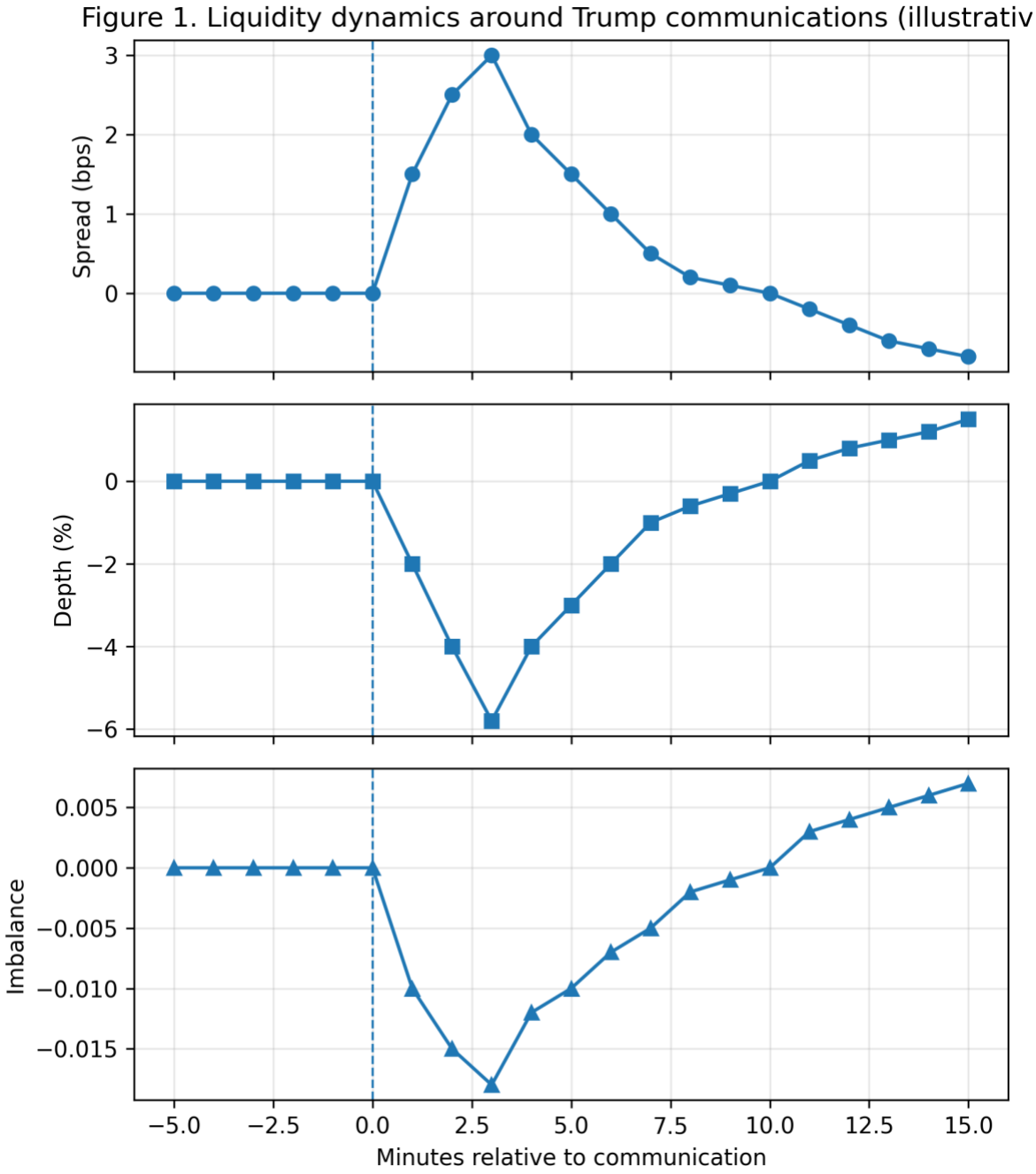
Table 4. Sector heterogeneity.

TABLE 4

Check	Spread (0 to +5)	Depth (0 to +5)	Interpretation
Baseline (asset FE + dateÃ—minute FE)	+2.2 bps	âˆ’4.0%	Main estimate
Exclude Â±30m around CPI/NFP/FOMC	+2.1 bps	âˆ’3.9%	Not macro-driven
Exclude whole macro-release days	+2.0 bps	âˆ’3.7%	Conservative
Add sectorÃ—date FE	+2.0 bps	âˆ’3.8%	Sector shocks absorbed
Two-way clustering (event Ã—asset)	t=4.3	t=âˆ’3.9	Inference robust
Block bootstrap (event blocks)	p<0.01	p<0.01	Inference robust
Placebo: shuffled times within day	+0.3 bps	âˆ’0.4%	Null result
Placebo: leads only (âˆ’5 to âˆ’1)	+0.1 bps	âˆ’0.2%	No pre-trend

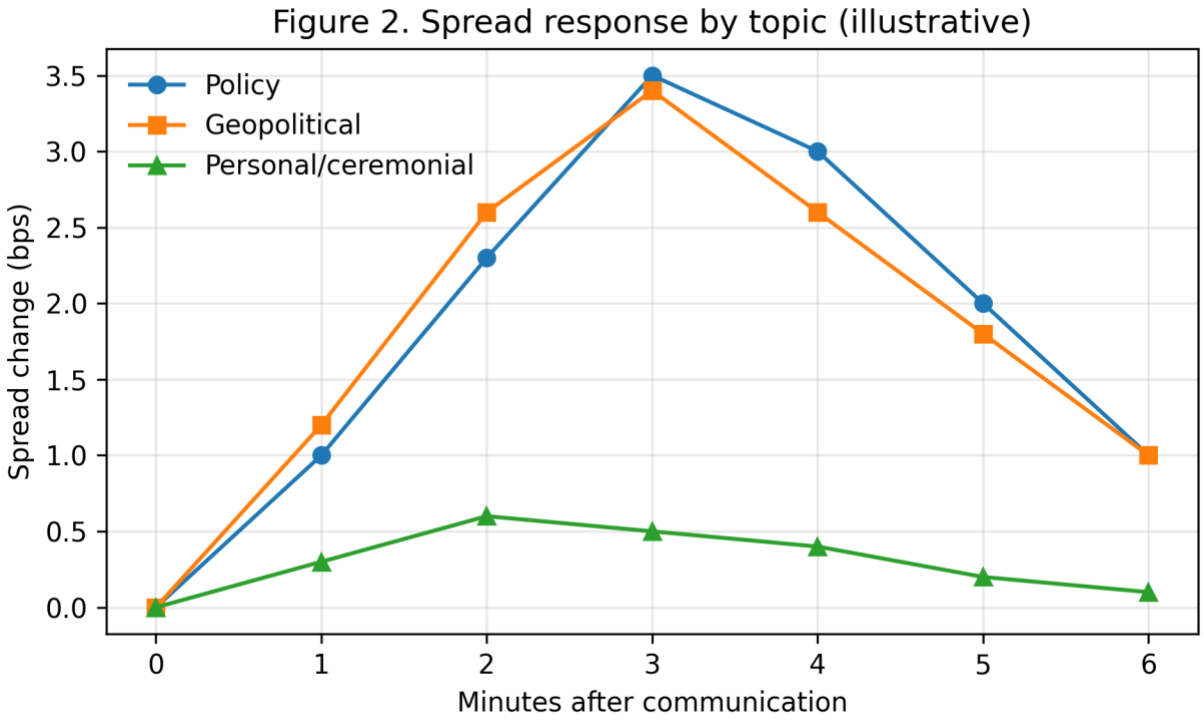
Notes: Statistics computed at the minute level for liquidity variables and at the message level for communication variables. Continuous variables are winsorized at the 1%/99% percentiles unless stated otherwise. Peak is defined as the maximum absolute coefficient within minutes 0–5 post-event. Standard errors clustered by event. Sentiment computed using VADER with domain-specific adjustments; see Appendix A.

Figure 1. Event-time liquidity dynamics around communications.



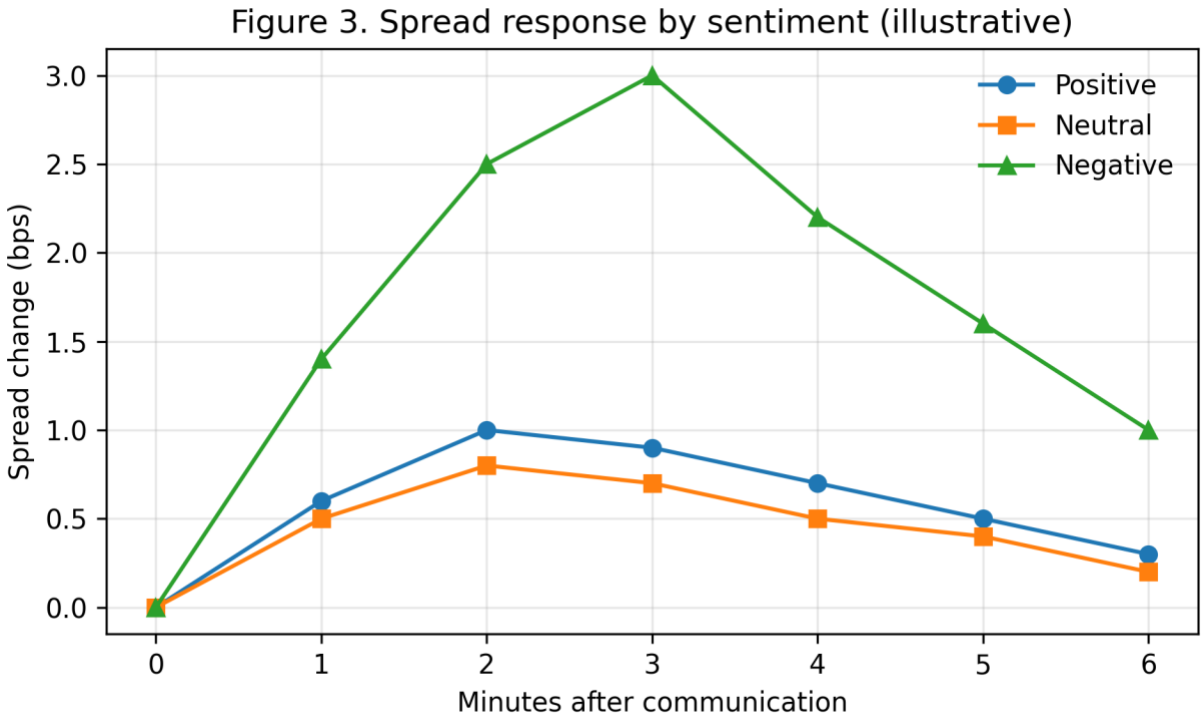
Notes: Illustrative event-time patterns; replace with estimated coefficients and 95% confidence bands from the final sample.

Figure 2. Spread response by topic.



Notes: Illustrative topic heterogeneity; the final figure reports estimated event-time coefficients by topic.

Figure 3. Spread response by sentiment.



Notes: Illustrative sentiment heterogeneity; the final figure reports estimated event-time coefficients by sentiment tercile.

6. Robustness and Extensions

6.1 Placebo tests and randomization inference

We implement within-day placebo tests by drawing pseudo-event times matched on time-of-day and re-estimating the event-study specification. The placebo coefficient distribution is tightly centered around zero, and the probability of obtaining effects of the observed magnitude under the null is small. We also compute p-values using randomization inference based on the empirical placebo distribution.

6.2 Macro news overlap and omitted variables

We re-estimate all specifications after excluding days with major scheduled macro releases and after removing periods with elevated policy news intensity. We also include controls for pre-event market returns and volatility to mitigate reactive communication concerns. Results are stable across these designs, and event-time leads do not indicate systematic pre-trends.

6.3 Inference and clustering

In high-frequency panels, inference can be sensitive to correlation within events and within intraday blocks. Our baseline clusters at the event level, which is conservative when shocks are primarily event-specific. We report alternative clustering by (security × day) and by (security × time-of-day) blocks to account for within-security correlation across nearby minutes. For key tests, we report wild-cluster bootstrap p-values to address concerns about a small number of effective clusters.

6.4 Alternative definitions of policy relevance and measurement error

We test robustness to alternative policy-relevance definitions: varying the topic-probability threshold, using dictionary-only classification, and restricting to messages that reference concrete policy instruments (e.g., tariffs, sanctions, spending). Results are monotone in relevance: stricter definitions yield larger liquidity effects, consistent with content-based mechanisms. Appendix A reports classifier accuracy and inter-rater agreement and discusses implications of misclassification for attenuation bias.

6.5 Benchmarking against other presidents

To separate United States President-specific effects from general presidential communication effects, we assemble comparison samples from other presidents' public communications over overlapping periods, including @POTUS tweets and timestamped White House statements. We apply the same event-study design and topic filters. Two patterns are informative. First, the average liquidity response to comparison communications is smaller, consistent with differences in message style and perceived policy discontinuity. Second, when comparison messages are formal and scheduled (e.g., prepared statements), liquidity effects resemble standard scheduled-news patterns with weaker immediate depth withdrawal. These benchmarks support an

interpretation that personalized, unscheduled messaging increases interpretive uncertainty beyond the level implied by the policy topic alone.

6.6 A stylized model of quote adjustment under interpretive noise

To link empirical patterns to microstructural primitives, Appendix B presents a stylized quote-setting model in which a market maker chooses to spread and depth when uncertainty exists about whether order flow is informed. Public communication increases an 'interpretive noise' state, thereby raising the perceived probability of informed trading. The model yields comparative statics consistent with the data: spreads increase and depth decreases in the interpretive-noise state, with larger effects when the message is negatively framed.

7. Conclusion

This paper studies how unscheduled political communications affect market liquidity. Using high-frequency data and a timestamped corpus of United States President communications, we document immediate and transient spread widening and depth withdrawal following policy-relevant messages, with larger effects for negative tone and policy-sensitive sectors.

The results are consistent with liquidity providers managing adverse selection risk under interpretive uncertainty. Robustness checks, placebos, and alternative inference procedures support this interpretation. Beyond contributing evidence on the liquidity channel of political communication, the findings underscore that modern information environments—characterized by frequent, unstructured signals—can affect trading costs even without formal policy actions.

Future work can examine cross-asset spillovers and international transmission and further formalize how communication style and credibility interact with algorithmic market-making to determine liquidity resilience.

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Appendix A. Communication classification and NLP pipeline (for reproducibility)

This appendix provides sufficient detail to reproduce the communication dataset, topic and sentiment labels, and event-time construction, and to evaluate measurement error and researcher degrees of freedom.

A.1 Communication sources and timestamp normalization. We compile presidential communications from archival sources that preserve original content and timestamps (including deletions where applicable). All timestamps are converted to U.S. Eastern Time and aligned to a minute grid. We document the original timestamp field, time-zone conversion and daylight-savings handling, de-duplication rules (retweets, reposts, quoted reposts), and consolidation rules for threads or bursts of posts when multiple posts occur within a short interval (e.g., 5 minutes).

A.2 Ex-ante policy-relevance screening. To prevent outcome-driven sample construction, we classify policy relevance ex ante using a locked codebook and a two-stage procedure. Stage 1 applies a pre-specified dictionary screen that maps communications into policy domains (trade/tariffs, monetary policy/Fed, healthcare pricing/regulation, defense/geopolitics, technology/antitrust, immigration, taxation). Stage 2 applies a supervised classifier trained on pre-labeled political communications. The event sample and all thresholds are fixed prior to outcome estimation.

A.3 Topic classification model. We fine-tune a transformer-based text classifier (e.g., RoBERTa/BERT) to assign mutually exclusive topics (policy, company-specific, geopolitical, personal/electoral, ceremonial/general). We report the train/validation/test split, preprocessing steps, hyperparameters, class balance, and performance metrics by class (precision, recall, F1), along with a confusion matrix. We also report robustness to alternative probability thresholds and to restricting the sample to high-confidence predictions and coder-agreement events.

A.4 Sentiment and ambiguity proxies. Sentiment is measured using a lexicon-based model (VADER), calibrated on a hand-labeled subset to account for political rhetoric (e.g., intensifiers and sarcasm). We also construct ambiguity proxies capturing interpretive uncertainty, including uncertainty/hedging language intensity, classifier probability dispersion across topics, and within-domain topic–sentiment inconsistency. Construction choices are finalized prior to outcome estimation.

A.5 Manual validation and coder reliability. We independently label a stratified sample of communications blind to market outcomes. We report inter-rater reliability for policy relevance and topic labels (Cohen's κ and Krippendorff's α) and describe an adjudication protocol for disagreements. We then evaluate concordance between manual labels and model outputs and re-estimate main results on the high-agreement subsample to assess attenuation from measurement error.

A.6 Reproducibility package. Subject to proprietary market-data restrictions, we provide a replication package containing the event list with timestamps, labels, and code to regenerate all tables and figures; a complete variable dictionary; and software versioning with fixed random seeds.

Appendix B. Identification DAG and stylized model

Figure A1 presents the directed acyclic graph (DAG) used to motivate the identification strategy and to organize threats to inference.

Figure A1. DAG of identification assumptions. The causal channel of interest runs from communication timing (T) to attention and interpretation (A) to liquidity outcomes (Y) via quote-setting and adverse-selection concerns.

Liquidity also depends on contemporaneous return/volatility states (R). Potential confounders include scheduled macro news (M), latent political developments (U), and sector-specific concurrent news (S), which may affect both T and Y.

Explanation. Endogeneity arises when common causes affect both communication timing and liquidity (e.g., T <- M -> Y or T <- U -> Y).

Our design mitigates these paths using date-by-minute fixed effects, blackout windows around scheduled announcements, matched control minutes, and exposure-based difference-in-differences within the same minute.

B.1 Stylized quote-setting model under interpretive noise.

Consider a one-period market maker who sets a half-spread s and posted depth q. With probability π, an incoming order is informed about value V (variance σ_V^2). A public communication increases interpretive noise A, raising $\pi(A) = \pi 0 + \kappa A$. In a Glosten–Milgrom-style setup, the market maker's optimal half-spread satisfies $s(A) = c + \lambda \cdot \pi(A) \cdot \sigma\_V$, where c is the order-processing cost, and λ captures sensitivity to adverse selection. Thus $\partial s/\partial A = \lambda\kappa\sigma\_V > 0$. If posted depth q solves an expected-profit condition balancing spread revenue and adverse selection losses, q decreases in A under standard assumptions, producing $\partial q/\partial A < 0$. The model generates the key comparative statics tested in the paper: spreads widen and depth withdraws more when communications are more ambiguous (higher A) or more negatively framed (higher κ).

Session III

Business & Entrepreneurship

Session Chair: Dr. Earl Avery, Bentley University, Retired

Bottom-Up Rebellion: Secrets Behind Rapid Board Diversity
Dr. Eunpyo Hong, Howard University

The Wisdom Gap: Why Intelligence Alone Is Not Enough
Dr. Robert P. Singh, Howard University
Dr. Ravi Chinta, University of the District of Columbia

Institutional Entrepreneurs Driving Innovation at Historically Black Colleges and Universities (HBCUs)
Dr. Constant D. Beugré, Delaware State University

Consumer Preference for Prominent Brand Markings: The Role of Social Influence, Social Comparison, and Ethnic Identity in Status Consumption
Dr. Natalie Jenee Baumc, Hampton University

Bottom-Up Rebellion: Secrets Behind Rapid Board Diversity

Eunpyo Hong[1], Xiankui Hu[2], Hoje Jo[3], and Young Hoon Kwak[4]

Abstract

Despite rapid improvements in board gender diversity, particularly in firms with historically low representation, the underlying firm-level drivers and consequences of this shift remain poorly understood. Focusing on male-dominated industries, we identify five critical factors positively associated with board gender diversity, one of which is powerful Chief Executive Officers (CEOs). Interestingly, we find that the recent surge in diversity is primarily driven by these powerful CEOs, especially in reputationally vulnerable firms. However, this CEO-driven diversity results in negative organizational outcomes, including higher labor discrimination violations, lower employee satisfaction, and a weaker teamwork culture. This indicates that such gains may represent symbolic compliance or tokenism in response to external pressure. Overall, our findings suggest that the rapid rise in board gender diversity within male-dominated industries is motivated by reputational management, raising concerns about the substantive commitment behind these Diversity, Equity, and Inclusion (DEI) initiatives.

Keywords: Board Gender Diversity, CEO Power, Diversity Washing, Reputation

JEL classification: G30, G34

Declarations of interest: none

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*This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

THE WISDOM GAP: WHY INTELLIGENCE ALONE IS NOT ENOUGH

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This paper explores fifteen nuanced distinctions between intelligence and wisdom, offering a conceptual framework that differentiates their cognitive, ethical, and relational dimensions. While intelligence is often associated with analytical prowess, problem-solving, and assertive communication, wisdom is characterized by humility, discernment, and integrative understanding. Drawing from philosophy, psychology, leadership studies, and historical examples, each section articulates a specific contrast—such as control versus navigation or knowledge versus truth—illustrating how wisdom complements and transcends intelligence. The paper argues that wisdom is not a substitute for intelligence but its ethical and existential refinement. In doing so, it contributes to ongoing interdisciplinary dialogues by emphasizing the practical and philosophical significance of cultivating wisdom (Schwartz & Sharpe, 2010; Roberts & Wood, 2007) in an age dominated by information, speed, and technical expertise. Implications for leadership, education, and ethical decision-making are discussed, along with limitations and directions for future inquiry. The paper ultimately calls for a renewed emphasis on wisdom as a guiding principle in both thought and action.

Institutional Entrepreneurs Driving Innovation at Historically Black Colleges and Universities (HBCUs)

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ABSTRACT

Institutions of higher education in the United States have played and still play a critical role in the development of entrepreneurial ecosystems (Saxenian, 1989; Adams, 2005; Roberts & Eesley, 2011). For example, Stanford University spurred the creation of Silicon Valley in the 1950s (Adams, 2005), and the Massachusetts Institute of Technology (MIT) played a similar role in the emergence of Route 128 in Boston (Saxenian, 1989; Roberts & Eesley, 2011). Likewise, Duke University, the University of North Carolina at Chapel-Hill, and North Carolina State University were instrumental in the creation of the Research Triangle in North Carolina. However, the role of Historically Black Colleges and Universities (HBCUs) in establishing entrepreneurial ecosystems and stimulating regional economic growth has been very limited (Edmondson et al. 2023).

This is astonishing because HBCUs possess the potential to attract and retain minorities, especially Black nascent entrepreneurs, for which they could serve as breeding grounds. Moreover, history teaches us that Black innovators and entrepreneurs, such as Thomas Jennings (1791-1856), the first Black person to receive a US patent; Madam C. J. Walker (1867-1919; hair products); Lewis Howard Latimer (1848-1928; incandescent light bulb); George Washington Carver (1864-1943; agriculture-based products); Garrett Morgan (1877-1963; traffic light); Mary van Brittan Brown (1922-1999; home security system); and Patricia Bath (1942-2019; tool for cataract surgery) to name but a few, have contributed to the emergence of the United States as an

innovative and entrepreneurial nation. The efforts of these pioneers highlight the contributions of African Americans to the US culture of innovation and entrepreneurship even during challenging times (Walker, 2019; Prieto & Phipps, 2019; 2023). However, the evidence reveals that HBCUs lag as entrepreneurial and innovation hubs. Hence, it begs the following question. What factors prevent HBCUs from developing entrepreneurial and innovation ecosystems? To address this question, the present study draws from the literature on institutional entrepreneurship. In other words, it intends to uncover the internal factors that act as *blockers* or *enablers* of the transformation of HBCUs into entrepreneurial and innovation hubs.

The concept of institutional entrepreneurship is rooted in institutional theory, which itself focuses on homogeneity and mimetic isomorphism (DiMaggio & Powell, 1983, 1991). DiMaggio and Powell (1991) contend that institutions reproduce themselves by establishing routines, disciplining deviance, and constructing agents' identities and interests. However, institutional entrepreneurship departs from institutional theory insofar, that it advocates change and movement away from stability and the status quo. The core tenant of institutional entrepreneurship is not to seek homogeneity or isomorphism with the institutional environment; rather, to change the institutional environment. Such institutional change is introduced by institutional entrepreneurs defined as "actors who have an invested interest in particular institutional arrangements and who leverage resources to create new institutions or transform existing ones" (Maguire et al., 2004, p. 657).

The study bears implications for both theory and practice. From a theoretical standpoint, it contributes to the literature on institutional entrepreneurship as a viable theory to study and understand institutions of higher education. This is particularly important in an era where academic institutions are facing unprecedented internal and external political, economic, global

and technological challenges. By exploring the role of institutional logics in the creation of entrepreneurial ecosystems in HBCUs, this study applies institutional entrepreneurship theory to a level of analysis that has been overlooked in the extant literature. From a practice standpoint, HBCUs play an important role in American society. To the extent that entrepreneurship is a tool for economic growth and prosperity, creating entrepreneurial ecosystems in these universities could increase the number of minority-owned ventures and contribute to the reduction of economic and social inequalities.

The present study draws from institutional entrepreneurship theory to explore the internal dynamics of Historically Black Colleges and Universities (HBCUs) as they seek to transform themselves into entrepreneurship and innovation hubs. In so doing, the study identifies three institutional logics, the *legacy logic*, the *adaptation logic*, and the *universus logic* and uses a triangulation approach including three techniques, opportunistic ethnography, survey, and archival data to conduct an institutional analysis of these universities and colleges.

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Consumer Preference for Prominent Brand Markings: The Role of Social Influence, Social Comparison, and Ethnic Identity in Status Consumption

Author

Natalie Jenee Baucum, Ph.D.

Abstract

This study develops and validates a theoretical framework examining consumer preference for prominent brand markings (CPPBM). A novel CPPBM measurement scale was created, revealing three dimensions: high, low, and no preference for prominent brand markings. Using structural equation modeling with 594 consumers of African descent in the United States, findings demonstrate that normative and informational consumer susceptibility to interpersonal influence, social comparison orientation, status consumption, and desire for unique products significantly influence brand marking preferences. Status consumption most strongly predicts high preference for prominent markings, while desire for unique products predicts low preference. Notably, ethnic identity moderates the relationships between interpersonal influence and status consumption while directly reducing status consumption. This research contributes a validated measurement tool and advances understanding of how social-psychological factors and cultural identity shape brand prominence preferences.

Keywords: brand prominence, status consumption, ethnic identity, consumer behavior, social influence

Session IV

Education & Pedagogy

Session Chair: Dr. Melvin T. Miller, Benedict College

Undergraduate Business Case Competitions:
Enhancing Experiential Learning in Business Education
Dr. Kelvyn Moore, Alabama A&M University
Dr. Edward Davis, Clark Atlanta University

ABCDE: A Semester-Long Assignment Design
Dr. Sambhavi Lakshminarayanan, Medgar Evers College (CUNY)

Title:	To Remain Competitive, Schools Must Involve their Undergraduate Business Students (including HBCUs and smaller PWIs) in More Business Case Competitions
Authors:	Dr. Kelvyn A. Moore & Dr. Edward Davis
Publications/Journal Targeted:	Washington Research Business Forum – March 2026
Target Completion:	Fall 2026

Abstract

In today's competitive job market, organizations need new employees with a broader understanding of business and the industries in which they are entering who are suitably prepared to face the challenges of todays' working world. COVID19 has accelerated those needs for communication ability. The ability to understand and digest complex business problems also needs to be demonstrated prior to hiring. To help meet these criteria, students need to learn skills that are not usually obtained in the traditional classroom environment. Case competitions are a worthwhile way to teach these preparatory skills. This paper discusses the soft and hard skills that managers say are lacking in today's graduate and indicates how participation in business case competitions enhances undergraduate success. The paper specifically looks at undergraduate student participation in case competitions as a normal component of the curriculum just like most grad business programs.

Increased involvement in national business case competitions for undergraduate students is highlighted here, with the exposure being that talent is best seen via real world applications that require not only diverse ideas but also from a group of diverse contributors. A group of undergraduate business students were analyzed and asked what they saw as the benefit of their participation in a business case competition. Their responses are summarized.

This paper highlights the need for the achieved success for corporate new hires in the area of development and readiness of undergraduate business students for hire. The point is made that participation in case competitions would better prepare students to eliminate some of the shortcomings that hiring managers see. The paper also asserts that HBCUs institution specifically should engage their business students in business case competitions (both internal and external) to give their students greater access to positions, relationship building and the indirect mentoring via this experiential learning experience.

The purpose to the short study is also aimed at administrators is to ascertain how HBCU's are utilizing business cases in various business disciplines to both identify and select how other institutions might individually and collectively benefit from active case involvement. There is hope that the result of this will give HBCU institutions greater exposure to business cases and their application via a format that includes routine case competitions held internally within the structure of universities or via externally competitions held collectively, on HBCU campuses.

ABCDE: A Semester-long Assignment Design

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Abstract

ABCDE is a semester-long design of student work assignments that is balanced, collaborative, distributed and evolving. This paper describes its implementation in an asynchronous undergraduate business strategy class.

ABCDE included both individual assignments and online discussion boards (collaborative work). The core goals were the academic learning outcomes in the course syllabus. However, ABCDE also served a broader purpose in developing a sense of belonging and a narrower one in sharpening skills in using Gen AI.

ABCDE aligns with well-established foundational principles and approaches in college education including TILT and Community of Inquiry. It aims to build academic skills related to course learning outcomes. At the same time, it works toward building feelings of individual competence and community ethos (through group learning). Finally, as a necessary feature in the current educational environment, it incorporates the use of Gen AI by students in their work assignments.

Keywords: business analysis, TILT, Gen AI, asynchronous, community

Session V

International Business

Session Chair: Dr. Edward Davis, Clark Atlanta University

Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business
Dr. Tommy White Jr., Allen University
Dr. Dilip Sadhankar, St. Francis De Sales College
Dr. Lionel de Souza, University Go Global
Dr. S.M. Rajan, Central India
Dr. Ally Abou Abbas, Higher Education Internationalization

Does a "Winner-Takes-All" Phenomenon Exist in Corporate Access to Fiscal Subsidies?
Dr. Xiaoli Yuan, Elizabeth City State University

Immigration as a Catalyst for Economic Growth and Innovation
Dr. Nisha Singh, Livingstone College

Long-Term Growth: Self-Interest vs. Synergistic Outcomes
Dr. Narendra Rustagi, Howard University

Traffic Volume and Statistical Analysis of Vehicle Movement in Raigarh, India
Dr. Sharad Maheshwari, Hampton University

Autonomous Resilience in Global Food Trade: A Quantum-Agentic Framework for Mitigating Supply Chain Shocks
Dr. Peter Y. Wui, University of Arkansas Pine Bluff
Dr. Mariofanna Milanova, University of Arkansas at Little Rock
Dr. Mansour Moetazavi, University of Arkansas Pine Bluff
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Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business

Paper Submitted

To

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Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business

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Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business

Abstract

A confluence of international business, education, and legal academics and professionals as researchers, have analyzed and present the growing convergence of international trade law, global regulatory governance, and higher education as interdependent pillars shaping modern international business. Drawing upon practitioner-based experience across the United States, India, and the United Arab Emirates (UAE), presented are analyses and best legal practices for cross-border trade, evolving regulatory frameworks governing global clinical research, and the expanding role of U.S. educational leadership in emerging economies and anchored in authoritative international frameworks, including the World Trade Organization (WTO), U.S. Food and Drug Administration (FDA), International Council for Harmonization (ICH), UAE Vision 2031, and India's National Education Policy (NEP 2020). The paper represents a synthesis of practical insights with globally accepted norms. The analysis demonstrates that U.S. leadership in regulatory science, legal governance, and academic diplomacy continues to shape global markets and institutional capacity-building. The paper culminates in analytically derived strategic recommendations for harmonizing compliance structures, expanding regulatory capacity initiatives, and strengthening trilateral U.S.–UAE–India partnerships to support sustainable economic growth, scientific integrity, and educational excellence.

Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business

Introduction

The twenty-first century has brought forth an era of unprecedented globalization characterized by deep symbiotic interdependence among nations in trade, regulatory governance, technological innovation, and higher education. Economic activity now routinely transcends national borders, driven by integrated supply chains, multinational enterprises, digital commerce, and globally coordinated research initiatives. In this environment, cross-border collaboration is no longer optional; it has become a structural imperative for participation in global trade and commerce.

The United States continues to occupy a centrally vital position in this global system. Its influence is particularly pronounced in three domains: international business law, regulatory science, and higher education. American legal frameworks have shaped international commercial norms. U.S. regulatory agencies, most notably the Food and Drug Administration (FDA), have set global benchmarks for safety and compliance. U.S. universities remain the world's most influential exporters of academic models, research standards, and leadership development.

In the contemporary environment, rapidly developing economies such as India and the United Arab Emirates are simultaneously undergoing ambitious transformation. India, which displays a momentum for change propelled by demographic scale and economic liberalization, seeks to modernize its legal, regulatory, and educational systems to support innovation and global competitiveness. The UAE's progress pathway is guided by strategic national visions such as Vision 2031, and has positioned itself as a regional hub for trade, biomedical research, higher education, and knowledge-based industries. Both countries increasingly look to U.S. models, less for replication, but for convergent adaptation within their unique cultural, regulatory, and economic policies and evolving trajectory.

This paper is about the evaluating the confluence of three interconnected pillars that underpin modern international business, as is denoted in this paper as:

1. **Best legal practices in international trade and cross-border business structuring**
2. **Regulatory affairs and compliance in global clinical research ecosystems**
3. **The export of U.S. educational leadership as a form of academic diplomacy**

Rather than presenting new empirical data, the analysis in this paper draws from decades of combined professional experience across the United States, India, and the UAE. These practice-based insights are a review and assessment of established international frameworks and provide a grounded perspective on how law, regulation, and education interact to shape global markets. By examining these domains together, the insights in the paper demonstrate that strategic leadership in international business increasingly depends on integrated legal expertise, regulatory integrity, and educational capacity-building.

Theoretical Positioning and Conceptual Foundations

A. Interdisciplinary Foundations of Global Convergence

Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business

This manuscript is positioned at the intersection of international business theory, regulatory governance, and higher education studies. Rather than advancing a single disciplinary model, the experimental-based paper reflects an **integrative theoretical approach** that reflects the increasingly interconnected nature of global economic systems. The concept of convergence employed here is also grounded in multiple theoretical traditions, including institutional theory, regulatory governance theory, and internationalization theory in higher education.

Institutional theory provides a foundational lens for understanding how organizations and states respond to global pressures by adopting shared norms, rules, and practices. The propositions of the institutional theory denote an explanation and focus on the varied and enduring facets of social structure underpinning sociology and organizational studies. Its postulations seek to understand the frameworks by which structures, such as plans, regulations, customs, and routines, emerge as guiding standards for social conduct (DiMaggio & Powell, 1983; Khassawneh & Elrehail, 2022). From this multi-dimensional perspective, convergence emerges through processes of coercive, normative, and mimetic isomorphism, as governments, firms, and educational institutions align their systems with internationally legitimized models. The widespread and global adoption of WTO rules, ICH guidelines, and U.S.-style accreditation frameworks exemplifies such institutional alignment.

At the same time, the views presented herein recognize that convergence is not synonymous with uniformity. Drawing on comparative institutionalism, the analysis presented herein acknowledges that global frameworks are adapted to local contexts, producing hybrid governance models rather than wholesale replication. This insight is particularly relevant in examining India's and the UAE's selectively attuned adoption of U.S.-aligned regulatory and educational practices.

Table 1. Key Global Frameworks Influencing Trade, Regulation, and Education

Domain	Framework	Governing Body	Strategic Impact
Trade	GATT, GATS, TRIPS	WTO	Market access, IP protection
Regulation	ICH, FDA 21 CFR	ICH / FDA	Clinical research harmonization
Education	NEP 2020	Govt of India	Higher education reform
Education	Vision 2031	UAE Government	Knowledge economy development

B. Regulatory Governance Theory

Regulatory governance theory offers a second critical foundational underpinning for this study. This body of scholarship is an examination of how regulatory authority is exercised, coordinated, and legitimized across multiple levels of governance, including national, transnational, and global arenas. The contemporaneous exponentially increasing adoption of technologies, AI in finance and other domains is lagging in commensurate clarity and advancement in legal and standardized laws or regulations on this usage. The regulatory boundary is unclear due to the lack of rules and regulations from the last decade (Levi-Faur, 2011), persisting to the current

(Ridzuan, et al., 2024). In the context of international business, regulation increasingly operates through networks rather than hierarchical command structures. The collaboration and innovative adaptation of established frameworks and standards optimize performance, however, regulations and technology the dilemma of the latter outpacing the former is a persistent quandary.

The ICH represents a paradigmatic example of networked regulatory governance, bringing together regulators and industry stakeholders to develop the continuing aim of harmonized standards that transcend national borders. Similarly, the global influence of the U.S. FDA illustrates how domestic regulatory institutions can acquire transnational rigorous oversight and influence through credibility, expertise, and enforcement, based on accountability and exacting standards, amenable to local adaptation, that is in keeping with established standards and practices.

This paper may reflect a deemed positioning of regulatory convergence not simply as a technical process but as a strategic instrument that shapes market access, innovation trajectories, and ethical norms. Regulatory harmonization, therefore, is seen as an alignment that reduces transaction costs for firms while enhancing trust among stakeholders, thereby facilitating cross-border trade and research collaboration. However, governance theory also highlights potential asymmetries of power, raising important questions about regulatory dominance and capacity disparities between developed and emerging economies.

C. International Business and Trade Theory

Within international business scholarship, this manuscript is a reflection of the engagement with theories of globalization, transaction cost economics, and institutional distance. Traditional trade theory emphasizes comparative advantage and market liberalization, while newer approaches recognize the role of legal and regulatory institutions in shaping firm adherence to ethical and regulatory compliance behaviors that yield competitive outcomes.

Looking at this from a transaction cost perspective, regulatory harmonization and legal predictability reduce uncertainty and opportunism in cross-border transactions, making international ventures more ethical and viable. Conversely, regulatory fragmentation increases costs and risk, particularly in knowledge-intensive sectors such as pharmaceuticals and higher education services.

The paper is also about awareness and the invocation of the concept of **institutional distance**, which refers to differences in legal, regulatory, and cultural environments between countries. By examining U.S.–India–UAE cohesive interactions, the analysis in this paper may indicate how education and regulatory capacity building function as mechanisms for reducing institutional distance, thereby facilitating international business integration.

D. Higher Education Internationalization Theory

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The theoretical framework chosen in this experiential analytical research is an incorporation of scholarship on the internationalization of higher education, with an assessment of the pros and cons. Early models framed internationalization primarily in terms of student mobility and cultural exchange. More recent views have held, as found in literature, the conceptualization of higher education as an integral component of a global industry and a strategic tool of national policy (Altbach & Knight, 2007). Globally, the higher education appears disheveled and inadequate to leverage and prepare students as strategic assets as an estimated 220 million students globally languish in the aftermath of Covid-19, and this new strategic policy (Tilak & Kumar, 2022).

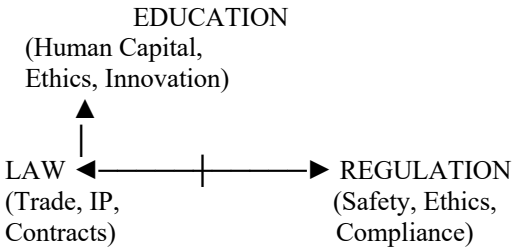
The views in this paper are consonant with perspectives that view international education as a form of **soft power and academic diplomacy**, with significant relevance in influencing governance norms, professional standards, and leadership cultures. The different forms of higher education, such as branch campuses, accreditation export, and joint research programs, are analyzed as institutional mechanisms through which educational systems transmit regulatory and ethical norms across borders. While individual national variances exist, the quest for uniformity and standardization is sought, especially in regulated industries and such domains.

By integrating higher education theory with regulatory governance and international business frameworks, the opinions expressed in this paper advance a more holistic understanding of how education contributes to global convergence beyond its traditional pedagogical role.

E. Conceptual Contribution and Positioning

The primary theoretical contribution of this manuscript may lie in its articulation of **global convergence as an integrated, multi-domain process, with the aspirations for greater standardization and uniformity, to the extent possible**. While existing views expressed in literature often examine trade law, regulation, or education in isolation, the contributors to this paper advance a **convergence model** that explicitly links these domains as mutually reinforcing components of global business systems.

Figure 1: Integrated Convergence of Law, Regulation, and Education



Note. The model illustrates the interdependence of legal, regulatory, and educational systems enabling global business.

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Rather than proposing a new grand theory, the authors in this manuscript offer a **conceptual synthesis** that bridges disciplinary silos and responds to calls for more interdisciplinary approaches in international business research. The U.S.–India–UAE comparative perspective provides empirical grounding for this synthesis, illustrating how convergence operates in practice across different institutional contexts.

In doing so, the views in this paper may contribute to scholarly debates on globalization, governance, and internationalization by highlighting the strategic role of education and regulatory capacity in shaping global markets. This positioning underscores the relevance of the study to researchers, policymakers, and practitioners seeking to understand and manage the complexities of a rapidly changing twenty-first-century international business.

I. Best Legal Practices for International Trade

A. The International Trade Environment

International trade operates within a complex architecture of multilateral, regional, and domestic legal regimes. At the multilateral level, the World Trade Organization (WTO) provides the foundational framework governing global commerce. WTO agreements endeavor to establish binding rules that promote predictability, transparency, and non-discrimination in international trade relations.

Three agreements are pertinent to understanding the opportunities and challenges, and particularly central to modern international business:

The **General Agreement on Tariffs and Trade (GATT)** governs trade in goods and establishes principles such as most-favored-nation treatment and national treatment. These principles seek to prevent discriminatory trade practices and promote open markets.

The **General Agreement on Trade in Services (GATS)** extends similar openness and reciprocity principles to services, including finance, education, telecommunications, and professional services—sectors that now constitute a significant share of global economic activity.

The **Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)** harmonizes minimum standards for intellectual property protection, addressing patents, trademarks, copyrights, and trade secrets. TRIPS is particularly significant for industries reliant on innovation, such as pharmaceuticals, biotechnology, and information technology.

Together, these agreements create a baseline legal environment within which international businesses operate. However, they coexist with bilateral and regional trade agreements, as well as domestic laws that may impose additional obligations. Effective international business strategy, therefore, requires not merely awareness of WTO norms but also careful navigation of overlapping regulatory regimes, and where different evolving standards make it necessary to understand the regulatory, cultural, geographic, and other dynamics.

B. Legal Risks and Compliance Imperatives

Engaging in cross-border commerce exposes firms to a plethora of legal risks that can undermine operations, profitability, and reputation if not properly managed. Among the most significant risks are jurisdictional conflicts, contract enforceability challenges, regulatory non-compliance, and exposure to anti-corruption and sanctions regimes.

Jurisdictional conflicts arise when disputes involve parties, assets, or conduct spanning multiple legal systems. Differences in procedural law, enforcement mechanisms, and judicial independence can significantly affect outcomes. To mitigate such risks, firms must carefully structure transactions and dispute resolution mechanisms.

Contract enforceability is another critical concern. Even well-drafted contracts may face enforcement challenges in jurisdictions with unfamiliar legal traditions or inconsistent judicial practices, which present unique challenges and difficulties in addressing these. This reality underscores the importance of selecting governing law, law firms, and dispute resolution forums strategically, with a view to mitigating risks, or displaying the utmost prudence in anticipating potential hurdles, and appropriate risk avoidance, mitigation, and prevention.

Export controls and sanctions compliance have become increasingly prominent, particularly in light of geopolitical tensions and national security concerns. In the United States, the Office of Foreign Assets Control (OFAC) administers sanctions programs that restrict transactions with designated countries, entities, and individuals. Violations can result in severe civil and criminal penalties.

Anti-bribery and anti-corruption compliance represents a central pillar of international legal risk management, where it is critical to be aware of trade practices and propensities. The U.S. Foreign Corrupt Practices Act (FCPA) expressly prohibits bribery of foreign officials and imposes strict penalties and accounting requirements on erring U.S. companies and issuers. Importantly, the FCPA has extraterritorial reach, meaning conduct in violation of the FCPA and US law, even occurring outside the United States, may still fall within its scope. Similar legislation exists in other jurisdictions, creating an accountable global compliance landscape that demands robust internal controls and ethical governance in the USA and internationally for Americans and companies.

C. Best Practices in Structuring International Business Ventures

To operate effectively within this complex environment, international businesses must adopt and implement best practices that integrate legal foresight, regulatory compliance, and risk mitigation.

Cross-border contract drafting is foundational and contingent upon the integration of knowledge of the nuances in enforcement, arbitration, and other mechanisms, being an imperative in different value and legal systems. Contracts should explicitly specify governing

law and dispute resolution mechanisms. International arbitration, particularly through established international institutions, notably the International Chamber of Commerce (ICC) or the London Court of International Arbitration (LCIA), is often preferred due to neutrality, enforceability under the New York Convention, and procedural flexibility.

Intellectual property protection is especially critical in innovation-driven sectors of technology and research. It is incumbent upon firms to register patents, trademarks, and copyrights in each jurisdiction where protection is sought, rather than relying only on home-country registrations. TRIPS-compliant safeguards should be incorporated into licensing and technology transfer agreements to prevent violations of intellectual property rights and misappropriation.

Dispute management strategies should prioritize early resolution and cost efficiency to prevent litigation that may be protracted and frustrating. While WTO dispute settlement mechanisms are available for state-to-state disputes, private-sector conflicts often benefit from mediation or arbitration. Alternative dispute resolution (ADR) mechanisms can preserve commercial relationships and reduce litigation risks, which include elongated timelines, delays, and costs.

II. Regulatory Affairs and Global Clinical Research

A. Overview of the International Regulatory Environment

Global clinical research has evolved into a highly interconnected enterprise involving multinational sponsors, contract research organizations, academic institutions, and regulatory authorities across jurisdictions. Clinical trials for pharmaceuticals, biologics, and medical devices are increasingly conducted across multiple countries to accelerate development timelines, improve population diversity with a large pool of patients and candidates, and to reduce costs. The effect of fining large patient pools and reduced costs with globalization has necessitated the development of harmonized regulatory standards to ensure participant safety, scientific validity, and data integrity, regardless of geographic location.

The most influential framework governing multinational clinical research is provided by the **International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human Use (ICH)**. Established to align regulatory requirements across major markets, the ICH has developed guidelines that are now globally recognized as the gold standard for clinical research conduct. Among these, **ICH E6(R2): Good Clinical Practice (GCP)** and **ICH E8(R1): General Considerations for Clinical Studies** play a central role in shaping trial design, execution, monitoring, and oversight (International Council for Harmonization [ICH], 2016, 2021).

Concomitantly and in parallel, national regulatory authorities continue to exercise sovereign oversight. In the United States, the **Food and Drug Administration (FDA)** enforces clinical research standards through regulations codified in **Title 21 of the Code of Federal Regulations (CFR)**, including Parts 50 (Informed Consent), 56 (Institutional Review Boards), and 312 (Investigational New Drug Applications) (U.S. Food and Drug Administration [FDA], 2018).

These regulations are widely viewed as among the most stringent globally and frequently serve as reference points for regulators in emerging markets.

The much sought-after harmonization and greater convergence of ICH guidelines and FDA regulations have contributed to a *de facto* global regulatory baseline. Countries such as India and the UAE increasingly endeavor and evolve to align their domestic frameworks with these standards to attract international research investment, gain regulatory credibility, and facilitate global market access, while the process of compliance and adherence to exacting standards hastens approvals and fosters greater success and innovation. However, alignment on paper does not always translate into uniform implementation, creating regulatory complexity that must be actively managed.

B. Ethical and Scientific Integrity in Multinational Clinical Trials

1. Informed Consent Across Cultural and Linguistic Contexts

Informed patient and research subject consent is a foundational ethical requirement of clinical research and a central pillar of both ICH GCP and FDA regulations. In multinational trials, however, obtaining truly informed consent presents significant challenges. The factors that impede include linguistic diversity, varying levels of health literacy, and cultural norms regarding authority and medical decision-making, which can affect participant comprehension. In the United States, the smaller availability of research subjects and higher recruitment costs are factors where overseas markets attractive, but the ethical issues of recruitment and strict compliance with the responsible and ethical conduct of research and trials are paramount.

Ethics committees and institutional review boards (IRBs) bear responsibility for ensuring that consent materials are not only translated accurately but also interpreted, culturally contextualized, and understanding of the research subject full are imperatives in trials. Literal translation alone is insufficient if participants do not fully understand the nature of the research, the associated risks, or their right to withdraw without penalty must be integrated in written and verbal recruitment and communications. At the same time, respect for local cultural practices must not diminish nor compromise universal ethical standards, particularly regarding voluntariness and autonomy.

The **Declaration of Helsinki** articulates with emphasis that special attention must be given to vulnerable populations and that informed consent processes in the recruitment of participants for clinical research and trials must be adapted to local contexts while preserving core ethical principles in the responsible and rigorous conduct of a study (World Medical Association, 2013). Failure to achieve this balance of ethics and rigor has historically contributed to controversies in global clinical research and underscores the need for robust oversight mechanisms in the undertaking of international studies.

2. Risk–Benefit Assessment and Participant Protection

The risk versus benefit is a critical discussion in research. A vital dimension of ethical research governance is the assessment of risk in relation to anticipated benefit. Regulatory authorities and ethics committees must evaluate whether a proposed study is scientifically justified to meet current and emergent and other needs and whether the potential benefits to participants or society outweigh the foreseeable risks.

In multinational trials, disparities in healthcare standards, protocols, and access can complicate a rigorous and robust study. Participants in lower-resource settings may perceive clinical trial participation as a means of accessing care otherwise unavailable, raising concerns about undue monetary and health promises as inducement in participating in a study. Regulatory oversight in local and international settings must therefore ensure that trial designs incorporate appropriate safeguards, including independent monitoring, data safety evaluation monitoring boards, across the continuum of a study or trial, and clearly defined rules for cessation if there is some violation of data collection, or other components of a clinical trial.

The efforts to bring about standardization of research and clinical studies are an ongoing process across the world. The inherent design in U.S. regulatory protocols, standards, and frameworks places stringent emphasis on systematic risk assessment, and these principles have provoked global practice through standardization and ICH adoption. However, consistent application across jurisdictions remains uneven for reasons that may be imaginable in disparate regulatory and legal systems, particularly in rapidly expanding research markets.

3. Post-Trial Access and Justice

Post-market and study surveillance are reflective of the need to monitor and display vigilance in the success of research and patient safety. Ethical responsibility does not cease with trial completion. The question of post-trial access to beneficial interventions is often cited as one of the most debated issues in global clinical research. The Declaration of Helsinki states that participants should have access to interventions identified as beneficial in the study, particularly when no satisfactory alternatives exist. The Declaration of Helsinki calls for transparency and clearly articulated guidelines on procedure in exceptional situations, including studies on vulnerable humans, the use of placebo and interventions with unproven efficacy (World Medical Association, 2013; Gutaj et al., 2022).

From the perspective of many, and in practice, post-trial access obligations are often ambiguous and inconsistently enforced. Sponsors of clinical research studies may meet regulatory requirements without ensuring sustainable access for host communities, leading to perceptions of exploitation. From the vast experience of the authors of this study, addressing this issue requires coordination among sponsors, regulators, and governments to align ethical expectations with practical implementation. Sponsors may be well served in maintaining a robust regulatory oversight component of legal, clinical, and administrative personnel, with the vigilance to ensure

research is undertaken with diligence and unwavering quality and on stringent and uncompromising ethical foundations.

C. Regulatory Challenges in Emerging Markets

1. India: Scale, Opportunity, and Compliance Complexity

India has emerged as one of the world's most significant hubs for clinical research, driven by its large patient population, diverse disease burden, and growing biomedical infrastructure. The country has transformed to strengthen its regulations, with substantial regulatory reforms undertaken to strengthen oversight and align with international standards. The **New Drugs and Clinical Trials Rules (2019)** represent a comprehensive effort to modernize India's clinical research framework, streamline approvals, and enhance participant protection.

The **Indian Council of Medical Research (ICMR)** has also issued ethical guidelines that closely display alignment with international norms, including requirements for informed consent, compensation for trial-related injury, and ethics committee oversight. Despite these advances, implementation challenges persist, as a large country and a multitude of factors act in concert and isolation, which pose challenges. These factors include the variability in institutional capacity, uneven training of investigators and ethics committees, and administrative complexity, all of which can create compliance risks for multinational sponsors.

The diverse geographic, cultural, economic, and other factors complicate the regulatory and clinical aspects of clinical studies. From an international business perspective, India illustrates both the promise and the challenge of emerging research markets: significant opportunity coupled with regulatory fragmentation that requires sophisticated compliance strategies, and some physical presence of knowledgeable teams with clinical, regulatory, and other pertinent competencies.

2. United Arab Emirates: Regulatory Capacity Building and Strategic Vision

The UAE represents a contrasting scenario in many respects and is an equally instructive case. Instead of relying on scale, the UAE has pursued a strategy of regulatory excellence and strategic investment to position itself as a regional leader in biomedical research and innovation. Under **UAE Vision 2031**, the country has prioritized the development of advanced healthcare infrastructure, biopharmaceutical manufacturing, and stringently uncompromising clinical research oversight.

Regulatory authorities in the UAE have increasingly adopted international best practices, drawing from FDA and ICH models to build credibility and attract global partnerships. The emphasis on regulatory capacity building, which includes training, digitalization, and inter-agency coordination, reflects a recognition that strong regulation is not a barrier to innovation but a prerequisite for sustainable growth.

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The UAE's approach highlights the role of regulatory governance as a strategic asset when made the focal emphasis. By aligning domestic frameworks with global standards, the country enhances its integration into international research networks and global value chains.

D. Regulatory Affairs as a Strategic Business Function

Across the US and many international jurisdictions, regulatory affairs have evolved from a compliance-focused function to a strategic and integral component of international business operations. Organizations engaged in global clinical research must anticipate regulatory expectations, manage cross-border submissions, and maintain ongoing compliance from trials and research, and thereafter throughout the product lifecycle.

The breadth of experience is the reason why U.S. regulatory leadership plays a critical role in shaping this environment. FDA guidance documents, inspection practices, and enforcement actions influence global norms, even beyond U.S. borders. The familiarity with the U.S. regulatory expectations has become a valuable form of regulatory capital for organizations operating internationally and the partners engaged in the development of health care in its different forms of research and marketing.

For emerging markets, collaboration with U.S. institutions, in diverse but coordinated engagement, is vital, and is relied on through training programs, joint research initiatives, and regulatory dialogues—offers a pathway to capacity building and international integration. This collaborative dynamic illustrates how regulatory affairs intersect with education and diplomacy, reinforcing the broader convergence explored in this paper.

III. Exporting U.S. Educational Leadership: Academic Diplomacy and Global Impact

A. The Global Market for American Higher Education

Higher education has emerged as a transformational and strategic instrument of global influence, economic development, and workforce transformation. Among all the major industrialized and exporting nations, the United States has gained a uniquely dominant position in the global education market. U.S. universities, accreditation standards, and pedagogical models have become global reference points for quality, innovation, and institutional governance. Globally, the higher education seems challenged in the transformation of students as a strategic national asset, from the previous decades (Altbach & Knight, 2007) to the contemporary era, as a reported 220 million students globally, can be a source of strategic advantage is education is harnessed to achieve that outcome (Tilak & Kumar, 2022).

The internationalization of American higher education extends far beyond mere student mobility. In contemporary connotations and realities, it encompasses faculty exchanges, joint research initiatives, branch campuses, transnational accreditation, curriculum licensing, and executive education partnerships. Collectively, these activities constitute a form of **academic diplomacy**,

through which educational engagement advances institutional interests and also broader economic and strategic objectives.

The demand for U.S.-led education has grown most rapidly in regions undergoing economic diversification and regulatory modernization. The Middle East, particularly the UAE and Saudi Arabia, and South Asia, led by India, represent key growth markets. These regions seek to build human capital capable of supporting advanced industries such as biotechnology, artificial intelligence, advanced manufacturing, healthcare, and global finance. In doing so, they frequently turn to American educational frameworks as benchmarks to strive for excellence and building global credibility.

B. Academic Diplomacy as Soft Power

The concept of soft skills and broadly the associated power, traditionally associated with cultural influence and diplomacy, applies directly to higher education. Universities transmit norms, values, and institutional practices that shape leadership cultures across generations. U.S. educational leadership promotes principles such as academic freedom, evidence-based inquiry, merit-based advancement, and institutional autonomy. These represent values that often influence governance structures that extend well beyond the campus.

Academic diplomacy manifests now in an enhanced learning environment facilitated by the forces of technology, increased affluence, and a greater desire to acquire academic qualifications, all of which operate through multiple channels. Joint degree programs and branch campuses embed U.S. curricula and governance models within host countries. Research collaborations create enduring professional networks that align scientific standards and ethical expectations. Accreditation partnerships reinforce quality assurance mechanisms that seek to emulate U.S. regulatory and institutional practices.

Unique competencies are an outcome of the American influence on global education, as importantly, educational diplomacy complements regulatory and trade engagement. Graduates trained under U.S.-aligned systems appear better equipped to operate within complex legal and regulatory environments, including those shaped by WTO norms, FDA standards, and international compliance regimes, though the need to study foreign environments and their evolution is a requirement. Nevertheless, with that grounding, the adaptive and learning skills are also enhanced. Education thus becomes an enabling infrastructure for international business and regulatory convergence.

C. U.S.–UAE Collaboration Models

The UAE provides one of the most advanced examples of strategic engagement with U.S. higher education. Over the past two decades, the country has invested heavily in creating a global education hub, leveraging partnerships with leading American institutions to accelerate capacity building and international integration.

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1. Branch Campuses and Joint Institutions

The educational expansion thrust, some high-profile examples, such as the **NYU Abu Dhabi** alliance, which may illustrate the UAE's approach to academic development. These institutions operate under U.S. academic standards while integrating local cultural and strategic priorities. Faculty governance, research expectations, and student assessment mirror U.S. practices, reinforcing global credibility.

Strategic alliances and such models serve multiple objectives. For host countries, they reduce outbound student migration, retain talent, and align education with national economic strategies. For U.S. institutions, they expand global reach, diversify revenue streams, and deepen international research engagement.

2. Accreditation Diplomacy

Stringent standards in education and accreditation play a central role in exporting U.S. educational leadership. Organizations such as **ABET**, **AACSB**, and regional accrediting bodies have become *de facto* global standards for quality assurance. Institutions in the UAE increasingly seek U.S. accreditation to signal international legitimacy and attract global faculty and students.

Gaining accreditation and approval is a form of diplomacy that extends beyond quality assurance. Such endorsement embeds governance norms related to transparency, assessment, continuous improvement, and stakeholder accountability. These quality in the form of accreditation norms align closely with broader regulatory and compliance expectations in international business and research environments.

3. Alignment with UAE Vision 2031

The objectives of the UAE are laudable. The UAE Vision 2031 explicitly emphasizes knowledge-based economic development, innovation, and global competitiveness. Education is strategically recognized and is now positioned as a strategic driver of national transformation, rather than a standalone social sector. U.S. educational partnerships align naturally with this vision by supporting advanced STEM education, clinical research training, and leadership development.

The case of the UAE is an indicator of how education, regulation, and economic strategy can be diligently integrated. This integration reinforces the central thesis of this paper: that educational leadership is integral in association and inseparable from regulatory capacity and international business success.

D. U.S.–India Educational Collaboration Under NEP 2020

India represents a different but equally significant dimension of U.S. educational engagement. The population data and statistics indicate that the most populous country in the world is also one

of the world's largest higher education systems and a rapidly expanding youth population. India's educational reforms carry global implications.

The **National Education Policy (NEP) 2020** marks a transformative shift in India's approach to higher education. The policy emphasizes interdisciplinary learning, institutional autonomy, internationalization, and research excellence. It explicitly encourages collaboration with foreign universities, including joint degrees, faculty exchanges, and research partnerships.

U.S. institutions are strategically, from an educational standpoint, well-positioned to contribute to NEP 2020's objectives. American experience in liberal arts education, research governance, and accreditation aligns closely with India's reform agenda and its goals of being among the top three or four economies of the world. At the same time, India's scale and diversity present opportunities for innovation in delivery models, digital education, and applied research.

Existing educational collaborations have the potential to grow; however, even as of now, the relationship between the U.S. and India also supports regulatory and business convergence. Graduates trained under U.S.-aligned systems are and more likely to be more familiar with international compliance standards, ethical research norms, and global professional practices. This human capital development directly supports India's constant efforts to increase integration into global value chains.

E. Exporting Ethical and Governance Frameworks

There are new challenges in academic integrity with ready-made solutions offered with AI, yet plagiarism monitoring has also improved in technological detection solutions. The strength of the US higher education extends beyond curriculum and credentials; U.S. educational leadership exports ethical and governance frameworks that shape institutional behavior. These include standards for research integrity, conflict of interest management, human subjects protection, and academic freedom.

In the context of global clinical research, educational programs in regulatory affairs, bioethics, and clinical trial management play a critical role in capacity building. Training programs modeled on U.S. standards help in the ongoing quest to harmonize regulatory practices across jurisdictions and reduce compliance risks in multinational research.

Driving innovation with quality and ethical rigor, governance frameworks also influence how institutions manage intellectual property, technology transfer, and industry partnerships. U.S. universities have developed sophisticated models for balancing commercialization with academic mission, offering valuable lessons for emerging innovation ecosystems.

F. Challenges in Transnational Education

There are challenges, as despite its benefits, exporting U.S. educational leadership must contend with different values, beliefs, and standards. Cultural differences can create tension around pedagogy, governance, and academic freedom. Regulatory barriers, including visa restrictions and licensing requirements, can impede mobility and collaboration.

The range of academic and intellectual discovery has its own set of issues. Intellectual property theft and its protection remain a persistent concern, particularly in research-intensive partnerships. Institutions must carefully structure agreements to protect proprietary knowledge while enabling meaningful collaboration.

Among the geopolitical dynamics that can affect educational partnerships are many as well. Governments in most emerging and mature economies increasingly view universities as strategic assets. Navigating these dynamics requires diplomatic sensitivity and institutional resilience.

G. Opportunities for Strategic Expansion

After critically assessing the nuances of expansion, we can say that despite these challenges, expansion opportunities remain substantial. Global demand for **STEM education**, particularly in fields linked to healthcare, biotechnology, and digital transformation, continues to grow. The expansion of **medical and clinical research training programs** aligns directly with regulatory capacity-building needs in emerging markets.

The concept of **global campuses** is viewed as institutions integrated with local innovation ecosystems, and represents a promising model for the future. Such campuses combine education, research, entrepreneurship, and industry engagement, reinforcing the convergence of law, regulation, and economic development.

The inference drawn from extensive research with experiential knowledge also acquired in real-world settings is that through strategic educational engagement, the United States can continue to shape global norms while supporting the aspirations of partner countries. Education thus emerges not merely as an export sector, but as a foundational element of international business strategy and global governance.

IV. Strategic Synthesis: Convergence of Law, Regulation, and Education in Global Business

A. The Convergence Model: An Integrated Framework

The preceding analysis demonstrates that international trade law, regulatory affairs, and educational leadership are no longer discrete domains. Instead, they function as interdependent systems that collectively shape the architecture of modern international business. This convergence reflects a structural transformation in the global economy, where legal predictability, regulatory integrity, and human capital development are mutually reinforcing,

especially where there is a deliberate effort to achieve this convergence for the potential outcomes that can contribute to nation-building.

International trade agreements establish the legal pathways through which goods, services, and intellectual property flow across borders. Regulatory systems ensure that such flows meet safety, ethical, and quality standards. Educational institutions supply the skilled professionals capable of navigating and sustaining these complex systems, which are constantly evolving to achieve harmonization with US standards. Weakness in any one pillar undermines the effectiveness of the others.

From this perspective, global competitiveness is not achieved solely through market access or technological advantage, but through **institutional coherence.** This transformation represents the alignment of legal frameworks, regulatory capacity, and educational ecosystems. The United States has historically excelled in this alignment, which explains its outsized influence in shaping global norms across all three domains.

Table 2. Comparative National Strengths in the Convergence Model

Country	Legal Systems	Regulatory Capacity	Educational Influence
United States	Mature, global benchmark	Advanced (FDA)	World-leading
India	Rapidly modernizing	Expanding	Large-scale reform
UAE	Agile, strategic	High investment	Global partnerships

B. Regulatory Harmonization as an Enabler of Trade and Innovation

From the facts and details presented and the derived analysis, regulatory harmonization plays a pivotal role in enabling cross-border commerce and innovation. In sectors such as pharmaceuticals, biotechnology, and medical devices, regulatory divergence can act as a non-tariff barrier, increasing costs, delaying market entry, and discouraging investment. Conversely, alignment with international standards, proven for consistency and rigor, such as those promulgated by the ICH and enforced by the FDA, is a driver of progress and facilitates global market integration.

For emerging economies, regulatory harmonization offers a pathway to participation in global value chains. India's earnestness in its seeking alignment with ICH guidelines and modernization of its clinical trial regulations illustrates how regulatory reform can attract international research investment while enhancing participant protection. Similarly, the UAE's dedicated emphasis on regulatory capacity building under Vision 2031 demonstrates how regulatory excellence can be leveraged as a strategic national asset.

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The United States holds a position of earned respect in the areas of focus presented in this paper. The enlightenment by U.S. regulatory leadership is central to this process. FDA standards often function as a gold standard and a global benchmark, shaping expectations even in jurisdictions where they do not have formal authority and have made no physical inroads. This influence underscores the importance of regulatory diplomacy, which entails engagement through training, collaboration, and technical assistance; these may represent the pathway to promote convergence without imposing uniformity.

C. Education as Regulatory and Economic Infrastructure

Education is a driver of positive change and occupies a unique position within the convergence framework. As a vehicle to transform, it serves simultaneously as a public good, an economic sector, and an enabling infrastructure for governance and innovation. Broadly, U.S. educational leadership in the different institutions and organizations operating internationally contributes to global convergence not only by exporting curricula but also by transmitting institutional norms related to quality assurance, ethical conduct, and evidence-based decision-making.

Graduates of U.S.-aligned programs are better prepared to operate within complex legal and regulatory environments. This preparedness is particularly valuable in fields such as regulatory affairs, clinical research management, international law, and global business administration. As such, educational engagement directly supports regulatory harmonization and trade integration.

The cases analyzed herein. of India and the UAE illustrate different pathways through which education supports national development strategies. India's NEP 2020 seeks to scale educational reform across a vast and diverse system, emphasizing internationalization and research excellence. The UAE, by contrast, has pursued targeted partnerships with elite institutions to rapidly build capacity and global credibility. Both approaches highlight the adaptability of U.S. educational models to distinct national contexts.

D. Trilateral Strategic Framework: United States–India–UAE

Building on the analysis, we propose a **trilateral strategic framework** linking the United States, India, and the UAE across trade, regulation, and education. Each country brings complementary strengths to the partnership.

The United States contributes mature legal frameworks, advanced regulatory systems, and globally recognized educational institutions. India offers scale, talent, and a dynamic innovation ecosystem undergoing rapid reform, with a focused effort to be among the top economies of the world. The UAE is sustained in goal-driven achievement and provides strategic investment capacity, regulatory agility, and a vision-driven approach to economic diversification.

Within this framework presented, several priority areas emerge:

Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business

1. **Regulatory Capacity Building**
   Joint training programs in regulatory science, clinical research oversight, and compliance management can strengthen institutional capacity while promoting harmonization.
2. **Educational Partnerships**
   Expansion of joint degree programs, faculty exchanges, and research collaborations aligned with NEP 2020 and UAE Vision 2031 can support workforce development in high-impact sectors.
3. **Innovation and Technology Transfer**
   Collaborative platforms linking universities, industry, and regulators can accelerate commercialization while safeguarding ethical and legal standards.
4. **Policy Dialogue and Governance**
   Structured dialogue among policymakers, regulators, and academic leaders can facilitate alignment of legal and regulatory reforms with educational strategies.

Such a trilateral approach moves beyond bilateral engagement, recognizing that global challenges, which range from healthcare innovation to digital governance, and require multi-nodal collaboration.

E. Policy and Practice Recommendations

Drawing on the integrated analysis, the following recommendations are proposed for policymakers, regulators, and institutional leaders:

1. **Promote Integrated Policy Design**
   Trade, regulatory, and education policies should be developed in coordination rather than isolation, reflecting their interdependence.
2. **Invest in Regulatory Education**
   Specialized educational programs in regulatory affairs and compliance should be expanded to support harmonization and risk management.
3. **Strengthen Accreditation and Quality Assurance**
   Adoption of internationally recognized accreditation standards can reinforce institutional credibility and facilitate cross-border recognition.
4. **Encourage Ethical Governance**
   Ethical frameworks governing research, business conduct, and education should be embedded within institutional practices and enforced consistently.
5. **Leverage Academic Diplomacy**
   Educational engagement should be recognized as a strategic tool of international cooperation, complementing trade and regulatory initiatives.

Conclusion

The global economy is increasingly defined by the almost seamless convergence of markets, regulations, and knowledge systems, both synchronously and asynchronously, and is mediated and leveraged by online technologies. In this technology-driven environment, strategic

leadership in international business depends not only on economic power but also on institutional coherence and normative influence. The United States remains uniquely positioned to exercise such leadership through its integrated strengths in law, regulation, and education, where collaboration is indispensable, adaptation is essential, and engagement allows some flexibility, but adherence to regulatory standards, ethics, and the rule of law is uncompromising.

The United States, in its partnerships with emerging economies such as India and the UAE demonstrate how convergence can be mutually beneficial, supporting economic diversification, scientific advancement, and educational excellence. By strategically aligning legal frameworks, regulatory governance, and academic diplomacy, nations can build resilient systems capable of addressing complex global challenges.

As the world advances and globalization continues to evolve, the convergence of trade, regulatory affairs, and education will remain central to sustainable international business. In this paper, we have presented the argument that deliberate integration of these domains—grounded in ethical governance and collaborative engagement, indeed, offers a pathway toward inclusive growth and shared prosperity in the twenty-first century.

Author Note

The authors declare no conflicts of interest related to this manuscript. No external funding was received for this work. The analysis presented is based on professional practice experience and established international frameworks. The views expressed are solely those of the authors and do not represent the official positions of any affiliated institutions or governments.

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Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business

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Re: Manuscript Submission – *Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business*

Dear Conference Coordinator:

We are pleased to submit our manuscript entitled *"Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business"* for consideration in the Howard University, Washington Business Research Forum, and its dedicated business Journal.

In this interdisciplinary paper, we examine the strategic integration of international trade law, global regulatory governance, and higher education leadership across the United States, India, and the United Arab Emirates. Drawing on practitioner experience and global frameworks, the study provides actionable insights for policymakers, educators, and business leaders seeking to advance ethical and effective international collaboration.

In this manuscript, we examine the strategic convergence of international trade law, regulatory governance, and higher education as foundational pillars shaping contemporary international business. Drawing on practice-based insights from the United States, India, and the United Arab Emirates, the paper integrates authoritative global frameworks—including the World Trade Organization (WTO), U.S. Food and Drug Administration (FDA), International Council for Harmonisation (ICH), India's National Education Policy 2020, and UAE Vision 2031—to offer a comprehensive, policy-relevant analysis.

The manuscript contributes to the literature by:

1. Advancing an integrated convergence framework linking law, regulation, and education;
2. Providing comparative insights into emerging market regulatory and educational reforms; and
3. Demonstrating how academic diplomacy functions as a strategic tool in global business and governance.

The manuscript is original, has not been published previously, and is not under consideration elsewhere. All authors have approved the submission and declare no conflicts of interest.

Global Convergence in Trade, Regulatory Affairs, and Education: Strategic Leadership and Best Practices for International Business

We believe the manuscript aligns well with the Conference and its journal's focus on international business, policy, and global governance, and we respectfully request your consideration.

Thank you for your time and consideration.

Sincerely,

Lionel de Souza

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Does a "winner-takes-all" phenomenon exist in corporate access to fiscal subsidies? Evidence from Chinese A-share listed companies

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ABSTRACT

Corporate Environmental, Social, and Governance (ESG) performance has garnered widespread attention, with fiscal subsidies serving as a key governmental tool to promote strong ESG performance. This study explores the relationship between corporate ESG performance and access to fiscal subsidies, as well as the underlying mechanisms, using data from Chinese A-share listed companies. The findings indicate that companies can secure more fiscal subsidies by enhancing their ESG performance, with evidence of a "winner-takes-all" phenomenon. Mechanism tests reveal that the positive correlation between ESG performance and fiscal subsidies is primarily transmitted through two channels: government rewards and support. Heterogeneity analysis shows that the effect of obtaining more fiscal subsidies through improved ESG performance is more pronounced in private enterprises, small-scale firms, and capital-intensive companies. Additionally, fiscal subsidies are more effective in boosting innovation and corporate value for firms with poorer ESG performance. Therefore, fiscal subsidy implementation should be intensified appropriately, while accelerating the establishment of standardized ESG rating systems. Subsidies should be allocated based on high-quality disclosure information, balancing support for firms with ESG advantages and those with potential for ESG improvement to mitigate the "winner-takes-all" effect.

ARTICLE INFO

Keywords: ESG performance; Fiscal subsidies; Disclosure quality; Innovation; Government support; Winner-takes-all

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Abstract:

Immigrants play a critical role in driving the United States' economic growth through entrepreneurship, innovation, and labor market participation. Analysis of immigrant-founded companies reveals that firms led by immigrants or their children generate trillions in revenue, spanning key sectors such as technology, manufacturing, and high-growth industries like artificial intelligence and semiconductors. Immigrant workers also support both essential labor markets—healthcare, construction, and agriculture—and high-skill innovation sectors, contributing disproportionately to patents, startups, and venture capital investment. The purpose of this paper is to examine which countries contribute most to U.S. economic growth, assess the effect of immigration on income, identify present areas where contributions are substantial, and highlight future sectors with potential for growth. Overall, immigrants not only expand the labor force and stimulate business creation but also create significant net fiscal benefits, demonstrating their integral role in sustaining U.S. competitiveness and long-term economic prosperity.

Literature Review

A substantial body of economic research has examined the relationship between immigration and economic performance in the United States, with a strong consensus that immigrants contribute significantly to *entrepreneurship, innovation, income growth, and overall economic dynamism*. Studies consistently show that immigrant entrepreneurs start businesses at higher rates than native-born individuals, generating employment and expanding economic activity. For example, immigrants are estimated to start new firms at nearly twice the rate of native-born Americans, and immigrant-owned startups contribute significantly to job creation and wage growth across sectors.

Economists also find a positive, causal link between immigration and *innovation*. Using long-run data on migration and local economic outcomes, researchers estimate that immigration contributes to higher rates of patenting and real income growth in U.S. counties, with skilled foreign-born workers fostering innovation and productivity gains. Evidence from patent analysis confirms that immigrants not only generate a disproportionate share of U.S. patents relative to their population share but also stimulate innovation spillovers that benefit native inventors.

Moreover, recent aggregate studies review broader patterns of immigrant entrepreneurship, showing that immigrants account for a substantial share of new employer businesses and are over-represented in high-growth industries where innovation and economic returns are most pronounced. Systematic literature reviews reinforce these findings, highlighting cultural diversity, educational attainment, and entrepreneurial skill as key drivers of immigration's positive effects on innovation and growth.

At the same time, some research nuances the discussion by emphasizing the *role of skill composition*: high-skilled immigrants tend to have more positive impacts on innovation and income growth than lower-skilled migrants, and the overall effect on per-capita income depends on local labor market structures and immigrant skill distributions.

In sum, the economic literature underscores that immigrants enhance U.S. economic performance through higher rates of business formation, greater patenting and innovation, and contributions to wage and productivity growth — particularly when immigration flows include a large share of high-skill individuals with STEM and entrepreneurial backgrounds.

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Long Term Growth: Self Interest vs Synergistic Policies

Narendra K. Rustagi, Howard University

Abstract

US looked only at its interests and imposed heavy tariffs on imports from several countries including India. As per US Customs and Border Pretection (2025), between Jan 20 and December 15, 2025, 'U.S. Customs and Border Protection collected more than $200 billion in tariffs.'. While the amount is disputed, regardless of the amount, what is important is the impact it had on the relationships with other countries. Due to heavy US tariffs, India signed several Free Trade Agreements and expanded and diversified its export markets resulting in India's total exports rising to US$ 64.5 billion between November 2024 and November 2025 to US$ 73.99 billion, a 15.52% increase. During this period, another challenge related to rare earth minerals. In reference to rare earth minerals, China and US followed strategy of control of resources, while India is following the strategy of signing cooperative agreements and memorandums of understand with mineral rich countries including Zambia, Zimbabwe, Mozambique, Malawi, Mali and Cote-d'Ivoire and technology sharing partnerships with countries like Australia, United States and Japan. The focus, thus, is to build alliances and jointly seek solutions. With this strategy, India has been growing at a very fast pace. Overall, in terms of GDP, Indian economy improved from steadily, rising from 10th in 2010, to 9th in 2014, to 8th in 2015, to 6th in 2016-17, to 5th in 2022, to 4rh in 2025. The objective of this paper is to compare the impact of Indian policies that focus on synergistic policies follow by India and purely Self-Interest policies follow by some countries.

Traffic Volume and Statistical Analysis of Vehicle Movement in Raigarh, India

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Research Report

Study of Traffic in Small Industrial Town In India
Raigarh (Chhittisgarh, India)

1. Introduction

India's rapid economic expansion has placed unprecedented pressure on both urban and semi-urban infrastructure systems. Among these, transportation and transit networks function as critical backbones for industrial productivity, workforce mobility, and sustainable regional development. Smaller industrial towns such as Raigarh occupy a central position within India's manufacturing corridor, yet they often lack the robust transportation infrastructure required to sustain long-term economic growth.

Raigarh is strategically situated within a mineral-rich belt and hosts a diverse cluster of industries, including steel, cement, and power generation. Despite this strong industrial base, the town faces persistent mobility challenges such as inadequate road width, congestion caused by heavy freight vehicles, limited public transportation options, and insufficient multimodal connectivity. These issues reflect broader infrastructure constraints observed across many emerging industrial clusters in India.

2. City of Raigarh

Raigarh, located in the state of Chhattisgarh in central India, is one of the region's most significant industrial hubs. Historically known for jute milling and traditional handloom weaving, the city has evolved into a major center for steel, power, and cement production. It is home to several world-class industrial facilities, including Jindal Steel and Power—operator of the world's largest coal-based sponge iron plant—as well as major thermal power assets such as the Adani Power Plant. The region's economic strength is further supported by abundant mineral resources, particularly coal, iron ore, and limestone, which underpin its heavy manufacturing industries.

- Steel & Power: Jindal Steel & Power (world's largest coal-based sponge iron plant), Adani Thermal Power Plant.
- Cement: Proximity to raw materials supports major players like Ambuja, Ultratech, and ACC.
- Mining: Essential raw materials like coal, iron ore, limestone fuel the region's industries.

- Resource Rich: Abundant coal, iron ore, and limestone deposits fuel heavy industries.
- Logistics Hub Potential: Well-connected by road and rail, positioning it as a key logistics center.

Figure 1: Map of India

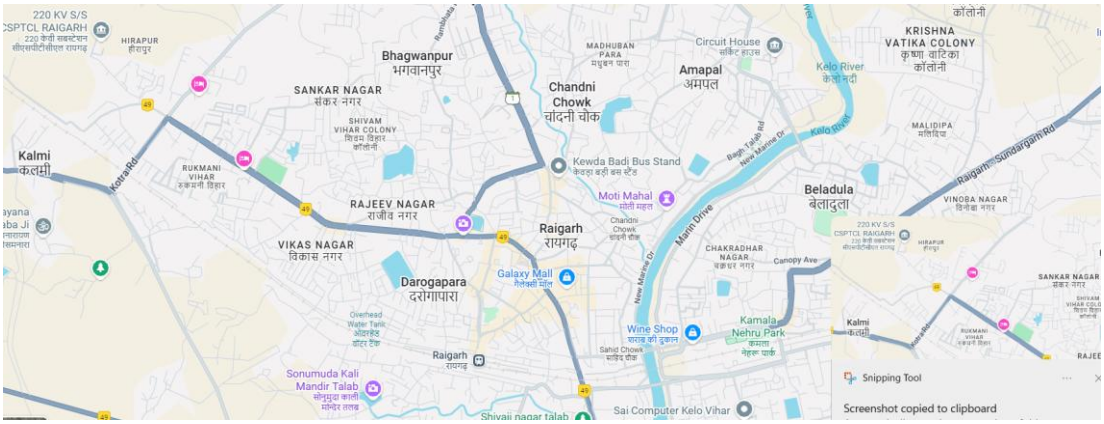

Figure 2: Map of City of Raigarh

3. Plan of Study

I traveled to the city of Raigarh, India, in June–July 2023. Because the city was not well known to me, I contacted OP Jindal University-OPJU (Punjipatra, Raigarh) prior to my visit. I arrived in Raigarh on June 19, 2023, after traveling through Delhi and Raipur, and remained there until July 1, 2023. During this period, I sought assistance from the School of Management to support the research project. To be clear, I do not have any real connection with the city of Raigarh, other than one previous visit to OPJU during my previous sabbatical in 2016. Traveling to Raigarh required reaching New Delhi, flying to state Capital, Raipur and then 4-5 hours taxi (or train) ride to reach to Raigarh.

Four students volunteered to participate in traffic data collection for the city. These students were trained by me during my stay, and I supervised an initial trial run to ensure consistency in data recording. In the absence of any automated traffic-counting technology, an observational data collection method was employed. Some earlier data had to be discarded, as it did not meet the reliability requirements for analysis; therefore, several datasets were recollected to ensure accuracy.

Date	Activity	Sample Size
July-Sept 2023	Traffic Volume Data	84
July-Aug 2024	Commuter data collection	80
Jan-Feb 2025	Truck operator Survey	80

Table 1: Timeline of data collection

4. Literature Review

There is lack of government data. Several attempts were made with city municipal and other administrative offices, but no such data was available. Small Indian cities collect no such data on regular basis. Little published work could be obtained on Indian small cities traffic data. Here are some informal observations along with general traffic data from the literature (see bibliography).

- India's transportation sector consistently highlights a combination of rapid motorization
- Infrastructure deficits
- Regulatory and institutional complexity as central challenges.
- Planning bodies (Niti Ayog, 2018) shows that road transport carries more than 60% of freight and over 85% of passenger traffic.
- Railways historically being the backbone of long-distance movement.
- Since the 1990s economic liberalization, India has seen very high growth in vehicle ownership, particularly two-wheelers and cars, without a proportional expansion in road capacity.
- Raigarh is a Tier-3 city and it suffers from similar poor planning and land use. Development of highways and growth along the highways (there is no freeway near Raigarh) created a worsening traffic as through-traffic and local access is all mixed up.
- There is no public transit system in Raigarh. There are a few private bus operators with very poor service. This leads to congestion of local traffic environmental factors aside.
- Freight movement is very inefficient. Toll plaza are clogged.
- Very poor last-mile connectivity to ports and industrial zones
- Limited warehousing capacity and quality.
- Trucking is not very organized industry.
- In Raigarh this leads to overloaded trucks, long delays, traffic jams, etc. due to narrow approach roads, and inadequate bypasses.
- Road safety is extremely poor. With little to no emergency services in government sector.
- It lacks formal public transport planning. Raigarh poor data availability for traffic and road inventory.

5. Research Data Collection

a. Traffic Data.

Following table shows the track count data in our observation

Num	Location	Location Code	Start Time	Finish Time	14-wheeler trucks	10-wheeler trucks	6-wheeler trucks	4-wheeler trucks	other	Lanes	Time of Observation	Total truck count	Rate/Hr	Rate/Lane/ Hr
1	Bhupdeopur	1	9:45 AM	10:45 AM	45	52	45	10	35	2	1.00	187	187	94
2	Bhupdeopur	1	4:45 PM	5:45 PM	36	65	25	16	25	2	1.00	167	167	84
3	Chandarapur X1	2	8:35 AM	9:35 AM	45	65	35	65	20	2	1.00	230	230	115
4	Chandarapur x1	2	5:35 AM	6:40 AM	55	95	25	35	25	2	1.08	235	217	108
5	Lakha Road	3	9:05 AM	10:20 AM	65	54	12	25	36	2	1.25	192	154	77
6	Lakha Road	3	2:05 PM	3:20 PM	34	80	25	12	25	2	1.25	176	141	70

7	Lakha Road	3	11:25 AM	12:35 PM	35	65	25	10	25	2	1.17	160	137	69
8	Lakha Road	3	5:35 AM	6:35 AM	25	62	20	15	10	2	1.00	132	132	66
9	Jindal Road	4	8:50 AM	9:50 AM	50	60	10	19	52	2	1.00	191	191	96
10	Jiindal Road	4	2:20 PM	3:30 PM	60	55	20	10	35	2	1.17	180	154	77
11	Jindal Road	4	9:23 AM	10:23 AM	40	25	15	32	25	2	1.00	137	137	69
12	Jindal Road	4	5:12 PM	6:12 PM	69	63	35	20	36	2	1.00	223	223	112
13	Chatamuda Chowk	5	8:55 AM	10:00 AM	50	75	52	20	35	2	1.08	232	214	107
14	Chatamuda Chowk	5	2:20 PM	3:18 PM	30	60	24	15	20	2	0.97	149	154	77

15	Chatamuda Chowk	5	12:10 PM	1:25 PM	55	80	35	32	25	2	1.25	227	182	91
16	Chatamuda Chowk	5	4:10 AM	5:10 AM	60	55	32	20	35	2	1.00	202	202	101
17	Pussore Road	6	8:40 AM	9:55 AM	55	80	10	25	23	2	1.25	193	154	77
18	Pussore Road	6	12:10 PM	1:35 PM	60	55	15	35	18	2	1.42	183	129	65
19	Pussore Road	6	10:35 AM	11:50 AM	70	65	25	24	45	2	1.25	229	183	92
20	Pussore Road	6	4:55 AM	6:00 AM	30	90	11	19	25	2	1.08	175	162	81
21	Kharsiya Road	7	8:40 AM	9:10 AM	42	58	24	15	24	4	0.500	163	326	82
22	Kharsiya Road	7	12:30 PM	12:50 PM	56	62	15	18	29	4	0.333	180	540	135

23	Kharsiya Road	7	2:15 AM	2:40 AM	36	48	18	28	15	4	0.417	145	348	87
24	Kharsiya Road	7	3:30 AM	3:50 AM	48	75	22	26	28	4	0.333	199	597	149
25	Sarangad Road	8	10:05 AM	10:40 AM	43	18	24	30	26	4	0.583	141	242	60
26	Sarangad Road	8	11:15 AM	11:52 AM	54	68	25	18	22	4	0.617	187	303	76
27	Sarangad Road	8	1:30 AM	1:50 AM	26	47	31	19	31	4	0.333	154	462	116
28	Sarangad Road	8	2:20 PM	2:54 PM	42	60	26	32	40	4	0.567	200	353	88
29	Tamnar	9	9:50 AM	10:40 AM	64	68	20	36	54	4	0.833	242	290	73
30	Tamnar	9	11:20 AM	11:58 AM	80	72	26	40	44	4	0.633	262	414	103

31	Tamnar	9	12:22 PM	12:43 PM	56	48	27	26	45	4	0.350	202	577	144
32	Tamnar	9	5:05 PM	6:02 PM	82	78	36	40	37	4	0.950	273	287	72
33	Nh47	10	9:48 AM	10:56 AM	61	69	26	14	28	4	1.133	198	175	44
34	Nh47	10	2:28 PM	3:10 PM	22	56	15	9	18	4	0.700	120	171	43
35	Nh47	10	11:30 AM	12:44 PM	25	64	18	10	31	4	1.233	148	120	30
36	Nh47	10	2:17 PM	3:17 PM	22	68	16	12	25	4	1.000	143	143	36
37	Jindal 1	11	8:19 AM	9:09 AM	74	84	28	25	44	4	0.833	255	306	77
38	Jindal 1	11	10:14 AM	10:58 AM	70	88	51	34	28	4	0.733	271	370	92

39	Jindal 1	11	11:04 AM	11:58 AM	71	82	28	36	32	4	0.900	249	277	69
40	Jindal 1	11	12:02 PM	12:59 PM	81	92	28	36	25	4	0.950	262	276	69
41	Taraimal	12	8:32 AM	9:32 AM	38	61	14	8	23	4	1	144	144	36
42	Taraimal	12	3:45 PM	4:45 PM	46	72	24	11	29	4	1	182	182	46
43	Taraimal	12	9:15 AM	10:15 AM	53	79	6	16	19	4	1	173	173	43
44	Taraimal	12	6:30 PM	7:30 PM	64	83	14	9	33	4	1	203	203	51
45	Gerwani	13	10:05 AM	11:05 AM	56	67	8	13	35	4	1	179	179	45
46	Gerwani	13	1:07 PM	2:07 PM	65	91	19	10	43	4	1	228	228	57

47	Gerwani	13	10:30 AM	11:30 AM	30	54	21	6	15	4	1	126	126	32
48	Gerwani	13	4:23 PM	5:23 PM	22	62	18	8	27	4	1	137	137	34
49	Punjipatra	14	9:50 AM	10:50 AM	53	76	10	19	39	4	1	197	197	49
50	Punjipatra	14	3:50 PM	4:50 PM	57	63	18	15	31	4	1	184	184	46
51	Punjipatra	14	9:23 AM	10:23 AM	44	73	17	8	24	4	1	166	166	42
52	Punjipatra	14	5:12 PM	6:12 PM	69	87	12	11	27	4	1	206	206	52
53	Gharghoda	15	9:56 AM	10:56 AM	61	69	26	14	28	4	1	198	198	50
54	Gharghoda	15	2:18 PM	3:18 PM	22	56	15	9	18	4	1	120	120	30

55	Gharghoda	15	11:49 AM	12:49 PM	25	64	13	10	31	4	1	143	143	36
56	Gharghoda	15	2:17 PM	3:17 PM	22	52	9	12	25	4	1	120	120	30
57	Jindal Road I4	16	9:29 AM	10:29 AM	68	91	12	18	32	4	1	221	221	55
58	Jindal Road I4	16	12:41 PM	1:41 PM	52	74	19	14	21	4	1	180	180	45
59	Jindal Road I4	16	9:45 AM	10:45 AM	63	84	11	12	37	4	1	207	207	52
60	Jindal Road I4	16	5:23 PM	6:23 PM	64	81	12	17	22	4	1	196	196	49
61	Raigarh	17	8:56 AM	9:56 AM	49	70	13	30	46	4	1	208	208	52
62	Raigarh	17	10:45 AM	11:45 AM	56	89	15	15	24	4	1	199	199	50

63	Raigarh	17	9:45 AM	10:45 AM	46	76	23	20	12	4	1	177	177	44
64	Raigarh	17	6:00 PM	7:00 PM	71	86	30	10	36	4	1	233	233	58
65	Jindal By Pass	18	2:05 PM	3:05 PM	54	67	7	5	28	4	1	161	161	40
66	Jindal By Pass	18	5:35 PM	6:35 PM	59	85	20	17	39	4	1	220	220	55
67	Jindal By Pass	18	9:15 AM	10:15 AM	45	45	15	6	9	4	1	120	120	30
68	Jindal By Pass	18	1:52 PM	2:52 PM	20	75	45	9	34	4	1	183	183	46
69	Kharsia Road	19	9:50 AM	10:50 AM	45	64	23	15	46	4	1	193	193	48
70	Kharsia Road	19	3:41 PM	4:41 PM	40	57	12	20	43	4	1	172	172	43

71	Kharsia Road	19	11:05 AM	12:05 PM	32	85	20	9	24	4	1	170	170	43
72	Kharsia Road	19	2:00 PM	3:00 PM	56	84	10	14	26	4	1	190	190	48
73	Odisha Highway	20	11:56 AM	12:56 PM	40	76	31	17	43	4	1	207	207	52
74	Odisha Highway	20	4:18 PM	5:18 PM	15	86	15	8	16	4	1	140	140	35
75	Odisha Highway	20	10:45 AM	11:45 AM	21	48	19	16	25	4	1	129	129	32
76	Odisha Highway	20	4:05 PM	5:05 PM	44	94	5	18	46	4	1	207	207	52
77	Chandarapur Highway	21	2:40 PM	3:40 PM	70	75	17	14	35	4	1	211	211	53
78	Chandarapur Highway	21	10:30 AM	11:30 AM	56	46	10	12	29	4	1	153	153	38

79	Chandarapur Highway	21	5:45 PM	6:45 PM	54	67	20	15	42	4	1	198	198	50
80	Chandarapur Highway	21	10:10 AM	11:10 AM	60	74	13	20	31	4	1	198	198	50
81	Bilaspur Highway	22	11:10 AM	12:10 PM	54	65	12	13	38	4	1	182	182	46
82	Bilaspur Highway	22	4:45 PM	5:45 PM	76	45	43	12	42	4	1	218	218	55
83	Bilaspur Highway	22	9:00 AM	10:00 AM	86	68	26	23	16	4	1	219	219	55
84	Bilaspur Highway	22	2:30 PM	3:30 PM	45	75	12	10	43	4	1	185	185	46

Table 2: Truck Count Data in Raigarh

b. Commuter Data Analysis—Analysis pending.

c. Truck Operator Survey—Data collection just completed

6. Analysis

Descriptive Statistics and correlations

Statistic	Value
N	84 observations
Mean (vehicles/hr)	190.1
Median	182
Stand. Deviation	38.4
Minimum	120
Maximum	273
Coefficient of Variation (CV)	0.202
IQR (Interquartile Range)	50
Outliers Detected	High-volume outliers at 326, 348, 353, 370, 414, 462, 540, 577, 597.

Table 3: Basic Statistics of Traffic Count

Vehicle Type	Mean	Median	Std Dev	Min	Max
14-wheeler trucks	51.5	50	13.9	22	86
10-wheeler trucks	67.9	68	14.8	18	95
6-wheeler trucks	22.3	20	9.4	5	52
4-wheeler trucks	17.5	15	7.8	8	36
Other vehicles	30.6	28	10.2	9	54
Total Vehicles	189.8	183	32.2	120	273

Table 4: Mean Count by Type of Vehicle

Statistic	Value
Mean	71.9
Median	70
Minimum	30
Maximum	149

Table 5: Normalized Per Lane Volume Per Hour

- A total of 15,777 vehicles were recorded across all observations.
- Traffic volumes are generally stable with moderate variability. Heavy-duty vehicles dominate roadway usage. The average hourly traffic flow was approximately 190 vehicles per hour, with a coefficient of variation indicating moderate variability.
- Heavy trucks (10- and 14-wheelers) account for over 60 percent of total traffic volume.
- The single extreme outlier likely reflects a temporary surge in freight movement. Correlation analysis shows strong associations between total volume and 14-wheelers, as well as moderate relationships with other categories.
- This traffic count is very low compared to any MSA traffic volume. Typical rush hour volume is a few thousand vehicles per lane per hour.
- This shows extreme congestion on the highways and roadways.

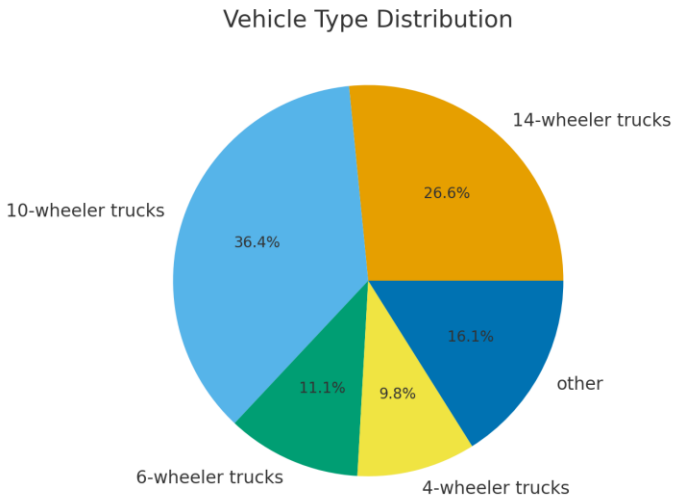

Figure 3: Distribution of Type of Vehicles

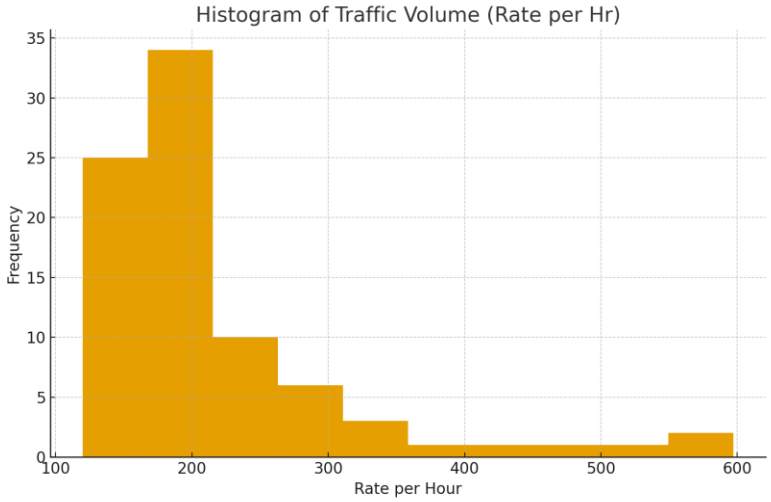

Figure 4: Histogram of Total Hourly Traffic Volume

Variable	**Strongest Correlation**
Total Vehicles	14-wheelers (r ≈ 0.73)
Rate per Hour	14-wheelers (r ≈ 0.71)
10-wheelers	Moderate correlation with Rate per Hour (r ≈ 0.48)
Other vehicles	Moderate correlation (r ≈ 0.46)

Figure 4: Correlation Highlights

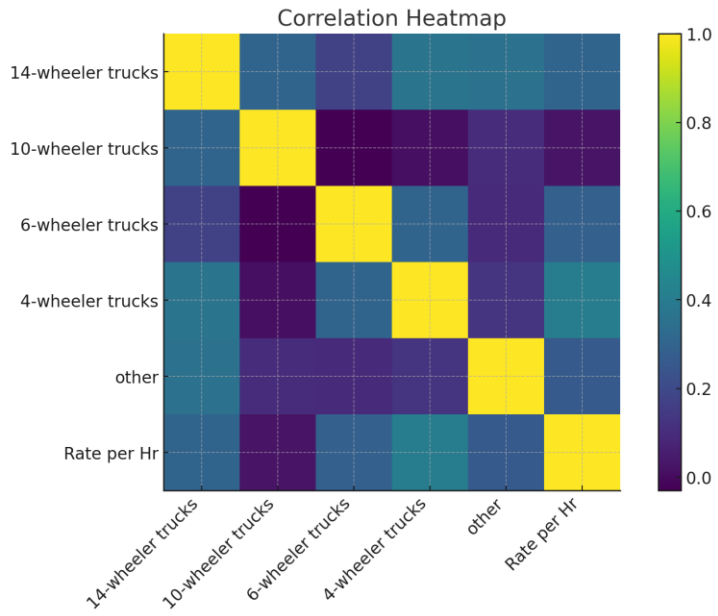

Figure 5: Correlation Heat Map Between Type of Vehicle

7. Conclusion

- No comparison point is available due to poor/no past data from the city.
- Traffic is very slow as volume is merely 100-200 vehicles per hour per lane compared to a few thousand in US MSA in peak hours.
- Poor road conditions and disregard for time wated.
- Traffic in Raigarh is freight-dominated.
- Highly consistent traffic, this may be due to traffic jams and slow moving vehicles
- Shared network causes congestion.
- Poor infrastructure, low maintenance of roads.
- No clear freight policy.

In conclusion, Raigarh's transportation and transit systems demonstrate both the challenges and potential flaws in planning and infrastructure development of India's industrial towns, especially Tier 2 and Tier 3 towns. Hence, any improvement in mobility infrastructure including removing unnecessary inefficiencies, like stoppage and checkup, can significantly enhance industrial productivity, mobility, and overall economic growth. The insights from this study extend to small industrial towns in India by offering lessons applicable similar developing economies.

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Rite: Autonomous Resilience in Global Food Trade: A Quantum-Agentic Framework for Mitigating Supply Chain Shocks

Authors: Dr. Peter Y. Wui (UAPB), Dr. Mariofanna Milanova (UA Little Rock), Dr. Mansour Moetazavi(UAPB), Dr. Qinglong Jiang(UAPB)

Keywords: Agentic AI, Quantum Optimization, Global Food Security, Supply Chain Resilience, Convergence Science

Abstract Narrative

The stability of the global food supply chain is increasingly threatened by non-linear disruptions, including geopolitical trade shocks and volatile climatic events. Traditional econometric models often rely on passive predictive analytics that struggle with the "curse of dimensionality" inherent in massive, high-dimensional datasets such as the UN-FAOSTAT, USDA GATS (10-digit HS codes), and WTO I-TIP regulatory matrices.

This paper presents the Autonomous Resilience for American Agribusiness (ARAA) framework, a novel Growing Convergence Research (GCR) initiative. The ARAA model introduces a Multi-Agent System (MAS) where autonomous AI agents—specialized in logistics, policy, and risk assessment—actively deliberate and negotiate trade re-routing in real-time.

When these agents encounter NP-hard optimization bottlenecks that exceed classical computational limits, the framework utilizes a Quantum-Classical Interface. By decomposing massive observation spaces into localized Quadratic Unconstrained Binary Optimization (QUBO) subproblems, the system leverages Quantum Annealing to identify the absolute lowest-friction logistics paths.

Preliminary results indicate that this autonomous orchestration can achieve a 30% reduction in logistical waste and a 25% increase in rerouting speed during simulated global shocks. The presentation will detail the "Sense-Think-Act" loop of our agentic architecture and discuss the formation of Quantum-Agri-Informatics as a new discipline to harden national food infrastructure against unpredictable disruptions.

Session VI

Artificial Intelligence & Technology

Session Chair: Dr. Narendra Rustagi, Howard University

Prompt-Driven Analytics and Autonomous Service Robotics in Higher Education
Dr. DeShea Simon, Hampton University

Digital Transformation: AI-Driven Strategies for Expanding Entrepreneurial Access to Capital in Community Banking and Minority Depository Institutions
Dr. Melvin T. Miller, Benedict College

Technology in Higher Education: AI Transformation Strategies for HBCU Business Schools
Dr. JoAnn Rolle, Medgar Evers College (CUNY) -Retired

Prompt-Driven Analytics and Autonomous Service Robotics in Higher Education: An Enterprise AI-Generated Evaluation of BellaBot Deployment

Abstract

This study investigates the pedagogical and operational implications of deploying an AI-powered service robot, BellaBot, within a structured academic delivery simulation and examines the novel use of an enterprise artificial intelligence (AI) platform to generate a comprehensive analytical report solely through prompt engineering. In a multi-day campus deployment, student teams programmed and operated BellaBot to complete scheduled deliveries across designated rooms, documented timestamps, return-to-base logs, route durations, and performance irregularities, and analyzed operational outputs including task distribution, efficiency trends, and peak utilization periods. Delivery activities were coordinated through structured manifests, formalized sequence workflows, and faculty-verified completion logs, producing measurable operational data across multiple days and locations. Distinct from traditional analytics workflows requiring manual statistical scripting or dashboard construction, all data synthesis, visualization narratives, and interpretive reporting were generated exclusively through iterative, structured prompts within an AI enterprise platform. The platform transformed extracted robotic log data into descriptive analytics, comparative visual summaries, and strategic operational insights without direct human-authored statistical code. Findings demonstrate that prompt-driven AI reporting can accurately identify workload distribution patterns, running-time variability, and efficiency optimization opportunities while simultaneously enhancing students' competencies in systems thinking, data interpretation, and human–machine collaboration. The study contributes to emerging scholarship on AI-augmented analytics and service robotics in higher education by presenting a replicable framework in which autonomous system deployment and enterprise AI reporting function as integrated learning and operational tools. Implications extend to instructional design, institutional robotics acquisition strategy, and the evolving role of prompt engineering as a methodological instrument in organizational analytics and experiential business education.

Digital Transformation: AI-Driven Strategies for Expanding Entrepreneurial Access to Capital in Community Banking and Minority Depository Institutions

Dr. Melvin T. Miller
Benedict College, Columbia, SC

Abstract:

Community banks and Minority Depository Institutions (MDIs) have historically played a critical role in financing small businesses and supporting entrepreneurial activity in underserved communities. However, increasing competitive pressure from large financial institutions and FinTech platforms, coupled with evolving regulatory and technological demands, has challenged their capacity to scale impact. This study will examine how artificial intelligence (AI) and financial technology (FinTech) solutions can strategically strengthen community banking and MDIs in expanding entrepreneurial access to capital while preserving relationship-based banking models.

Drawing from research in entrepreneurship, banking, and emerging technology, the paper explores how AI-driven credit analytics, alternative data models, and digital lending platforms can enhance underwriting efficiency, reduce information asymmetries, and improve risk assessment for small and minority-owned enterprises. At the same time, it will evaluate concerns related to algorithmic bias, regulatory compliance, data governance, and mission alignment within mission-driven financial institutions.

The study proposes an integrated framework for AI adoption within community banks and MDIs that balances technological innovation with inclusive finance principles and relationship-centered banking practices. Strategic recommendations will be offered for bank leadership, policymakers, and ecosystem stakeholders to support responsible technology integration, strengthen capital deployment to entrepreneurs, and enhance long-term institutional sustainability. By positioning community banks and MDIs as innovation-enabled anchors within entrepreneurial ecosystems, the research contributes to actionable solutions for sustainable economic growth and national business competitiveness.

AI TRANSFORMATION STRATEGIES FOR HBCU BUSINESS SCHOOLS

Executive Summary Report (Webinar Companion)

HBCU Business Deans Roundtable | January 26, 2026

Dr. JoAnn D. Rolle, PhD

Last verified: January 10, 2026

EXECUTIVE OVERVIEW

Your peers asked for “what works,” “what it costs,” and “what to do next.” The presentation is intentionally concise; this report contains the supporting evidence, verified funding examples, and implementation playbooks to move from inspiration to institutional action.

How to Use This Report

Step	Purpose
01 | Benchmark	See what leading business schools are doing with AI and what is replicable at HBCUs.
02 | Validate	Use the verified funding table to strengthen internal proposals and external grant narratives.
03 | Choose	Select one of four proven implementation models that fits your current capacity.
04 | Execute	Follow the 90-day roadmap to create visible momentum quickly.

Key Findings

- Global business schools are operationalizing AI via required coursework, certificates, and executive education—often emphasizing leadership decision-making, governance, and transformation (not just tools).
- Verified HBCU AI-aligned funding documented in this report totals $23M+ across 8 institutions (conservative verification; additional dollars likely exist but are excluded unless primary-source verified).
- Four proven models can be implemented without waiting for a “perfect” center launch: Partnership-First, Research-Led, Consortium/Shared-Capacity, and Across-Campus AI Infusion.
- Funding pathways exist now (federal + foundation + defense). The fastest early wins tend to be curriculum pilots + capacity-building proposals + targeted partnerships.

Recommendations for Immediate Action (30 days)

1. Pick the model first (don’t start with random tool adoption).
2. Launch 1–2 pilot course modules (AI-infused assignments + ethical decision framework + employer-facing outcomes).

3. Build a one-page "AI Integration Case Statement" (student outcomes, workforce alignment, evaluation plan).
4. Align your first proposal to a high-fit opportunity (examples in Section 5).

SECTION 2: GLOBAL AI EDUCATION LEADERS

Across institutions, the most transferable moves are:

- AI literacy for every manager (decision-making, governance, ethics, measurement)
- Use-case driven learning (operations, marketing, finance, HR, supply chain)
- Executive education as a revenue engine + employer pipeline
- Applied credentials (certificates, micro-credentials, stackable learning)

Verified Institutions (10) — Quick Reference

Note: Many schools do not publish a single "launch year" for AI integration; where not explicitly stated on the official page, it is marked N/D (not disclosed).

Institution	Country	AI Focus	Launch
MIT Sloan Executive Education	USA	AI strategy & leadership (exec ed)	N/D
Wharton Executive Education	USA	AI for business transformation	N/D
Harvard Business School	USA	Data science & AI for leaders	2025
UC Berkeley Haas	USA	AI-native leadership & capability	2025
Carnegie Mellon Tepper	USA	AI for leaders, analytics	N/D
Northwestern Kellogg	USA	Tech + management fusion	2022
Oxford Said	UK	Governance, strategy, adoption	N/D
Cambridge Judge	UK	Strategy & transformation	N/D
INSEAD	France/Singapore	Enterprise transformation	N/D
Stanford (GSB ecosystem)	USA	Human-centered AI, innovation	N/D

Why This Matters for HBCUs

- Executive education is the fastest path to revenue + employer relationships + curriculum proof points without waiting for a new degree approval cycle.
- A portfolio approach lets schools launch two pilots quickly (e.g., "AI for Managers" + "AI Governance for Business") and scale based on demand.

SECTION 3: HBCU AI SUCCESS STORIES

Verified Funding Summary (Conservative Standard)

Verification standard: Every figure below is verified via official university announcements and/or agency documentation referenced in those announcements. Where a dollar amount could not be verified through accessible primary sources, it is excluded.

#	Institution	Initiative	Funder	Amount	Year
1	Prairie View A&M (PVAMU)	AI + big data research (CREDIT+)	U.S. Dept. of Defense	$8,000,000	2024
2	Florida A&M (FAMU)	AI + cybersecurity initiatives	Hewlett Foundation	$5,000,000	2025
3	Morgan State	AI/ML for climate & environment (NRT ACCESS)	NSF Research Traineeship	$3,000,000	2023
4	Clark Atlanta University	AI Hub / capacity-building (AIHUB@CAU)	NSF ExpandAI	$2,790,000	2024
5	Tuskegee University	AI/ML workforce training (joint grant)	NSF	$2,100,000	2025
6	Jackson State University	AI initiative / statewide ecosystem	State of Mississippi	$1,300,000	2025
7	Bowie State University	AI research + capacity (ExpandAI)	NSF ExpandAI	$400,000	2024
8	Savannah State University	AI Research Center (environmental focus)	NSF	$399,999	2024
	TOTAL (2023–2025)			$23M+	

SECTION 4: FOUR PROVEN IMPLEMENTATION MODELS

MODEL 1: PARTNERSHIP-FIRST (Stillman Model)

Timeline	3–6 months to first partnership
Investment	Low ($50K–$200K first year, depending on staffing and pilots)
Best for	Institutions with limited research infrastructure but strong employer ties
Focus	Corporate relationships for curriculum modules, projects, internships, and “real use-case” teaching

90-Day Implementation Steps:

5. Weeks 1–2: Identify 20 employer targets (regional + alumni); draft partnership one-pager
6. Weeks 3–4: Secure 3 discovery calls; align to 1 pilot course module + internship/project pathway
7. Weeks 5–8: Launch pilot (guest lectures + project briefs + rubric); collect outcomes
8. Weeks 9–12: Announce partnership + student showcase; convert into a repeatable program

Success Factors:

- Single relationship owner (named)
- Employer-facing outcomes (portfolio artifacts)
- Low-friction pilots before long MOUs

Risk Management: Partner dependency → diversify to 3–5 partners, avoid single-source reliance.

MODEL 2: RESEARCH-LED (NC A&T Pattern)

Timeline	6–12 months (proposal + award cycles)
Investment	Medium to High (faculty capacity, grants office readiness, lab needs)
Best for	HBCUs with strong STEM units and prior grant performance
Focus	Federal research + training grants that build durable infrastructure

First 90 Days:

9. Select 1 “mission problem” (e.g., AI + climate, AI + supply chain, AI + health equity)
10. Build proposal team + evaluator + data management plan
11. Run a pilot module to generate evidence for proposals

MODEL 3: CONSORTIUM / SHARED-CAPACITY (Multi-HBCU Partnerships)

Timeline	6–9 months to first joint submission
Investment	Medium (coordination + governance + shared evaluation plan)
Best for	Regional clusters of HBCUs, or alliances around a shared mission problem
Focus	Shared proposals, shared curriculum assets, shared employer network

Why It Works:

- Stronger combined capability signal
- Shared administrative burden
- Larger-scale outcomes for funders

MODEL 4: ACROSS-CAMPUS AI INFUSION (Bowie State–Type Pattern)

Timeline	3–9 months (fastest path to “AI for every major”)
Investment	Low to Medium (faculty development + curriculum redesign)
Best for	Business schools that can move quickly through curriculum committees
Focus	Embed AI outcomes across existing courses (not “one new degree”)

Real example: Bowie State's NSF-supported AI capacity-building effort is publicly cited at $400K.

90-Day Steps:

12. Weeks 1–2: Map 10 courses where AI can be embedded (analytics, ops, marketing, finance, HR)
13. Weeks 3–4: Faculty workshop: AI-assisted assignment design + academic integrity + rubrics
14. Weeks 5–8: Launch 2 course pilots + student artifacts (dashboards, risk memos, governance plans)
15. Weeks 9–12: Publish outcomes + package into funding narrative ("evidence of execution")

SECTION 5: ACCESSIBLE FUNDING OPPORTUNITIES

Current as of January 2026

Funding Landscape: Three Pathways

Pathway 1	Pathway 2	Pathway 3
Federal capacity + research (NSF, DoD)	Foundation curriculum innovation (Mozilla RCC)	Defense HBCU/MI programs (DoN/ONR NOFO)

A. FEDERAL (NSF) — HBCU-UP (Solicitation NSF 23-563)

Program: NSF HBCU-UP (Historically Black Colleges and Universities Undergraduate Program)

Focus: Strengthen STEM undergraduate education and research capacity at HBCUs

Key Tracks:

- Targeted Infusion Projects (TIP)
- Implementation Projects (IP)
- Research Initiation Awards (RIA)
- Broadening Participation Research (BPR)
- HBCU-UP Resource Hubs

Why business schools fit: AI workforce integration requires evaluation, curricular innovation, partnerships, and measurable outcomes—exactly the kinds of structures these tracks support when co-led with STEM partners.

Source: https://www.nsf.gov/funding/opportunities/hbcu-historically-black-colleges-universities-undergraduate/nsf23-563/solicitation

B. NSF EducateAI (DCL)

What it is: NSF DCL encouraging proposals that support inclusive AI education experiences.

Actionable for HBCUs: Use EducateAI framing to submit proposals through eligible NSF programs such as NSF Computer Science for All (CSforAll) and NSF IUSE: CUE.

Source: https://www.nsf.gov/funding/opportunities/dcl-advancing-education-future-ai-workforce-educateai/nsf24-025

C. NSF National AI Research Institutes

Use when: Capacity exists for large-scale research + workforce components.

Source: https://www.nsf.gov/funding/opportunities/national-artificial-intelligence-research-institutes

D. NSF Research Traineeship (NRT)

Strong fit for: AI workforce pathways in business-relevant domains (climate, health, supply chain, cybersecurity).

Example: Morgan State's NRT ACCESS ($3M, 2023)

E. NSF ExpandAI

Focus: Capacity-building AI education/research at MSIs, including HBCUs

Example: Clark Atlanta University $2.79M

F. Mozilla Responsible Computing Challenge (2026)

Focus: Interdisciplinary curriculum linking computing with humanities/social sciences; ethics + responsibility framing

Grant size: Up to $125,000

Why business schools fit: Responsible AI, governance, and decision-making for leaders is directly aligned with business curriculum.

Source: https://www.mozillafoundation.org/en/responsible-computing-challenge-funding-opportunity/

G. DEFENSE — Department of the Navy (DoN) HBCU/MI Program (FY26)

Program: DoN / ONR HBCU/MI Program (FY26) — NOFO N0001425SF005

Source: https://www.onr.navy.mil/assets/2025-07/N0001425SF005.pdf

Funding Strategy Timeline

Phase	Action
0–90 days	Pilot modules + partner letters + "evidence of execution"
90–180 days	HBCU-UP track selection + proposal build
180–365 days	Larger-scale proposals (AI institutes / major DoD programs)

SECTION 6: 90-DAY IMPLEMENTATION ROADMAP

Decision Matrix

Your Institution Has…	Recommended Model	Timeline	Best First Target
Strong employer ties; limited research admin	Partnership-First	3–6 months	Pilot + partner commitments
Research infrastructure; grant-writing bench	Research-Led	6–12 months	NSF HBCU-UP + NRT
Regional partners; desire to share burden	Consortium	6–9 months	Joint submission
Need fast AI exposure across majors	Across-Campus Infusion	3–9 months	Mozilla RCC + HBCU-UP TIP

90-Day Timeline (Week-by-Week)

WEEKS 1–2: Decision Phase

- Convene leadership: dean + provost sponsor + IR/evaluation rep
- Choose model + name a single accountable AI Integration Lead
- Inventory current courses (where AI fits immediately)
- Identify first targets: 3 employers OR 3 pilot courses OR 3 consortium partners

WEEKS 3–4: Planning Phase

- Faculty interest survey
- Student focus group (what AI skills do they want and why)
- Advisory board consultation
- Draft a 1-page AI Integration Case Statement (outcomes + timeline + evaluation)

WEEKS 5–8: Pilot Phase

- Launch 1–2 AI-enhanced modules (graded rubric; integrity plan)
- Faculty bootcamp (prompting, evaluation, and policy)
- Begin 3 partnership conversations (or proposal planning, if research-led)

WEEKS 9–12: Momentum Phase

- Collect pilot outcomes (student artifacts + employer feedback)
- Student showcase event
- Announce expansion plan
- Submit first proposal OR finalize first partnership agreement

MILESTONE: By Day 90, students can see proof of change—and leadership has a validated plan.

SECTION 7: RESOURCES & CONTACTS

Key URLs (Verified Pages)

- NSF HBCU-UP Solicitation (NSF 23-563): https://www.nsf.gov/funding/opportunities/hbcu-historically-black-colleges-universities-undergraduate/nsf23-563/solicitation
- NSF EducateAI DCL (NSF 24-025): https://www.nsf.gov/pubs/2024/nsf24025/nsf24025.jsp?org=CNS
- Mozilla Responsible Computing Challenge (2026): https://www.mozillafoundation.org/en/responsible-computing-challenge-funding-opportunity/
- DoN/ONR HBCU/MI NOFO (FY26): https://www.onr.navy.mil/assets/2025-07/N0001425SF005.pdf
- Grants.gov listing: https://www.grants.gov/search-results-detail/359909

Verified HBCU Success-Story Pages

- PVAMU DoD $8M: https://www.pvamu.edu/blog/pvamu-awarded-8-million-for-cutting-edge-ai-big-data-research-project/
- FAMU Hewlett $5M: https://news.famu.edu/2025/famu-cyber-policy-institute-expands-ai-cybersecurity-initiatives-with-hewlett-foundation-support.php
- Morgan State NSF NRT: https://www.morgan.edu/news/climate-change-nsf-research
- CAU NSF ExpandAI: https://www.cau.edu/ai-hub-planned-for-clark-atlanta-university-with-2-79m-nsf-grant-in-collaboration-with-ai4opt-at-georgia-tech/
- Savannah State NSF $399,999: https://savannahstate.edu/news/technology/cost-receives-399999-grant-to-establish-ai-research-center/
- Jackson State $1.3M: https://www.jsumsnews.com/?p=49020

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APPENDIX A: METHODOLOGY

This report uses a conservative verification standard appropriate for high-stakes academic and funding decision contexts:

- Funding totals include only amounts verified through official university announcements and/or agency documentation referenced in those announcements.
- Where a dollar amount could not be verified via accessible primary sources, it is either excluded or flagged for future verification.
- Global institution examples prioritize official program pages; where access restrictions prevented page capture, the report notes the limitation and relies on indexed verification where appropriate.

Last verified: January 10, 2026

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