

The Gambit of De-Dollarization: Unveiling New Currency Frontiers through NLP

Vineeth Kumar Reddy Anumula and Niskhep A Kulli

Sacred Heart University, CT 06825 , USA

Abstract. In the light of heightened geopolitical and economic volatility, conversation around de-dollarization and the rise of alternative currencies has intensified, sparking widespread public debate. This article builds on analyzing 6000 tweets retrieved from platform X, utilizing advanced natural language processing (NLP) techniques—sentiment analysis, tweet classification using BERT (Bidirectional Encoder Representations from Transformers), named entity recognition (NER), and Latent Dirichlet Allocation (LDA) modeling—to delve into these critical discussions. This study uncovers key entities and other emerging financial technologies, revealing a complex and evolving narrative. The findings underscore the critical role of social media as a barometer for global economic trends, particularly in light of ongoing debates surrounding currency alternatives. With geopolitical tensions mounting, the discourse on financial sovereignty, cryptocurrencies, and national economic strategies is becoming increasingly polarized. Sentiment analysis reveals stark contrasts in public opinion, while LDA modeling uncovers dominant themes driving the conversation.

This research is especially timely, as the growing intensity of discussions on currency dominance and financial security demands a more nuanced understanding. By offering a real-time analysis of these debates, this paper provides essential insights for policymakers, economists, and academics. As the global financial landscape shifts, our findings serve as a crucial layer in the academic discourse, revealing how technology, public opinion, and geopolitics intertwine to shape the future of global economies.

Keywords: Natural language processing, NLP, Currency, Sentiment analysis, Entity recognition, Latent Dirichlet Allocation(LDA), De-Dollarization.

1 Introduction

As global powers engage in a high-stakes chess over economic dominance surrounding de-dollarization, the rise of alternative currencies have gained significant traction, driven by geopolitical shifts and economic uncertainties. The long-standing dominance of the US Dollar in global trade and finance is being questioned as countries explore alternatives, including the Chinese Yuan, cryptocurrencies like Bitcoin, and emerging digital currencies. The concept of de-dollarization, once a theoretical conversation, has now entered mainstream discourse, fueled by concerns over US economic policies, sanctions, and the growing influence of other global powers. This phenomenon, marked by an increasing reliance on non-dollar assets and the establishment of alternative financial systems, reflects deeper trends in global economic realignment.

David C. Wyld et al. (Eds): NLAI, IBCOM, MLDS, GridCom, SCAI, ICCSEA, SPPR – 2024
pp. 221-242, 2024. - CS & IT - CSCP 2024 DOI: 10.5121/csit.2024.142213

Amid these changes, social media has emerged as a critical space where public opinion, political rhetoric, and economic anxieties converge. Platforms like X provide real-time insights into how individuals, thought leaders, and institutions perceive these shifts. The fast-paced, decentralized nature of social media amplifies global conversations, making it a barometer for tracking economic sentiments and geopolitical movements.

This study builds on this growing body of discourse by analyzing 6,000 tweets from X using advanced natural language processing (NLP) techniques. By employing sentiment analysis, tweet classification with BERT (Bidirectional Encoder Representations from Transformers), named entity recognition (NER), and Latent Dirichlet Allocation (LDA) modeling, this research uncovers key narratives, entities, and emerging themes in the de-dollarization debate. In doing so, it offers a nuanced understanding of how public opinion shapes and responds to the evolving global financial landscape.

As global tensions rise and the conversation on currency alternatives becomes increasingly polarized, this research provides timely insights into the intersection of technology, public opinion, and geopolitical strategies. Through real-time analysis, this paper aims to contribute to the academic and policy discussions on how global economic shifts are being navigated and contested in the digital age.

2 Methodology

2.1 Data Retrieval

X API Integration: To gather relevant data for our study, the X (formerly Twitter) API was used to retrieve tweets discussing de-dollarization and currency alternatives. The integration was managed through the 'tweepy' library, which facilitated secure API access using a Bearer Token. This allowed efficient querying of the platform's data. Keywords such as "De-dollarization," "USD decline," "Yuan rise," "Brics," "Bitcoin dominance," and "Alternative currencies" were used to retrieve relevant tweets. To ensure comprehensive coverage of the discussion, additional phrases like "Global financial shifts," "Brics summit," "Economic Sanctions," and "Currency wars" were also incorporated.

The dataset initially consisted of approximately 10,000 tweets. After applying filtering techniques to remove retweets, bot-generated content, and duplicates, we arrived at a final dataset of 6,000 unique tweets. Only tweets relevant to de-dollarization and global currency shifts were retained, while retweets, bot-generated content, and spam were excluded through automated techniques

2.2 Data Pre-Processing

A custom pre-processing pipeline was developed to clean the tweet text for further analysis. The raw text underwent several stages of cleaning, including the removal

of URLs, mentions, hashtags, and special characters that do not contribute to the analysis. The text was also converted to lowercase for consistency. Metadata such as tweet creation date and tweet ID were retained for temporal and contextual analysis.

Once cleaned, the tweets were stored in a CSV file named `dedollarizationtweets.csv`. A unique version of the dataset was created by removing duplicate entries based on tweets, resulting in the final file `uniquededollarizationtweets.csv`. This dataset served as the foundation for subsequent analysis, including sentiment analysis and topic modeling.

2.3 Data Tokenization

Tokenization was used to break the cleaned tweet text into individual words (tokens). This step is crucial for analyzing word frequency and patterns. The NLTK library was employed for tokenization, as well as for removing stop words, which do not contribute meaningfully to the analysis. Additionally, custom stop words related to common terms in tweets (e.g., 'RT', 'https') were removed using regular expressions (regex).

2.4 Data Normalization

Text normalization techniques such as lemmatization were applied to reduce words to their base forms, ensuring uniformity across the dataset. This reduces the dimensionality of the text data and improves the accuracy of both sentiment and topic modeling. Once normalized, the data in the `uniquededollarizationtweets.csv` file was ready for sentiment analysis, tweet classification using BERT, and topic modeling via Latent Dirichlet Allocation (LDA).

Flowchart of Data Processing Steps



Fig. 1: Flowchart of Data Retrieval

3 Frequent Token Analysis

Our analysis delves into the most frequently mentioned tokens within tweets concerning de-dollarization, shedding light on the focal points of global discourse around currency dynamics. This robust analysis not only enumerates the tokens but also contextualizes their prevalence within the wider narrative of international economic shifts.

The data illustrates that the token "US" leads with 754 mentions, highlighting its pivotal role in discussions about the United States' influence on global financial systems. This prominence underscores the critical view of U.S. policies and their ripple effects across global markets. "World" and "dollar," with 496 and 401 mentions respectively, reflect the global scale of the discourse and the centrality of the U.S. Dollar in international trade and economic policy. Further analysis highlights the significant mentions of "people" (393), "India" (377), "BRICS" (338), and "Russia" (285). These terms underscore the global relevance of BRICS nations (Brazil, Russia, India, China, and South Africa) in challenging the dominance of the U.S. Dollar. The frequent references to "India" and "Russia" particularly indicate their pivotal roles in driving the BRICS agenda toward de-dollarization. By focusing on emerging economies, the discourse reflects the collective effort of these nations to recalibrate the established financial order and create a more multipolar currency system. Additionally, the inclusion of "people" emphasizes the human and social impact of these geopolitical shifts, as public sentiment aligns with the efforts to move away from dollar dependence.

The token "trump" (292) reveals the lasting impact of former U.S. President Trump's policies and his current economic strategies and perceptions, serving as a bellwether for U.S. influence on global financial policies. Meanwhile, "money" (292) encapsulates the core of the financial discussions—currency as both a medium of economic exchange and a tool of geopolitical strategy. This detailed token frequency analysis not only quantifies the most talked-about themes but also provides a springboard for understanding the nuanced perspectives that influence public opinion and policy decisions regarding the future of global currencies.

token	
us	754
world	496
dollar	401
people	393
india	377
global	354
brics	338
money	292
trump	292
russia	285

Fig. 2: Frequent Tokens

4 Bigram Analysis

Our analysis examines the most frequently occurring bigrams within tweets related to de-dollarization, offering insights into the key dynamics of the global conversation on shifting currency landscapes. By focusing on the co-occurrence of words, we gain a clearer understanding of how public discourse frames economic transformation and international policy. The bar chart below visualizes the top 10 bigrams, highlighting their frequency in the dataset.

Interestingly, the frequent tokens identified in the previous section, such as “US,” “dollar,” and “people,” align with the dominant bigrams in this section. For instance, “US dollar” and “people money” both reflect the focus on the United States and its economic policies, as well as the broader social implications of these discussions. The prevalence of tokens like “India” and “Russia” further underscores the geopolitical dimension of de-dollarization, as these nations play key roles in shifting global financial power.

The bigram “United States” appears most frequently, with over 200 mentions, underscoring the central role of U.S. monetary policies in global discussions. This highlights the critical examination of the U.S. Dollar’s dominant position in world markets and its future. “Climate change” and “Kamala Harris” follow closely, linking environmental and political issues with economic discussions on de-dollarization. These bigrams reveal not only technical aspects but also the broader geopolitical and environmental factors influencing global policy.

The bigram “US dollar,” with 88 mentions, further emphasizes the focus on the currency’s role in international trade. Bigrams such as “central banks” and “Saudi Arabia” reflect the involvement of key players in the financial system and global commerce. Interestingly, “god bless” appears with 65 mentions, indicating that many discussions mix political discourse with personal sentiments, showcasing a blend of economic and social concerns. Meanwhile, “world war” suggests public anxieties over geopolitical instability and its potential effects on global currency dynamics.

This thorough bigram analysis not only quantifies recurring themes but also deepens our understanding of the interrelated geopolitical, economic, and social factors shaping public opinion. The recurring word pairs offer insight into how different regions and political figures are perceived in the context of global economic shifts, emphasizing their pivotal role in influencing both public sentiment and policy direction. Through this, we see how public discourse integrates broader societal concerns, extending beyond economic theory to encompass the human and political dimensions of global change.

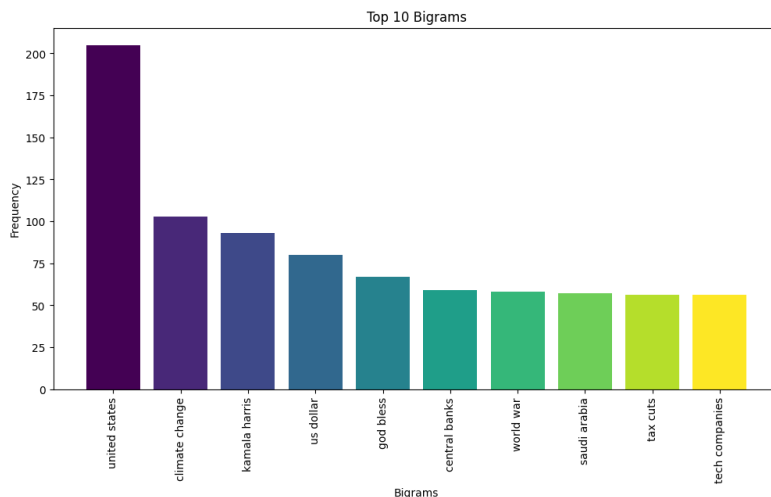


Fig. 3: Bigrams

5 Sentiment Analysis by Category

To analyze sentiment across the de-dollarization discourse, we employed a fine-tuned BERT (Bidirectional Encoder Representations from Transformers) model. BERT is well-suited for understanding context and sentiment in textual data, as it considers the relationship between words in a sentence, capturing both semantic meaning and sentiment. Each tweet was categorized and then assigned a sentiment score between -1 (highly negative) and +1 (highly positive) based on its content. The scatter plot visualizes the sentiment distribution across six key categories: Economic Policies, Financial Markets, Geopolitical Impact, Public Opinion, Currency Alternatives, and Uncategorized. The red horizontal line marks the neutral sentiment point (0), with positive scores positioned above and negative scores below. Overall Sentiment Overview The BERT-based sentiment analysis revealed a predominantly neutral tone in the majority of tweets. The clustering of points around the neutral line suggests that discussions on de-dollarization often maintain a balanced perspective, with neither extreme positivity nor negativity dominating the conversation. However, some categories reveal more polarized sentiment, with tweets either strongly supporting or criticizing particular aspects of the discourse.

Category Breakdown :

- Economic Policies (red): With 2,269 tweets, this category shows a relatively even spread of sentiment. Many tweets are centered around neutrality, but there are clear deviations towards both positive and negative sentiments, reflecting the divided opinions on policy changes and their potential impacts.

- Geopolitical Impact (blue): The 1,881 tweets in this category display a wide sentiment range, indicating that geopolitical shifts, such as new trade alliances or economic strategies, tend to evoke a broader spectrum of emotions. Both strong support and harsh criticism are evident in this category.
- Financial Markets (yellow): Consisting of 791 tweets, this category largely maintains a neutral sentiment, with occasional spikes in both directions. Uncertainty around market fluctuations seems to temper more extreme reactions.
- Currency Alternatives (purple): The 429 tweets in this category generally hover around the neutral zone. This suggests a cautious optimism around the potential for alternative currencies, with a balance between skepticism and positive expectations.
- Public Opinion (green): Although representing only 392 tweets, this category shows more extreme sentiment, indicating that individual voices tend to express stronger emotional responses—whether supportive or critical—compared to institutional or policy-focused conversations.

By leveraging BERT, we were able to capture a nuanced understanding of sentiment across these categories, illustrating how different facets of the de-dollarization debate evoke varied emotional reactions. This methodology allows us to not only track sentiment but also uncover the underlying opinions that shape public discourse.



Fig. 4: Sentiment Scores By Category

6 Average Sentiment by Category

To better understand the overall emotional tone of each category, we calculated the average sentiment score, providing a clearer picture of how discussions trend within

specific themes. The bar chart illustrates the average sentiment for each of the six categories, with sentiment scores ranging from -1 (highly negative) to +1 (highly positive).

Key Insights :

- Currency Alternatives (purple): This category stands out with the highest positive sentiment, showing an average sentiment score of approximately 0.14. Discussions about alternatives to the U.S. Dollar, such as cryptocurrencies or other regional currencies, seem to evoke a sense of optimism and potential for change. The positive sentiment reflects the public's interest in diversifying global currency systems.
- Economic Policies (blue): With a near-neutral average sentiment of just above 0, conversations in this category appear divided. While some express optimism about economic reforms, others remain cautious or critical about policy impacts, resulting in a balanced sentiment.
- Financial Markets (teal): Financial market discussions show a moderate positive sentiment, with an average score slightly above neutral. This suggests that while there is cautious optimism about market performance, uncertainty remains.
- Geopolitical Impact (green): Geopolitical discussions trend towards a mildly positive sentiment, reflecting hope in international alliances and partnerships, but also indicating concern over potential conflicts or instability.
- Public Opinion (light green): The average sentiment for public opinion is slightly positive, showing that individual expressions tend to lean towards favorable or hopeful views of de-dollarization. However, the sentiment distribution in this category is broader, indicating more emotionally charged responses.
- Uncategorized (yellow): While this category is neutral-leaning, the sentiment is not as positive as the other categories. This suggests that tweets not fitting into predefined categories tend to express more cautious or uncertain sentiment.

Overall Sentiment Overview:

From the chart, we can see that 40.89 of the analyzed tweets carry a positive sentiment, while 35.05 are negative, and 24.06 fall into the neutral category. The overall average sentiment across all categories stands at 0.03, indicating a slightly positive overall tone in the discourse around de-dollarization. While optimism dominates the discussion, there remains a significant portion of skepticism, particularly within the realm of economic policies and financial markets. This analysis of average sentiment provides a comprehensive view of how various topics within the de-dollarization debate are perceived. By understanding these overall trends, we can identify which areas are driving positive discourse and which ones are viewed with more skepticism or concern.

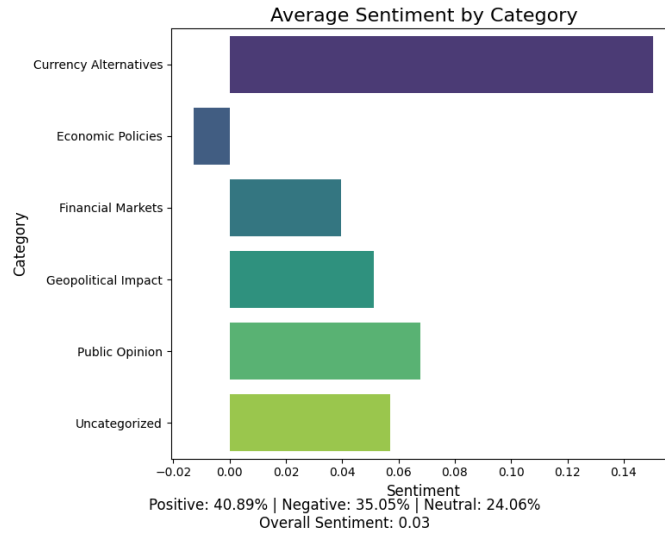


Fig. 5: Sentiment Analysis by Category

7 Entity Recognition

Entity Recognition provides a window into the most influential players and forces shaping the de-dollarization debate. By analyzing frequently mentioned entities in key thematic categories, we can see which geopolitical powers, organizations, and regions drive global discussions on currency power shifts.

Top Entities by Category :

- Economic Policies: In the Economic Policies category, global superpowers dominate the discourse, with China, America, India, Canada, Russia, and the United States as the most frequently mentioned entities. The presence of these nations reflects their central role in shaping international economic policy, especially in light of shifting trade alliances and fiscal reforms. Additionally, organizations like NATO play a pivotal role in security and economic decisions, while demographic entities such as Jewish and American highlight specific communities involved in shaping economic opinions and policies.
- Financial Markets: Within the Financial Markets, the United States emerges as one of the most mentioned entities, reflecting its significant influence over global financial stability. Other key entities include the United Nations (UN), Iran, Israel, and Congress, signaling the impact of international organizations and political bodies on market conditions. The frequent mention of Asian and Canadian reflects regional market influences, particularly in Asia and North

America. Political entities like Democrats also appear frequently, linking domestic U.S. politics to broader financial market movements, where policy shifts can drive global market reactions.

- **Geopolitical Impact:** The Geopolitical Impact category highlights the role of key nations such as Russia, America, China, India, and Israel in shaping global power dynamics. These countries often find themselves at the center of sanctions, trade agreements, and geopolitical strategies, all of which directly influence the global currency landscape. For example, Russia and Iran are frequently linked to sanctions that affect their access to global markets, while NATO and American involvement illustrate the strategic defense and economic pressures exerted by Western powers. The inclusion of Indian and Russian underscores how specific national interests intertwine with broader geopolitical issues, and sanctions on these nations often shift market dynamics in a de-dollarizing world.
- **Public Opinion:** The Public Opinion category is shaped by entities such as Islam, Christian, and Republican, reflecting the influence of religious and political ideologies on public discourse about de-dollarization. Geographic entities like New Orleans and British demonstrate the localized and international aspects of public discussions. Minority communities, such as the Hispanic population, also appear prominently, along with digital currency movements like Blackcardcoin, showing the intersection of social and economic factors in public debates.
- **Currency Alternatives:** The Currency Alternatives category is dominated by entities linked to cryptocurrencies and global currency shifts. Bitcoin and XRP emerge as major players in discussions surrounding digital alternatives to the U.S. Dollar, while national currencies like the Yuan, Rupee, and Riyal also feature prominently as potential alternatives. Gold, as a traditional store of value, remains significant in discussions about currency alternatives during financial uncertainty, while Dollar maintains its central role in comparisons with emerging alternatives.

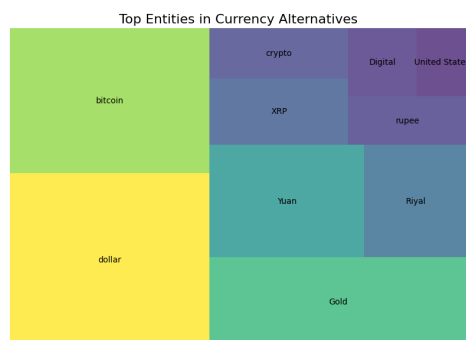


Fig. 6: Entities in Currency Alternatives

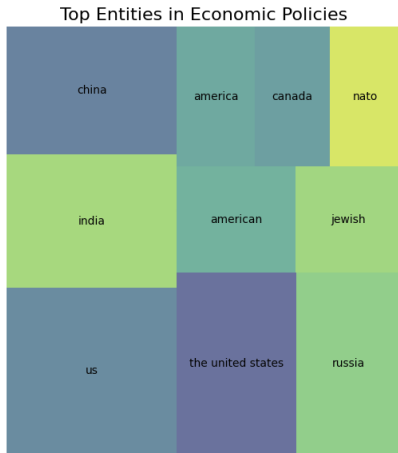


Fig. 7: Entities in Economic Policies

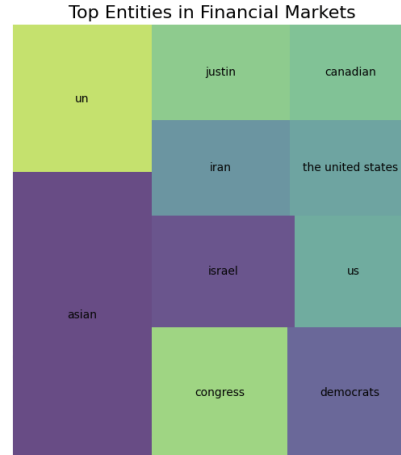


Fig. 8: Entities in Financial Markets

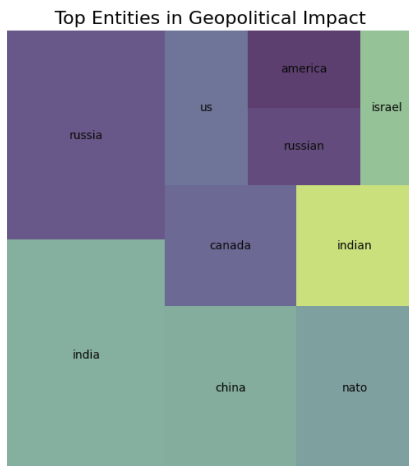


Fig. 9: Entities in Geographical Impact

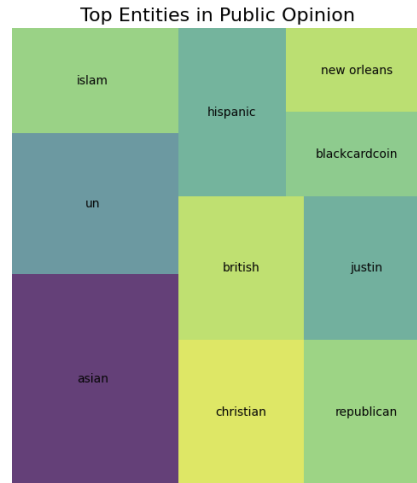


Fig. 10: Entities in Public Opinion

The Entity Network Graph further illustrates the interconnected nature of these key entities. Notably, United States, China, Russia, and NATO form a tightly linked cluster, highlighting their intertwined roles in both economic policy and geopolitical impact. This reflects how geopolitical tensions, such as sanctions imposed on Russia or Iran, can directly influence global financial markets and policy decisions by other global powers like the United States.

On the currency front, entities like Bitcoin, Crypto, Yuan, and Gold are connected in discussions about alternative financial systems, indicating the growing interest in diversifying away from the U.S. Dollar. These clusters reveal the relationships and conflicts driving the de-dollarization narrative, as well as the emerging role of digital currencies in global finance. By examining these key entities and their interactions, we gain a clearer understanding of the forces shaping the de-dollarization discourse. From geopolitical sanctions to shifts in financial markets, these entities are pivotal in steering the conversation about the future of global currencies.

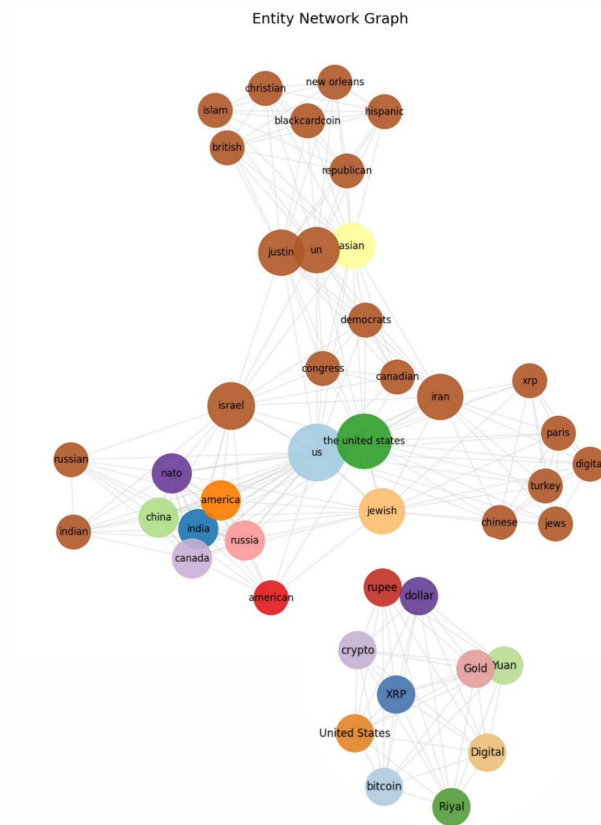


Fig. 11: Entity Network Graph

8 Latent Dirichlet Allocation(LDA)

To uncover the key themes within the de-dollarization discourse, we applied Latent Dirichlet Allocation (LDA) using the Gensim library, a widely-used tool for topic modeling in Natural Language Processing (NLP). LDA enables the identification of

latent topics within the dataset by analyzing the co-occurrence of words and grouping them into distinct themes. Each document, in this case, tweets, is assumed to reflect a mixture of topics, allowing us to capture the complex structure of discourse.

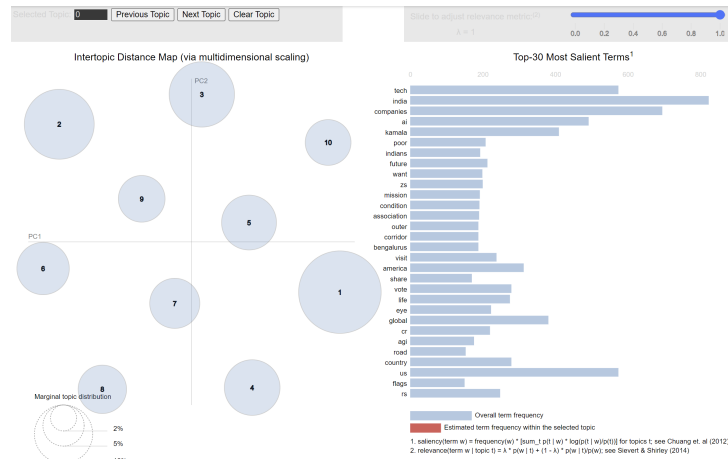


Fig. 12: LDA Interdimensional Map

The Intertopic Distance Map (left side of the visualization) was generated using pyLDavis, an interactive tool that aids in interpreting the results of the LDA model. This map uses multidimensional scaling (MDS) to visually represent the relationships between topics. Each circle on the map corresponds to a topic, and the size of the circle represents the prevalence of the topic within the dataset. Larger circles indicate more dominant topics, while smaller ones are less prevalent. Additionally, the distance between circles reflects the similarity or distinctiveness of topics. Topics that are closely spaced share more similar words and themes, while those that are far apart are more distinct. This map provides a visual way to assess topic separation and overlap, helping us understand how tightly or loosely the topics are connected within the discourse. Furthermore, the marginal topic distribution in the bottom-left corner quantifies the relative prevalence of each topic, with larger proportions indicating that more tweets are dominated by that topic.

On the right side of the visualization, we see a bar chart showing the Top-30 Most Salient Terms across all topics. These terms, which appear frequently within the corpus, are essential to understanding the key themes in the discourse. Terms like “tech,” “India,” and “companies” highlight the prominence of discussions around technological advancements, major global players like India, and the influence of corporations. Meanwhile, words like “future,” “mission,” and “global” suggest that many conversations are forward-looking and focused on strategic shifts in the global economic order. The blue bars represent overall term frequency, while the red bars

The word cloud provides a vivid, sprawling representation of the most prominent terms shaping the ongoing discourse around de-dollarization. The size of each word correlates with its frequency, allowing us to quickly identify the key topics, entities, and emotions driving conversations across social media platforms. From global politics to economic power shifts, the words paint a complex picture of public opinion, geopolitical dynamics, and economic uncertainty.

Global Economic Power and Alternatives At the heart of the discourse, "Dollar" and "BRICS" emerge as the most prominent entities. The frequent mention of BRICS (Brazil, Russia, India, China, and South Africa) signals a collective push to challenge the U.S. Dollar's dominance, advocating for a multipolar financial order. Terms like Russia, trade, and nato further emphasize the role major global powers are playing in reshaping economic systems. India and China are particularly pivotal in these conversations, highlighting their rising influence in global finance. The petrodollar agreement plays a vital role here, with discussions on how oil trade may shift away from the Dollar toward alternative currency systems.

Economic Policies and Fiscal Matters Terms such as GDP, debt, trillion, and rates reflect the financial concerns tied to de-dollarization, particularly regarding global debt levels and fiscal sustainability. Discussions around recession, trillion-dollar debt, and the potential collapse of the petrodollar agreement feature prominently, highlighting the risks associated with de-dollarization. These terms indicate ongoing debates about interest rates, economic growth, and how countries plan to navigate the shift from Dollar dominance to alternative financial systems.

Political Dynamics: Key Figures and U.S. Policy Prominent U.S. political figures, including Trump, Biden, and Kamala Harris, are frequently mentioned, linking domestic U.S. politics to broader discussions about foreign policy and economic strategy. Bidenomics and its implications on inflation and immigration policies are central here. Discussions of sanctions and trade agreements reflect how U.S. policy shifts, particularly under Biden, could reshape global economic relations. Kamala Harris appears in conversations tied to social policy, immigration, and the U.S.'s role in the global financial landscape.

The Role of Technology and Innovation Technological advancements are playing a pivotal role in the conversation, with terms like tech, companies, AI, and digital highlighting the importance of emerging technologies in shaping the future financial system. Conversations around digital currencies like Bitcoin and the potential for gold-backed currencies suggest that technological innovations may drive the move away from the Dollar. The growing role of tech companies in financial infrastructure development, particularly in nations like India and China, is empha-

sized as a critical factor in global economic shifts.

Financial Markets: Traditional Assets vs. New Alternatives "Gold," "Bitcoin," and "crypto" dominate this topic, illustrating the competition between traditional stores of value and digital currencies in the de-dollarization conversation. Gold has traditionally been the go-to asset during economic uncertainty, but Bitcoin and cryptocurrencies are gaining traction as potential hedges against the decline of the Dollar. Saudi Arabia and the Riyal are also frequently mentioned, reflecting discussions about the future of global energy markets and oil trade moving away from the Dollar. The idea of gold-backed currencies is prevalent, suggesting a desire for more stable, tangible assets as the global economy shifts.

Geopolitical Conflicts and Sanctions The terms war, military, and control highlight the geopolitical tensions surrounding de-dollarization, with mentions of Russia, Ukraine, and sanctions being frequent. The Russia-Ukraine conflict has amplified discussions about how sanctions against Russia are driving the need for currency alternatives. The role of economic sanctions as a weapon in geopolitical warfare emphasizes the strategic importance of controlling the global financial system. Discussions about China and India reflect how these nations are capitalizing on the conflict to promote non-Dollar-based trade agreements.

Social Dynamics and Public Opinion The frequent appearance of people, freedom, and media points to the social dimensions of the de-dollarization conversation. The term "people" likely refers to public sentiment around economic shifts, while "freedom" may reflect discussions on financial independence from the Dollar's influence. Media narratives play a significant role in shaping public perceptions of de-dollarization, with conversations about propaganda and control signaling an ongoing ideological battle over who controls the financial narrative.

Propaganda, Media, and Ideological Battles Terms such as propaganda, control, and freedom suggest that ideological battles are playing a significant role in the de-dollarization discourse. The control of media and the strategic use of propaganda are central to shaping how the public perceives economic independence from the Dollar. Freedom is also a recurring theme, reflecting opposing ideologies about financial sovereignty and who will control the emerging financial landscape in a post-Dollar world.

Environmental and Economic Intersections Terms like climate and change suggest that the de-dollarization conversation is also touching on environmental issues. Climate change's potential impact on global economic stability is a growing concern, with discussions around green initiatives and renewable energy gaining traction. The shift from fossil fuels and traditional energy sources to renewables

could significantly affect global trade, potentially influencing which countries lead the way in the post-Dollar world. This topic also links environmental sustainability with financial stability, emphasizing how economic decline could be driven by environmental challenges.

Future Outlook: Control and Challenges The terms future, global, and change dominate this topic, suggesting a forward-looking view on the global financial system. Discussions about control, money, and industry reflect concerns about how powerful interests will maintain control over the financial landscape as the Dollar declines. The emergence of India, China, and other global powers in the financial sphere, as well as the influence of cryptocurrencies and gold-backed systems, suggests that while change is imminent, it will be hotly contested. The appearance of terms like warfare industry and social control in this topic highlights the tensions and struggles that will accompany this transition.

The word cloud provides a snapshot of the key themes, entities, and emotions shaping the de-dollarization discourse. From geopolitical tensions and economic alternatives to social justice and propaganda battles, the conversation spans multiple dimensions, reflecting the complexity of the global economic order. The dominant terms indicate that this debate is as much about future possibilities as it is about present realities, with countries, corporations, and individuals vying for control over the evolving landscape.

10 Sentiment Analysis by Topic

Building on the Word Cloud Analysis, we now incorporate sentiment analysis to explore the emotional tone associated with each of the ten topics identified through Latent Dirichlet Allocation (LDA). The graph above shows the average sentiment for each topic, ranging from -1 (highly negative) to +1 (highly positive). This analysis provides deeper insight into how these themes are emotionally perceived within the de-dollarization conversation.

Global Economic Power and Alternatives: Moderately Negative Sentiment This topic reflects a slightly negative sentiment, likely due to the challenges associated with BRICS nations' collective push to challenge the U.S. Dollar's dominance. The frequent mention of terms like "Dollar," "BRICS," and "countries" highlights ongoing concerns about geopolitical tensions and trade disruptions.

Economic Policies and Fiscal Matters: Slightly Positive Sentiment The sentiment here is slightly positive, likely driven by discussions around potential fiscal strategies, interest rate management, and taxation policies aimed at stabilizing global financial markets. Terms like "GDP," "debt," and "trillion" reflect both the

challenges and possible solutions within the global economy.

Political Dynamics: Key Figures and U.S. Policy: Negative Sentiment This topic shows a negative sentiment, likely tied to U.S. domestic politics and the divisive nature of policies surrounding figures like Trump, Biden, and Kamala Harris. Discussions around immigration and foreign policy also contribute to this pessimistic tone, with concerns about the U.S.'s role in global economic shifts.

The Role of Technology and Innovation: Neutral to Slightly Positive Sentiment Sentiment here leans slightly positive, driven by optimism surrounding technological advancements and digital currencies like Bitcoin. The prominence of terms like "AI," "tech," and "companies" reflects a hopeful outlook on how technology might shape future financial systems and contribute to global economic resilience.

Financial Markets: Traditional Assets vs. New Alternatives: Highly Positive Sentiment This topic shows the most positive sentiment, indicating widespread optimism around alternatives to traditional assets, such as Bitcoin, Gold, and cryptocurrencies. Discussions likely center on the advantages of these new financial systems, especially as hedges against the Dollar's decline.

Geopolitical Conflicts and Sanctions: Slightly Positive Sentiment Despite the focus on conflicts and sanctions, this topic shows a slightly positive sentiment, perhaps reflecting optimism about new global alliances or economic restructuring. Terms like "war," "sanctions," and "Russia" highlight the potential for shifts in global power dynamics.

Social Dynamics and Public Opinion: Neutral to Slightly Negative Sentiment This topic exhibits a neutral to slightly negative sentiment, reflecting mixed public opinions on the social impacts of de-dollarization. Terms like "freedom," "people," and "media" suggest discussions about societal changes, with concerns about control and media narratives contributing to the negative tone.

Propaganda, Media, and Ideological Battles: Negative Sentiment This topic carries a notably negative sentiment, tied to ideological and propaganda battles arising from media control and public perception. Terms like "propaganda," "freedom," and "control" underscore tensions around narrative-shaping and ideological struggles.

Environmental and Economic Intersections: Neutral Sentiment This topic maintains a neutral sentiment, with discussions primarily focused on climate change and its economic impacts. Terms like "climate" and "change" suggest that while

the environment is important, the discourse remains largely technical or policy-oriented, without strong emotional charges.

Future Outlook: Control and Challenges: Slightly Negative Sentiment
 Lastly, this topic reflects a slightly negative sentiment, likely due to concerns about transitioning away from the Dollar and the challenges of controlling future economic landscapes. Terms like "control," "money," and "global" point to the complexities and struggles anticipated in shaping the future of global finance.

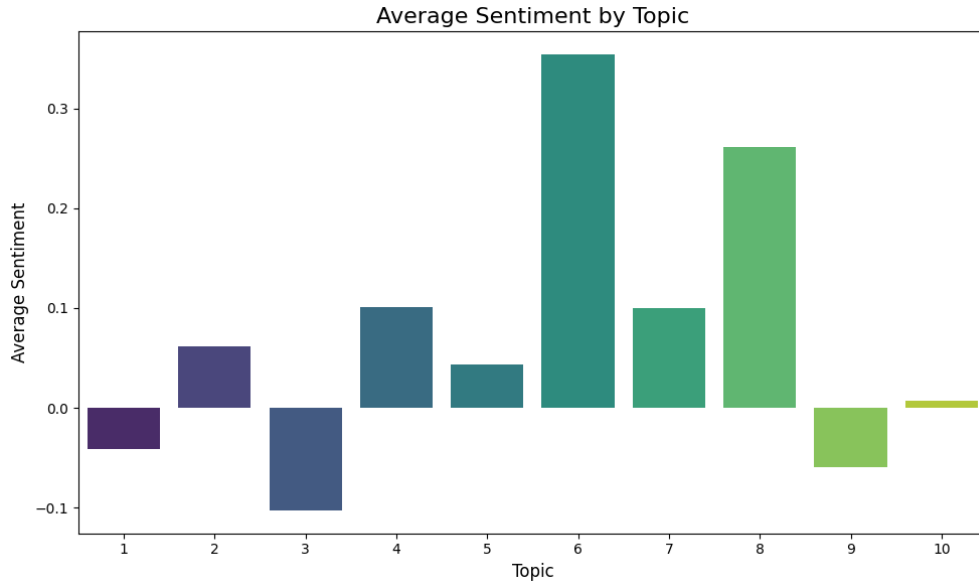


Fig. 14: Sentiment Analysis by Topic

11 Conclusion

This study delves into the dynamic and multifaceted discourse surrounding de-dollarization, leveraging cutting-edge natural language processing (NLP) techniques—namely, BERT-based sentiment analysis, named entity recognition (NER), and Latent Dirichlet Allocation (LDA)—to analyze 6,000 tweets from Platform X. Our goal was to uncover the key themes, sentiments, and entities shaping conversations about the shift away from the U.S. Dollar and how public sentiment reflects broader geopolitical and economic trends.

Dominant Themes: Global Economic Power and Alternatives emerged as a central theme, largely driven by discussions about BRICS nations' collective efforts to challenge U.S. financial dominance and promote a multipolar financial order. Conversations about Economic Policies and Fiscal Matters focused on concerns related to debt, GDP, and interest rates, while the Role of Technology and Innovation

emphasized the growing importance of digital currencies, blockchain, and AI in reshaping the global financial system.

Public Sentiment: Sentiment analysis revealed optimism surrounding cryptocurrencies and alternative financial systems, reflecting the public's interest in digital assets as tools for greater economic autonomy and security. Conversely, discussions related to geopolitical conflicts and U.S. political dynamics were marked by more neutral or negative sentiments, revealing concerns about global instability, sanctions, and uncertainty about the future of U.S. leadership in global financial matters.

Key Entities: The analysis identified the United States, China, Russia, India, and BRICS as the most frequently mentioned entities, indicating their pivotal roles in advancing the global de-dollarization agenda. Additionally, the frequent mention of Bitcoin, cryptocurrencies, and digital currencies points to growing public interest in exploring alternatives to the U.S. Dollar amid rising geopolitical tensions and economic uncertainties.

Emerging Financial Technologies: The discourse around Bitcoin, Gold, and cryptocurrencies reflects an increasing public interest in diversifying away from traditional financial systems. These technologies are not only viewed as potential hedges against the declining dominance of the U.S. Dollar but also as key players in the evolving global financial landscape.

Geopolitical Tensions: Our analysis highlighted the complex interplay between geopolitical tensions, sanctions, and currency shifts. Frequent mentions of Russia, sanctions, and the Russia-Ukraine conflict demonstrate how economic warfare increasingly influences global financial strategies. Countries seek alternatives to mitigate the impact of sanctions and protect their economies from external pressures.

Social and Media Influence: The appearance of terms such as people, freedom, and media underscores the significant role public opinion and media narratives play in shaping perceptions of de-dollarization. The conversation reveals an ongoing ideological battle over economic independence, with competing narratives influencing how stakeholders view the future of global financial systems. Social media, in particular, serves as a powerful barometer for real-time public sentiment, offering valuable insights into global perceptions.

Implications and Future Directions: This research contributes to a deeper understanding of the de-dollarization discourse by providing real-time insights into the themes and sentiments shaping global debates. As geopolitical tensions rise and discussions around currency alternatives intensify, it is clear that the future of global financial systems is being actively contested both politically and technologically.

From a policy perspective, these findings provide valuable insights for economists, policymakers, and financial institutions. Understanding the public's perceptions of currency alternatives, cryptocurrencies, and the influence of emerging powers like

China and India can help shape future strategies for navigating the evolving global economic landscape. Additionally, the prominence of geopolitical entities such as BRICS and their push for financial autonomy suggests that the traditional global financial hierarchy is undergoing significant transformation. Future research should explore the long-term impacts of digital currencies on global trade and economic policies, particularly as technologies like blockchain and AI continue to disrupt traditional financial systems. Moreover, further examination of how media narratives and public sentiment shape economic policies could provide critical insights into the sociopolitical forces driving these shifts.

In conclusion, The ongoing debate around de-dollarization is complex and multifaceted, reflecting immediate concerns about economic sovereignty and broader shifts in global power dynamics. As the world moves toward a more decentralized financial order, the narratives and entities identified in this study will play a pivotal role in shaping the future trajectory of the global economy. The themes uncovered in this research provide a foundation for future inquiry into how global financial systems will evolve amid technological disruption and geopolitical realignment.

12 Limitations and Future Work

Despite the valuable insights provided by this study, several limitations should be acknowledged. First, the dataset is limited to Platform X (formerly Twitter), which may not fully represent the global population's views. Platform X tends to attract certain demographics and can amplify voices that are more active or polarized. Future research could incorporate data from other platforms or sources, such as news media or expert opinions, to provide a more balanced perspective.

Additionally, while we retrieved approximately 10,000 tweets, only 6,000 were unique after filtering. This demonstrates that repetition and bot activity, though reduced, are still a factor. Future work could implement more sophisticated bot detection tools to further ensure the integrity of the dataset.

Another limitation is the absence of sarcasm detection in the sentiment analysis. Social media platforms often contain sarcastic or ironic content, which can skew sentiment results. Incorporating advanced techniques like sarcasm detection in future studies would enhance the accuracy of the sentiment analysis.

Finally, this study captures a snapshot in time, meaning that evolving discussions are not fully represented. Longitudinal studies could provide deeper insights into how sentiment and public opinion change in response to major global events.

References

1. N. Kulli and S. Senbel. ****COVID-19 Vaccine Response on Social Media Using LDA Analysis****. In: Arai, K. (eds) ***Advances in Information and Communication. FICC 2024***. Lecture Notes in Networks and Systems, vol 920. Springer, Cham, 2024. <https://doi.org/10.1007/978-3-031-53963-37>.

2. J. Devlin, M.-W. Chang, K. Lee, and K. Toutanova. **BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding**. *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics*, 2019, pp. 4171-4186.
3. A. Vaswani, N. Shazeer, N. Parmar, J. Uszkoreit, L. Jones, A. N. Gomez, L. Kaiser, and I. Polosukhin. **Attention is All You Need**. *Advances in Neural Information Processing Systems*, 2017, pp. 5998-6008.
4. Y. Liu, M. Ott, N. Goyal, J. Du, M. Joshi, D. Chen, O. Levy, M. Lewis, L. Zettlemoyer, and V. Stoyanov. **RoBERTa: A Robustly Optimized BERT Pretraining Approach**. *arXiv preprint arXiv:1907.11692*, 2019.
5. T. Wolf, L. Debut, V. Sanh, J. Chaumond, C. Delangue, A. Moi, P. Cistac, T. Rault, R. Louf, M. Funtowicz, and J. Brew. **Transformers: State-of-the-Art Natural Language Processing**. *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing: System Demonstrations*, 2020, pp. 38-45.
6. T. Brown, B. Mann, N. Ryder, M. Subbiah, J. Kaplan, P. Dhariwal, A. Neelakantan, P. Shyam, G. Sastry, A. Askell, and A. Agarwal. **Language Models are Few-Shot Learners**. *Advances in Neural Information Processing Systems*, vol. 33, 2020, pp. 1877-1901.
7. T. Mikolov, K. Chen, G. Corrado, and J. Dean. **Efficient Estimation of Word Representations in Vector Space**. *arXiv preprint arXiv:1301.3781*, 2013.
8. S. Ruder. **Neural Transfer Learning for Natural Language Processing**. *PhD Thesis*, National University of Ireland, Galway, 2019.
9. N. Reimers and I. Gurevych. **Sentence-BERT: Sentence Embeddings using Siamese BERT-Networks**. *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing*, 2019, pp. 3982-3992.
10. B. Eichengreen. **Exorbitant Privilege: The Rise and Fall of the Dollar and the Future of the International Monetary System**. *Oxford University Press*, 2011.
11. R. I. McKinnon. **The Unloved Dollar Standard: From Bretton Woods to the Rise of China**. *Oxford University Press*, 2013.
12. A. Subramanian. **Eclipse: Living in the Shadow of China's Economic Dominance**. *Peterson Institute for International Economics*, 2011.
13. H. Chey. **Theories of International Currencies and the Future of the World Monetary Order**. *International Studies Review*, vol. 14, no. 1, 2012, pp. 51-77.
14. J. Rickards. **The Death of Money: The Coming Collapse of the International Monetary System**. *Penguin Group*, 2014.
15. J. E. Stiglitz. **Freefall: America, Free Markets, and the Sinking of the World Economy**. *W. W. Norton Company*, 2010.
16. A. Tooze. **Crashed: How a Decade of Financial Crises Changed the World**. *Viking*, 2018.
17. P. Krugman. **The International Role of the Dollar: Theory and Prospect**. *Exchange Rate Theory and Practice*. University of Chicago Press, 1984, pp. 261-278.
18. X. Xu and X. Li. **The Renminbi as an International Currency: Achievements, Prospects, and Challenges**. *Journal of International Money and Finance*, vol. 107, 2020, pp. 102-113.
19. L. Panitch and S. Gindin. **The Making of Global Capitalism: The Political Economy of American Empire**. *Verso*, 2012.
20. R. Fan, J. Zhao, Y. Chen, and K. Xu. **Anger is More Influential than Joy: Sentiment Correlation in Weibo**. In *Proceedings of the 2014 ACM Conference on Web Science*, 2014, pp. 45-54.
21. J. Li, A. Sun, J. Han, and C. Li. **A Survey on Deep Learning for Named Entity Recognition**. *IEEE Transactions on Knowledge and Data Engineering*, vol. 31, no. 1, 2019, pp. 44-66.
22. A. Balahur and M. Turchi. **Comparative Experiments Using Supervised Learning and Machine Translation for Multilingual Sentiment Analysis**. *Computer Speech Language*, vol. 28, no. 1, 2014, pp. 56-75.