Investigating Causal Relationships Between Inflation News Among Other News Topics In Philippine News Media Using Granger Causality

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***Abstract*— A major economic problem for Philippine society is inflation, which is defined as a decline in the purchasing power of the country's currency and has an effect on job, welfare, and health care, among other things. This issue has prompted extensive coverage on social media, reaching Filipino consumers widely. It has led to a trend where numerous news outlets have published numerous articles focused on inflation. However, inflation's effects have also spilled over into other news topics. The purpose of this study is to investigate how inflation affects the Philippines by developing a Time Series model employing Granger Causality to discern causal relationships between inflation news articles and other news topics. Several processes were done to achieve the main objective: (a) identified and gathered reliable news outlets in the Philippines from various websites; (b) preprocess and categorize the gathered data; (c) identify the appropriate lag length with Vector Autoregression (VAR) model selection; (d) Perform Granger Causality test; (e) validate results with Johansen Cointegration with Vector Error Correction Model (VECM). Results indicated that inflation news from outlets like Business Mirror and ABS-CBN News significantly influenced topics such as business, welfare, and technology, suggesting that while inflation news shapes media narratives beyond its economic indicator role, the absence of long-term relationships signifies that these effects are short-lived.**

Keywords—inflation, multivariate time series, granger causality, causality testing, media analysis

I. INTRODUCTION

Inflation continuously erodes the purchasing power of the Philippine Peso, often at rates higher than the global norm. Between 2010 and 2020, the Philippines experienced an average inflation rate of 4.2%, within the central bank's target of 2-4% [1]. However, instances of inflation exceeding this range have created economic challenges, particularly for the low- and middle-income populations, which constitute 58.4% and 40%, respectively [2].

Understanding the effects of inflation is a complex process, with several methods already being utilized to determine its effects on various aspects on a country. While traditional methods like CPI and GDP analysis are commonly used to understand inflation, this study introduces Granger causality (GC) to uncover causal relationships between inflation and media coverage—a method not previously explored in the Philippine context. This method allows the researchers to understand and determine any causal relationships between inflation and other news topics bi-directionally by using online news articles gathered from verified news agencies in the Philippines.

Time series analysis (TSA) with its many applications in different fields is essentially a method of investigating the characteristics of the response variable with time as the independent varia able [3]. Time series models help in comprehending the underlying forces and structure behind the observed data in this case are the gathered articles on various news topics. These models can also be utilized for forecasting, monitoring, as well as feedback and feedforward control [4]. Taking advantage of this, TSA can help understand how news reacts to inflation by identifying their relationship with Granger causality. TSA and Granger causality is not unfamiliar in the field of economics. This technique was applied to explore connections between two or more variables, as demonstrated in the research conducted investigating the link between the Human Development Index and economic growth using Granger Causality [5]. Thus, analysing how inflation and news coverage interact provides valuable insights into the effects of inflation.

Due to the nature of the data used in this study, the researchers defined the scope and took into consideration the following limitations: (1) The news articles are only the ones available online, not physical newspapers; (2) the origin of the articles must only in the list of verified Philippine news agencies the researchers compiled; (1) the dates of the research articles must be from January 2024 to April 2024 due to storage limitations in data collection. Due to this scope, the study's findings may be influenced by the available articles on the specified scope. The findings of this study offer valuable insights into the dynamics between interrelated issues in the Philippines, enhancing the understanding of factors that affect inflation and vice versa.

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II. RELATED LITERATURE

A. Time Series

A time series is a sequence of observations arranged in order, often over time, but can also include spatial dimensions. It can be univariate (single variable) or multivariate (multiple variables). Data validity is crucial before preprocessing for time series analysis [7]. A feature is a measurable characteristic used to identify patterns and relationships within the time series [8]. Features must be identified and engineered to determine which significantly influence predictions [9]. Correlated features, which show statistical dependence, can confound inferences if not addressed before performing Granger causality tests [10]. Time series are categorized as stationary, with constant statistical properties over time, or non-stationary, which can disrupt causality outcomes due to changing properties [11].

B. Time Series Causality

Time series causality explores cause-and-effect relationships between variables in a time series, crucial for informed decision-making in fields like economics, medicine, and environmental sciences [12]. It has two main objectives: treatment effect estimation, which measures the impact of an event on a variable, and causal discovery, which seeks to identify causal relationships between variables in the time series, aligning with the goals of this study [13].

C. Granger Causality

Granger causality assesses whether one time series can predict another by analysing if past values of one improve the forecasting of future values. Introduced by C.W.J. Granger [14], it compares the forecasting performance of two series. Granger causality has been applied in various fields, notably in finance, where it identified key systemic events like the October 1997 mini-crash, the 1998 Russian default, and the 2002 stock market downturn [15].

D. Existing Works

Related works pertaining to news causality utilized much different methodologies to identify causal relationships between two or more topics. Some include using causal Bayesian networks, combination of causality models. One comparative study examined time-series causality techniques but on only one news source, and didn't infer topic causality [16]. Other methods include lexico-syntactic causal patterns on mined text [17], supervised learning via language models [18], knowledge bases [19], and machine learning [20]. Beyond news, Granger causality has been used to show that indices like the RCI, A-COVID Index, and uncertainty index significantly predict stock market volatility in Latin America [21], and that geopolitical tensions influence oil prices and forecast accuracy [22].

III. METHODOLOGY

A. Sources of Data

The data for this study is sourced from verified URLs of Philippine news agencies, all collected through Meltwater, a comprehensive media intelligence platform. The collected articles span nine general news topics: inflation, economy, politics, technology, environment, health, business, welfare, and foreign affairs. Only articles published between January 2024 and April 2024 were included. Each article was analysed by Meltwater to ensure it fell under one of the specified news topics and met the date range criteria before being collected.

B. Data Collection and Preprocessing

In collecting news article data from Meltwater, the researchers used the keyword feature to find articles that pertain to the selected news topics. The keyword feature also has filters, the filters used were: only Philippines made articles, to exclude non-Philippines based news agencies, articles written in Tagalog, English and Cebuano, and fall within the specified time frame for data collection.

The dataset comprises 118,266 articles across various news topics. The business category had the highest count with 32,505 articles, followed by technology with 20,286. Health and environment-related topics were nearly equal, with 14,686 and 14,683 articles, respectively. Economy and politics had similar counts of 11,618 and 11,616 articles. Welfare news contributed 5,081 articles, and inflation-focused articles totaled 5,734. Foreign affairs had the fewest, with 2,057 articles. The largest contribution in terms of origin came from The Manila Times with 64,198 articles. Other notable sources included Philstar.com (9,580), Daily Tribune (7,636), Business Mirror (7,039), and Manila Standard (6,497). Entries below 5,000 articles came from sources like Business World, SunStar Philippines, ABS-CBN News, GMA News Online, Rappler, Cebu Daily News, and Visayan Daily Star.

After downloading the data across all topics, a secondary filtering process was initiated. This began with merging all datasets with the same topic. This resulted in nine datasets representing all topics. Following this centralization, additional filtering was applied based on source and date. Nine empty datasets were created to store the fully filtered data per topic. The final data format consisted of daily mappings for each news source within the date range from January 1 to April 30, 2024.

The datasets for selected news outlets were converted into data frames and merged into a single dataset. Since some dates appeared in certain datasets but not in others, null values were checked by counting them in each column to ensure data quality. Rows containing null values were dropped to maintain consistent dates across the dataset. Unnecessary columns and those filled with zeroes over 50% were also discarded to reduce dimensionality and enhance manageability. To ensure analytical integrity, correlated features between data frames were identified by finding pairs with an absolute correlation coefficient greater than 0.8. Columns exhibiting perfect correlation scores of 1.0 were dropped to avoid numerical instability in future analyses. This preprocessing step not only eliminated redundant information but also improved overall performance of the dataset for subsequent analysis.

C. Data Analysis

The Augmented Dickey-Fuller (ADF) test served as a tool to determine the stationarity of time series data, a critical step for subsequent modelling techniques like Granger causality. It worked by transforming non-stationary time series into stationary ones through first difference transformation. Additionally, the selection of the Vector Autoregression (VAR) model aided in identifying the optimal lag order necessary for

modelling multivariate time series data using Vector Autoregression.

In the analysis of causal relationships among different variables, the Granger causality test was utilized. This test examined all possible combinations of non-stationary time series data, extracting p-values for different lag lengths. The minimum p-value across all lag lengths was selected and stored in the resulting data frame. Additionally, the Johansen cointegration test was conducted to determine whether any cointegrated vectors existed among the non-stationary time series variables. The presence of cointegration implied the existence of a long-run relationship among the variables, indicating meaningful and stable associations. Conversely, the absence of cointegrated vectors suggested that there was no long-run relationship among the variables, potentially leading to spurious correlations identified through Granger causality analysis.

D. Validation

- **Vector Autoregression (VAR) Model Selection:** The VAR model selection is commonly used to model multivariate time series data, serving as a basis for selecting the best-performing candidate model. In this approach, Information-Theoretic Criteria such as the Akaike Information Criterion (AIC) (1) and the Bayesian Information Criterion (BIC) (2) are applied to compare candidate models.

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_k Y_{k-2} + U_t \quad (1)$$

$$AIC = -2\log(L) + 2k \quad (2)$$

The model with the lowest criterion value is generally considered the best estimate of the unknown true model. When conducting Granger Causality analysis, model selection typically relies on the AIC, where the model with the lowest AIC value is chosen as the optimal model for testing causal relationships [23].

- **Johansen Cointegration Test:** Johansen Cointegration analyzes long-term relationships between multiple non-stationary time series. Unlike the Granger Causality test, which requires differencing for stationarity, Johansen's test checks for a long-term equilibrium without differencing. If cointegration exists, it suggests the variables move together over time. This method is often paired with Vector Error Correction Models to capture both short-term and long-term dynamics [24].
- **Vector Error Correction Model (VECM):** The VECM (3) is derived from the VAR model and is used to model systems of integrated time series with cointegrating relationships. The VECM captures both short-term deviations and long-term equilibrium adjustments [25].

$$\Delta y_t = \alpha(\beta' y_{t-1}) + \theta_1 \Delta y_{t-1} + \mu_t \quad (3)$$

- **Trace Statistic**: Trace statistic (4) is a number calculated from a statistical test of a hypothesis. It shows how closely your observed data match the distribution expected under the null hypothesis of that statistical test [26].

$$Trace\ Statistic = -T \sum_{i=r+1}^{p} \ln(1 - \hat{\lambda}_i) \quad (4)$$

- **Max Eigenvalue Statistic (MES):** MES (5) tests the null hypothesis of having exactly r cointegrating vectors against the alternative of $r + 1$ [27].

$$MES = -Tln(1 - \hat{\lambda}_{r+i}) \quad (5)$$

E. Conceptual Framework

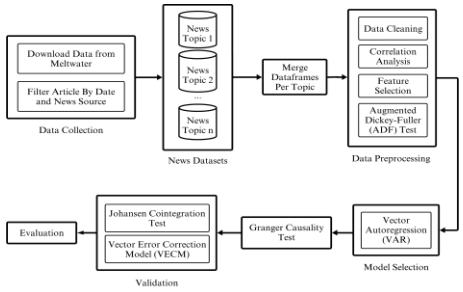

Fig. 1. Conceptual Framework

IV. RESULTS AND ANALYSIS

A. Data Preprocessing

The data was compiled into a single data frame, after which it was thoroughly examined for any potential null values. Following the merging process, the Variance Inflation Factor (VIF) was computed for all variables to identify and subsequently remove highly collinear features. To assess the stationarity of the time series, the Augmented Dickey-Fuller (ADF) test was applied. Specific variables—namely *Philstar.com_inflation*, *Business Mirror_technology*, *Rappler_Business*, and *Rappler_foreign_affairs*—were found to be non-stationary. These series were then differenced, and correlations were re-evaluated to ensure the integrity of the data for further analysis.

B. Lag Length Selection

With the data stabilized through preprocessing, the VAR model selection was conducted. The model determines the optimal lag length by evaluating four key criteria: AIC, BIC, Final Prediction Error (FPE), and the Hannan-Quinn Information Criterion (HQIC).

TABLE I. LAG LENGTH CRITERIA VALUES

Lag	AIC	BIC	FPE	HQIC

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0	27.49	27.83*	8.718e+11	27.63
1	28.33	33.37	2.046e+12	30.37
2	29.10	38.84	5.078e+12	33.05
3	29.58	44.03	1.220e+13	35.45
4	29.70	48.85	3.135e+13	37.47
5	28.05	51.91	3.022e+13	37.73
6	23.62	52.18	7.960e+12	35.21
7	10.76*	44.03	1.766e+10*	24.27*

This analysis focuses on minimizing the AIC, which balances model fit and complexity by penalizing overly complex models to prevent overfitting. The lowest AIC value, 10.76, was found at lag 7, indicating that the VAR model will use data from the previous 7 days to predict future values based on daily activities.

C. Granger Causality

The dataframe comprised 43 distinct variables, which were subsequently subjected to the Granger Causality Test. In this context, p-values lower than 0.05 were deemed significant; however, the researchers focused their analysis on strong causal relationships with p-values below 0.01. The initial phase of the analysis identified inflation-related topics as predictors and various other topics as response variables, aiming to ascertain whether inflation grag-causes these additional topics.

TABLE II. BUSINESS MIRROR'S INFLATION DATA AS PREDICTOR

Predictors (X)	Response Variables (Y)	P_Values
Business Mirror_inflation	ABS-CBN News_business	0.0002
	Business World_welfare	0.0002
	GMA News Online_welfare	0.0003
	ABS-CBN News_environment	0.0013
	InterAksyon_business	0.0028
	ABS-CBN News_welfare	0.0032
	GMA News Online_foreign_affairs	0.0038

The results show that inflation news from Business Mirror significantly influences coverage of various topics across multiple outlets. Notably, inflation reporting strongly affects business news from ABS-CBN News and InterAksyon, and welfare coverage from outlets like Business World, GMA News, and Philstar. It also impacts foreign affairs reporting by GMA News and environment news from ABS-CBN. These findings suggest that inflation coverage shapes how socio-economic issues are reported across the media.

TABLE III. SUNSTAR' INFLATION DATA AS PREDICTOR

Predictors (X)	Response Variables (Y)	P_Values
SunStar Philippines_inflation	Philstar.com_foreign_affairs	0.0015
	InterAksyon_business	0.0030

SunStar's inflation news is a strong predictor of business topics in InterAksyon (p = 0.0030) and foreign affairs topics in Philstar (p = 0.0015). These results imply that SunStar's coverage of inflation has a significant influence on the way these other publications cover international news and business-related topics. Similar to earlier findings, this highlights how inflation shapes media narratives on a variety of platforms and has a wider impact on a range of socioeconomic and global issues.

TABLE IV. GMA'S INFLATION DATA AS PREDICTOR

Predictors (X)	Response Variables (Y)	P_Values
GMA News Online_inflation_x	Philstar.com_environment_y	0.0005
	Manila Standard_technology_y	0.0011
	GMA News Online_foreign_affairs_y	0.0013
	Business Mirror_welfare_y	0.0048
	Rappler_technology_y	0.0071
	Philstar.com_environment_y	0.0005

Inflation news from GMA News Online is strongly linked to environmental coverage in Philstar (p = 0.0005) and technology topics in Manila Standard (p = 0.0011) and Rappler (p = 0.0071). It also significantly affects GMA News' own foreign affairs reporting (p = 0.0013) and welfare topics in Business Mirror (p = 0.0048). These results suggest that inflation coverage by GMA News influences a broad range of topics, impacting not just economic narratives but also technology, international affairs, and social welfare across various outlets.

TABLE V. ABS-CBN'S INFLATION DATA AS PREDICTOR

Predictors (X)	Response Variables (Y)	P_Values
ABS-CBN News_inflation	Business Mirror_environmen	0.0004
	Philstar.com_environment	0.0013
	Rappler_welfare	0.0015
	ABS-CBN News_welfare	0.0015
	Manila Standard_welfare	0.0033

	Rappler_environment	0.0039
	Manila Standard_technology	0.0074
	Business Mirror_technology	0.0079
	Daily Tribune_foreign_affairs	0.0084

Inflation coverage by ABS-CBN News is a strong predictor of environmental topics in Rappler (p = 0.0015), ABS-CBN News itself (p = 0.0015), and Manila Standard (p = 0.0033), as well as environmental topics in Business Mirror (p = 0.0004) and Philstar (p = 0.0013). Additionally, there are significant Granger causal relationships with environment topics in Rappler (p = 0.0039) and technology topics in Manila Standard (p = 0.0074) and Business Mirror (p = 0.0079). Lastly, the results indicate a significant influence on foreign affairs coverage in Daily Tribune (p = 0.0084).

TABLE VI. PHILSTAR'S INFLATION DATA AS PREDICTOR

Predictors (X)	Response Variables (Y)	P_Values
Philstar.com_inflation_x	Manila Standard_technology	0.0002
	ABS-CBN News_environment	0.0016
	Manila Standard_welfare	0.0033
	Philstar.com_welfare	0.0063
	Rappler_environment	0.0077

Inflation news from Philstar.com strongly predicts technology topics in Manila Standard (p = 0.0002), highlighting a close link between inflation reporting and tech discourse. It also significantly impacts environmental topics in ABS-CBN News (p = 0.0016) and welfare coverage in both Manila Standard (p = 0.0033) and Philstar.com (p = 0.0063). Additionally, there is a notable relationship with environmental reporting in Rappler (p = 0.0077).

TABLE VII. MANILA STANDARD'S INFLATION DATA AS PREDICTOR

Predictors (X)	Response Variables (Y)	P_Values
Manila Standard_inflation	Rappler_environment	0.0000
	Manila Standard_welfare	0.0007
	Philstar.com_welfare	0.0042
	Manila Standard_technology	0.0048
	SunStar Philippines_environment	0.0062
	GMA News Online_welfare	0.0075
	Rappler_foreign_affairs	0.0095

Inflation news from Manila Standard shows a very strong causal relationship with environmental topics in Rappler (p = 0.0000). It also significantly predicts welfare topics in Philstar.com (p = 0.0042) and Manila Standard (p = 0.0007), linking inflation to welfare coverage. Additionally, it impacts technology topics in Manila Standard (p = 0.0048) and environmental issues in SunStar (p = 0.0062). There are also notable relationships with welfare coverage in GMA News Online (p = 0.0075) and foreign affairs in Rappler (p = 0.0095).

TABLE VIII. DAILY TRIBUNE'S INFLATION DATA AS PREDICTOR

Predictors (X)	Response Variables (Y)	P_Values
Daily Tribune_inflation	GMA News Online_foreign_affairs	0.0011
	Rappler_economy	0.0018
	Rappler_environment	0.0018
	SunStar Philippines_welfare	0.0025

Inflation news from The Daily Tribune shows a significant correlation with GMA News Online's foreign affairs coverage (p = 0.0011), suggesting that inflation reporting may influence foreign affairs coverage. It also has a strong causal relationship with Rappler's environmental and economic topics (both p = 0.0018). Additionally, Daily Tribune's inflation news significantly impacts SunStar Philippines' welfare reporting (p = 0.0025).

This phase of the analysis examines inflation-related topics as response variables to ascertain whether other news topics contribute to an increase in inflation reports.

TABLE IX. BUSINESS MIRROR'S INFLATION DATA AS RESPONSE VARIABLE

Response Variables (Y)	Predictors (X)	P_Values
Business Mirror_inflation	GMA News Online_welfare	0.0003
	ABS-CBN News_foreign_affairs	0.0007
	Cebu Daily News_technology	0.0023
	The Manila Times_foreign_affairs	0.0029
	Business World_welfare	0.0059
	ABS-CBN News_environment	0.0061

Inflation news from Business Mirror reveals strong causal relationships with various topics from other outlets. Welfare news from GMA News Online (p = 0.0003) and Business World (p = 0.0059) shows significant causality. Foreign affairs topics from ABS-CBN News (p = 0.0007) and The Manila Times are also strong predictors, as are technology news from Cebu Daily News (p = 0.0023) and environmental news from ABS-CBN (p = 0.0061). These findings suggest that welfare, foreign affairs, technology, and environment coverage from several outlets can help predict inflation-related news.

TABLE X. SUNSTAR'S INFLATION DATA AS RESPONSE VARIABLE

Response Variables (Y)	Predictors (X)	P_Values
SunStar Philippines_inflation	Business World_welfare	0.0006
	ABS-CBN News_welfare	0.0015
	Business Mirror_technology	0.0016
	GMA News Online_welfare	0.0062

SunStar Philippines' inflation news reveals substantial linkages with welfare, technology, and other themes covered by many media sites. Welfare news from Business World (p = 0.0006), ABS-CBN News (p = 0.0015), and GMA News Online (p = 0.0062) seem to substantially predict inflation-related news from SunStar Philippines. Technology news from Business Mirror (p = 0.0016) likewise has a significant causal relationship with inflation coverage.

Response Variables (Y)	Predictors (X)	P_Values
GMA News Online_inflation	Cebu Daily News_technology	0.0006
	Business World_welfare	0.0087
	GMA News Online_foreign_affairs	0.0098

The results for GMA News Online inflation news show substantial Granger causal relationships with technology, welfare, and foreign affairs issues covered by other media sites. Specifically, technology news from Cebu Daily News (p = 0.0006) is a good predictor of inflation-related news from GMA News Online. Furthermore, welfare news from Business World (p = 0.0087) and foreign affairs news from GMA News Online (p = 0.0098) demonstrate substantial causality.

TABLE XI. ABS-CBN'S INFLATION DATA AS RESPONSE VARIABLE

Response Variables (Y)	Predictors (X)	P_Values
ABS-CBN News_inflation_y	Business World_welfare	0.0001
	Business Mirror_technology	0.0009
	Rappler_environment	0.0021
	InterAksyon_business	0.0092

Granger causality results for ABS-CBN News inflation news show strong correlations with welfare, technology, environment, and business topics from various outlets. Welfare news from Business World has the strongest causal link (p = 0.0001), indicating a significant influence. Technology news from Business Mirror (p = 0.0009) and environmental news from Rappler (p = 0.0021) also show notable causality, suggesting these topics shape ABS-CBN's inflation coverage. Additionally, business news from InterAksyon (p = 0.0092) is a significant predictor.

TABLE XII. PHILSTAR'S INFLATION DATA AS RESPONSE VARIABLE

Response Variables (Y)	Predictors (X)	P_Values
Philstar.com_inflation	Rappler_environment	0.0000
	ABS-CBN News_business	0.0004
	Manila Standard_environment	0.0007
	Philstar.com_foreign_affairs	0.0008
	Business Mirror_environment	0.0020
	The Manila Times_foreign_affairs	0.0029
	GMA News Online_welfare	0.0029
	ABS-CBN News_environment	0.0044
	SunStar Philippines_environment	0.0052
	Business Mirror_foreign_affairs	0.0071

Philstar.com's inflation news demonstrates strong predictive relationships with various topics, particularly from environmental, business, foreign affairs, and welfare coverage. Rappler's environmental news has the most significant causal influence (p = 0.0000), highlighting a robust connection between environmental reporting and inflation on Philstar.com. Other important predictors include business news from ABS-CBN News (p = 0.0004), environmental topics from Manila Standard (p = 0.0007), and foreign affairs from Philstar.com (p = 0.0008). Significant causality is also evident in environmental news from Business Mirror (p = 0.0020) and SunStar Philippines (p = 0.0052), as well as foreign affairs coverage from The Manila Times (p = 0.0029) and Business Mirror (p = 0.0071). Additionally, welfare news from GMA News Online (p = 0.0029) enhances Philstar.com's inflation coverage. Overall, these findings indicate that Philstar.com's inflation reporting is highly sensitive to environmental, foreign policy,

and socioeconomic issues, with environmental news playing a particularly dominant role in shaping inflation narratives.

TABLE XIII. MANILA STANDARD'S INFLATION DATA AS RESPONSE VARIABLE

Response Variables (Y)	Predictors (X)	P_Values
Manila Standard_inflation	GMA News Online_welfare	0.0000
	The Manila Times_foreign_affairs	0.0044
	ABS-CBN News_welfare	0.0072
	Manila Standard_foreign_affairs	0.0091

Inflation news in Manila Standard shows significant relationships with welfare and foreign affairs topics, particularly from GMA News Online, The Manila Times, and ABS-CBN News. The strongest predictor is welfare news from GMA News Online ($p = 0.0000$), indicating a robust link between welfare coverage and inflation reporting on Manila Standard. Additionally, foreign affairs news from The Manila Times ($p = 0.0044$) and internal reporting from Manila Standard itself ($p = 0.0091$) significantly influence inflation news. ABS-CBN News' welfare reporting ($p = 0.0072$) also enhances the predictability of inflation coverage. These findings suggest that welfare and foreign affairs topics are key drivers of inflation narratives in Manila Standard, with welfare-related news being the most significant causal factor.

TABLE XIV. DAILY TRIBUNE'S INFLATION DATA AS RESPONSE VARIABLE

Response Variables (Y)	Predictors (X)	P_Values
Daily Tribune_inflation	*Rappler_environment*	*0.0011*
	SunStar Philippines_welfare	*0.0018*
	Philstar.com_foreign_affairs	*0.0041*
	Manila Standard_foreign_affairs	*0.0088*

Daily Tribune's inflation news highlights significant relationships with environmental, welfare, and foreign affairs topics from various sources. Notably, environmental news from Rappler ($p = 0.0011$) strongly predicts inflation news on Daily Tribune, indicating that ecological issues significantly impact inflation reporting. Additionally, welfare news from SunStar Philippines ($p = 0.0018$) exhibits a significant causal relationship. Foreign affairs topics from Philstar.com ($p = 0.0041$) and Manila Standard ($p = 0.0088$) also serve as important predictors. These findings suggest that the Daily Tribune's coverage of inflation is influenced by a wide range of topics, including environmental and welfare issues, as well as international affairs.

D. Discussion

A notable trend is the strong correlation between inflation and welfare reporting, evident in publications like Business World, ABS-CBN News, SunStar, and Philstar.com. This highlights how economic pressures, such as inflation, directly affect social issues, prompting the media to underscore their interdependence. Additionally, the significant impact of inflation on environmental topics, as seen in outlets such as Rappler, ABS-CBN News, Manila Standard, and Philstar.com, suggests that inflation is framed in relation to environmental concerns, reflecting public discourse on the socioeconomic effects of environmental degradation and climate change.

Moreover, inflation news prominently influences foreign affairs coverage in outlets like Philstar, GMA News Online, and Manila Standard, indicating how inflation, as a global economic phenomenon, interacts with international relations, trade, and global policies. The impact of inflation on technology topics in publications such as Business Mirror and Manila Standard further emphasizes inflation's cross-cutting role in shaping the reporting of technological advancements and their societal consequences.

E. Cointegration Test

To validate the Granger causality results, the Johansen cointegration test was conducted after making all time series stationary through differencing. Although the individual non-stationary variables are not stationary, cointegration helps determine if they maintain a long-term equilibrium relationship.

The Johansen Cointegration test was followed by a Vector Error Correction Model, experimenting with time lags from 1 to 6 to find the best fit. However, no cointegrated relationships were found, indicating that the time series variables do not move together in the long run, suggesting that any correlation is likely short-term or spurious. This implies that the variables are either independent or influenced by different factors.

V. CONCLUSION

This study examined the causal relationship between inflation and various news topics using time series analysis, particularly the Granger causality test, on articles from selected Philippine news agencies. The Johansen cointegration test was also applied to assess potential long-term relationships. Results indicated that inflation news from outlets like Business Mirror and ABS-CBN News had significant predictive influence on topics such as business, welfare, and technology, showing that inflation news shapes media narratives beyond its economic indicator role. However, the Johansen test revealed no long-term cointegrated relationships, suggesting that while inflation news has short-term effects, these do not persist over time and are influenced by other factors.

In conclusion, the study highlights the complex, short-term dynamics between inflation news and socio-economic topics. The lack of long-term cointegration underscores the importance of distinguishing between temporary and lasting influences to better understand how economic indicators and media narratives interact.

To deepen the understanding of the relationships observed, we recommend extending the analysis timeframe to reveal persistent trends and distinguish between short-term and long-term effects. Including foreign news outlets could provide insights into how global perspectives shape inflation discourse. Future studies should explore alternative methodologies that account for structural breaks or regime changes, improving the accuracy of time-series analysis and capturing shifts in inflation-related narratives. These recommendations aim to enhance the exploration of causal relationships and the factors shaping economic narratives.

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