

Do Sectoral Stock Indices Predict Sectoral Economic Growth? (A Systematic Literature Review of Evidence for Mixed Frequency Forecasting in Emerging Markets)

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ABSTRACT

This study systematically reviews the literature on the ability of sectoral stock indices to predict sectoral economic growth, particularly using mixed-frequency forecasting approaches in emerging markets. The issue is important because stock markets operate at high frequencies (daily or weekly), while sectoral economic indicators—such as industrial output, sectoral GDP, and production indices—are typically available at lower frequencies (monthly, quarterly, or annually). This mismatch creates both methodological challenges and analytical opportunities in integrating financial and real-sector data. Using a systematic literature review, the study synthesizes theories of market efficiency, the relationship between finance and economic growth, and the Mixed Data Sampling (MIDAS) approach. The literature indicates that stock prices may contain forward-looking information related to profit expectations, sectoral demand, financing conditions, and investor sentiment. However, empirical evidence at the sectoral level in emerging markets remains mixed due to differences in market structures, macroeconomic volatility, uneven liquidity, and data limitations.

Keywords: Sectoral Stock Indices; Economic Growth; Mixed-Frequency; MIDAS; Emerging Markets; Forecasting; Macro-Financial.

INTRODUCTION

The relationship between the stock market and economic growth has long been one of the central issues in empirical financial and macroeconomic economics. The stock market not only serves as a place for financial asset transactions, but also as a mechanism for aggregating information regarding corporate prospects, industry conditions, investor expectations, and the direction of the economic cycle. Within the framework of the efficient market hypothesis, stock prices reflect the information available to the market, including expectations of future cash flows and relevant economic risks. Therefore, if the information is truly internalized in stock prices, then the movement of stock indices can function as an early indicator of real economic activity.(Fama, 1970)

The classical literature shows that stock returns are related to future economic activity explaining that stock returns correlate with variations in real output expectations and a company's cash flow. Similar findings are also reinforced by which suggests a historical relationship between stock returns and real economic activity over the long term. In the context of macroeconomic prediction(Fama, 1970) (SCHWERT, 1990), (Stock at.al., 2000) it is emphasized that the variable asset price is often considered as a precursor indicator, although its predictive power can change according to the period, country, and economic conditions.

However, most previous studies have still focused on the relationship between aggregate market indices and aggregate economic growth. This approach leaves an important question: can sectoral stock indices predict sectoral economic growth more accurately than aggregate market indices? This question is relevant because the structure of the modern economy is made up of sectors with different characteristics of business cycles, interest rate sensitivity, export linkages, capital intensities, and technological exposures. The financial, manufacturing, energy, consumption, infrastructure, property, and technology sectors do not always respond to economic shocks uniformly. Thus, signals from sectoral stock indices have the potential to provide more specific information regarding the performance prospects of a particular real sector.

In emerging markets, this issue has become more complex. Emerging markets generally have higher asset price volatility, lower market depth, uneven sectoral liquidity, and greater sensitivity to foreign capital flows and external shocks. The literature on the liberalization of financial markets suggests that the opening of capital markets can affect the cost of capital, asset valuation, and investment growth; However, these influences are not always homogeneous between countries and between sectors, especially when the quality of institutions, policy stability, and market depth differ substantially.(Henry, 2000)(Bekaert and al., 2005a)

The main methodological challenge in testing the relationship between sectoral stock indices and sectoral economic growth is the difference in data frequency. Stock index data is available on a daily or weekly basis, while sectoral economic growth data is usually available on a monthly, quarterly, or yearly basis. If high-frequency data is simply aggregated into low-frequency, some dynamic information may be lost. Conversely, if low-frequency data is forced into high-frequency, the risk of artificial interpolation can arise. Mixed-frequency forecasting approaches, specifically the Mixed Data Sampling or MIDAS model, were developed to address these problems by combining data at different frequencies without having to perform rough aggregation.(Ghysels and al., 2007)

(Clements & Galvão, 2008) The use of MIDAS and *mixed-frequency models* has evolved in the forecasting of GDP, inflation, consumption, and other macroeconomic indicators. and shows that the mixed-frequency approach can improve the quality of macroeconomic forecasting because it is able to take advantage of information that arrives faster. It specifically emphasizes the importance of daily financial data in forecasting macroeconomic variables, especially when market information reflects rapidly changing expectations.(Clemens & Galvão, 2008) (Andreou et. al., 2013a).

Based on this background, this article aims to compile a systematic review of the empirical and methodological evidence on the ability of sectoral stock indices to predict sectoral economic growth through a mixed-frequency forecasting approach in emerging markets. The main contribution of this study is to bring together three streams of literature that often develop separately, namely the literature on the relationship between the stock market and economic growth, the literature on sectoral indices and sectoral economic activity, and *the mixed-frequency forecasting* literature. Thus, this study not only maps past findings, but also formulates research gaps and future empirical agendas.

LITERATURE REVIEW

The relationship between the capital market and the real economy is based on the *Efficient Market Hypothesis* which states that stock prices reflect all available information, including macroeconomic indicators. In this context, stock indices serve as (Sitanggang et. al. , 2025)*a leading indicator* due to their *forward-looking* nature, where stock prices move based on investors' expectations of the company's profit, future demand, capital costs, and the overall outlook of the industry.

Signal theory also reinforces this role; Stock price movements signal to market participants about future economic conditions before official data such as GDP is released. However, the effectiveness of the index as a predictor is highly dependent on the quality of the market and the efficiency of the transmission of information from financial markets to real economic activity.(Sitanggang and al., 2025)

Empirical studies show that more in-depth checks at the sectoral level provide more accurate insights than aggregate analysis. Sectoral stock indices (such as the IDX-IC in Indonesia) reflect industry-specific dynamics that often have different business cycles.Riza, 2017(Shafadina and al., 2019)

Some sectors show stronger predictive capabilities than others. For example, the large trade and retail sectors in Indonesia were identified as leading the overall economic cycle for up to two quarters. International research also confirms that sectoral yields, especially in the material, real estate, and consumption sectors, significantly improve the accuracy of economic growth forecasts over simple (Anastasia) and al., 2023) *benchmark* models (Marfatia , 2023).

One of the main challenges in connecting financial markets and GDP is the difference in data frequency. Stock indices are available in high frequency (daily or weekly), while sectoral GDP is generally released in low frequency (quarterly). The use of *Mixed-Frequency* models (such as MIDAS or *Mixed-Frequency Panel*) provides the flexibility to capture daily signals from the stock market without having to eliminate valuable information through conventional data aggregation processes.

The *nowcasting* approach using mixed-frequency data has proven effective in predicting economic conditions in *real-time*, especially in times of major shocks such as the COVID-19 pandemic, where high-frequency mobility and financial data are able to capture economic contractions faster than official statistical data. (Back to Basics and al., 2021; Ringo & Monika, 2022)

Research on predecessor indicators in Indonesia has been conducted, but most of it still focuses on the national level. At the sectoral level, it was found that macroeconomic variables such as inflation, interest rates, and exchange rates have a significant impact on the volatility of sectoral indices, which in turn reflects the systematic risks of each industry. (Alena et. al., 2017; Sutrisno, 2017)

Post-COVID-19 pandemic, there has been a shift in sectoral performance; The health and commodities sectors (such as coal) show resilience and growth that surpasses the construction sector and other industries. This confirms that the use of sectoral stock indices as the main unit of analysis can provide a more granular picture of the national economic recovery. (Thorbecke, 2023)

RESEARCH METHOD

The research design uses a systematic literature review approach with a narrative-thematic orientation. The SLR approach was chosen because the purpose of this study is not just to summarize the literature, but to identify conceptual patterns, empirical evidence, methodological strategies, and research gaps in the field of sectoral macro-financial forecasting. SLR allows the review process to be carried out in an explicit, structured and replicable manner. The general guidelines for the preparation follow the principles of PRISMA and the PRISMA 2020 update. (Moher David and Liberati, 2009); (Page and al., 2021)

a. Research Questions

The study was directed at four research questions:

- RQ1: How does the literature explain the relationship between sectoral stock indices and sectoral economic growth?
- RQ2: How is the mixed-frequency forecasting approach used to link high-frequency stock market data with low-frequency sectoral economic data?
- RQ3: To what extent does empirical evidence in emerging markets support the predictive ability of sectoral stock indices to achieve sectoral economic growth?
- RQ4. What are the main research gaps in the literature on sectoral stock indices, sectoral economic growth, and mixed-frequency forecasting?

b. Journal Search Strategy

Literature search strategies can be done through reputable databases such as Scopus, Web of Science, ScienceDirect, SpringerLink, Wiley Online Library, Taylor & Francis, Emerald, SSRN, NBER, and Google Scholar. Recommended keywords are:

("sectoral stock index" OR "sectoral stock indices" OR "industry stock returns") AND ("sectoral growth" OR "sectoral economic growth" OR "industrial production" OR "sectoral output") AND ("mixed-frequency" OR "MIDAS" OR "nowcasting" OR "forecasting") AND ("emerging markets" OR "developing economies" OR "emerging economies")

Additional keywords that can be used are:

("stock returns" AND "real activity") ("financial markets" AND "economic growth") ("daily financial data" AND "macroeconomic forecasting") ("industry returns" AND "business cycle") ("stock market development" AND "economic growth")

c. Inclusion and Exclusion Criteria

The inclusion criteria used are: peer-reviewed journal articles, reputable academic working papers, articles with a focus on the stock market, economic growth, indicators of real activity, mixed frequency data, MIDAS, nowcasting, or emerging markets. Literature that only discusses stock return predictions with no relation to real economic activity is issued. Non-academic articles, market opinions, media reports, and sources without a clear empirical or conceptual methodology are also excluded.

d. Data extraction

Each article that passes the selection can be coded based on: author and year, country or research region, type of stock index, real economic indicators, frequency of data, estimation methods, prediction horizon, main results, limitations, and relevance to the sector study. This process is important to distinguish literature that actually discusses predictive relationships from literature that only shows historical correlation.

e. Quality Assessment

Quality assessment is conducted by considering the clarity of the research question, the validity of the data, the suitability of the method, the transparency of the model, the robustness test, and the relevance to the context of the emerging market. Articles with explicit methodologies and clear data sources are given higher interpretive weight than studies that only present simple statistical relationships without methodological control.

Step	Description
1	Identification of articles from Scopus, Web of Science (WoS), ScienceDirect, SSRN, and Google Scholar
2	Removal of duplicate records
3	Title and abstract screening
4	Exclusion of irrelevant articles
5	Full-text assessment
6	Methodological quality assessment
7	Final articles selected for thematic synthesis
8	Synthesis of theories, methods, empirical evidence, research gaps, and future research agenda

Figure 1 : Flow of methodology

RESULTS

Literature Map: From Aggregate Stock Markets to Sectoral Stock Indices

Early literature on the relationship between the stock market and economic activity largely departed from the idea that stock prices reflect investors' expectations of future economic conditions. Within this framework, an increase in stock prices can reflect optimism about the company's profits, investments, consumer demand, and growth prospects. Conversely, a decline in stock indices can signal increased risk, weakening demand, or worsening financing conditions. emphasizing that stock returns cannot be separated from expectations of real economic activity because the value of a company is essentially dependent on future cash flows.(Fama, 1970)

However, the use of aggregate market indices has limitations. Aggregate indices mix various sectors with different characteristics, so sectoral signals can be overshadowed by the dominance of a particular sector. For example, a market index dominated by the financial or commodity sector may reflect the dynamics of the two sectors more than the overall economy. In this context, sectoral stock indices have the potential to be a sharper indicator because they represent investors' expectations for certain economic sectors. Energy sector stock indices can reflect the outlook for commodity prices and energy investments, while consumption sector indices can reflect household purchasing power expectations.

The macrofinance literature supports the idea that asset prices can act as leading indicators. suggests that financial variables, including stock prices, interest rates, and bond spreads, are often used in output and inflation forecasting. Nonetheless, the predictability of financial variables is unstable all the time. This instability is an important issue in emerging markets because changes in policy regimes, exchange rate crises, high inflation, and volatility in capital flows can change the relationship between the stock market and the real economy. (Stock and al., 2000)

Theories Explaining the Relationship between Sectoral Stock Indices and Sectoral Growth

There are three main theoretical foundations that explain why sectoral stock indices can predict sectoral economic growth. First, the market efficiency theory states that stock prices reflect available information regarding future prospects. If investors have information about sectoral demand, company profits, government policies, or production cost pressures, this information will be reflected in the stock price of the relevant sector. (Fama, 1970) (Beck & Levine, 2004a) (Beck & Levine, 2004a) Second, the theory of financial development and growth states that a developing financial market can improve capital allocation, risk management, and investment efficiency. shows that the development of the stock market and the banking sector is related to long-term economic growth. It also shows that the stock market and banks have a significant relationship with economic growth within the framework of a cross-country panel. From a sectoral perspective, the stock market can help channel capital to sectors with higher growth prospects. (Beck & Levine, 2004a) (Beck & Levine, 2004a).

Third, information theory and expectations explain that the stock market moves before official economic data is published. Sectoral economic data often has a pause in publication, while stock prices change daily. Therefore, sectoral stock indices can capture information that has not yet appeared in official statistical data. This is the methodological reason why the *mixed-frequency forecasting* approach has become relevant: it allows researchers to use daily or weekly information to predict monthly or quarterly sectoral indicators.

Mixed-Frequency Forecasting and Its Relevance

Mixed-frequency forecasting is an approach designed to combine data of different frequencies in a single forecasting model. The MIDAS model is one of the most influential approaches because it allows high-frequency variables to enter the prediction equation of low-frequency variables without full aggregation. explained that MIDAS uses a parameterized lag structure so that high-frequency information can be used efficiently. (Ghysels and al., 2007).

In the context of this article, the dependent variable can be in the form of quarterly sectoral output growth, while the independent variable can be in the form of the daily return of the sectoral stock index. The MIDAS model allows daily returns in one quarter to be used to predict sectoral growth in that quarter or the next. This way, the model

doesn't need to convert the entire daily data to a quarterly average simply, as the weight of each daily lag can be different.

(Andreou and al., 2013a), showing that daily financial data can improve macroeconomic forecasting when entered with the right techniques. These findings are particularly relevant for emerging markets as official economic information often experiences delays in publication. By leveraging sectoral stock indices, policymakers and market participants can get early signals about sectors that are strengthening or weakening.

Empirical Evidence on Emerging Markets

(Beck & Levine, 2004b; Bekaert et al., 2005b) Empirical evidence regarding the relationship between the stock market and economic growth in emerging markets shows mixed results. Some studies have found that stock market developments can drive economic growth through increased liquidity, savings mobilization, and more efficient capital allocation. Studies on capital market liberalization have also shown that stock market openness can lower the cost of capital and increase investment; (Beck & Levine, 2004b; Bekaert and al., 2005b) (Henry, 2000.) (Bekaert et al., 2005b).

However, the evidence has not directly answered sectoral questions. Emerging markets have characteristics that make the relationship between sectoral indices and sectoral growth not always linear. First, not all sectors of the economy have adequate stock market representation. The agricultural sector, for example, often has a large contribution to the economy but limited representation of issuers on the stock exchange. Second, sectoral indices can be dominated by several large companies, so indices do not always reflect the overall condition of the sector. Third, sectors that rely heavily on global commodities can be more affected by international prices than domestic demand.

This shows that the predictive ability of sectoral stock indices needs to be carefully tested by considering market structure, issuer concentration, index liquidity, sector openness to international trade, and the quality of sectoral data. In emerging markets, the financial and commodity sectors often have large capitalization and are more liquid than other sectors. As a result, the predictability of sectoral indices may be stronger in sectors with large number of issuers, high liquidity, and direct linkages to measurable economic activity.

Table 1. Synthesis of Key Literature

Theme	Main Literature	Contributions to Articles
Efficient market hypothesis	(Fama, 1970)	Explain the theoretical basis that stock prices reflect information and expectations
Stock returns and real activity	(Fama, 1970; SCHWERT, 1990)	Explain the relationship between stock returns and real economic activity
Asset prices as leading indicators	(Stock et al., 2000)	Supports the use of financial variables as predictive indicators
Financial development and growth	(Beck & Levine , 2004a); (Beck & Levine , 2004a)	Explaining the role of the stock market in economic growth
Financial liberalization in emerging markets	(Henry, 2000.); (Bekaert and al., 2005b)	Provides a foundation for emerging market dynamics
Mixed-frequency forecasting	(Clemens & Galvão , 2008; Ghysels and al., 2007)	Describe methods for combining high- and low-frequency data

Daily financial data (Andreou et al., 2013b) for macro forecasting	It is the basis for the use of daily stock index data in the prediction of economic indicators
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Source : Data processed (2026)

Based on the synthesis of key literature in table 1, the following is why the concept of Daily/Weekly sectoral stock indices has implications in predicting Monthly/Quarterly Sectoral Economic Growth:

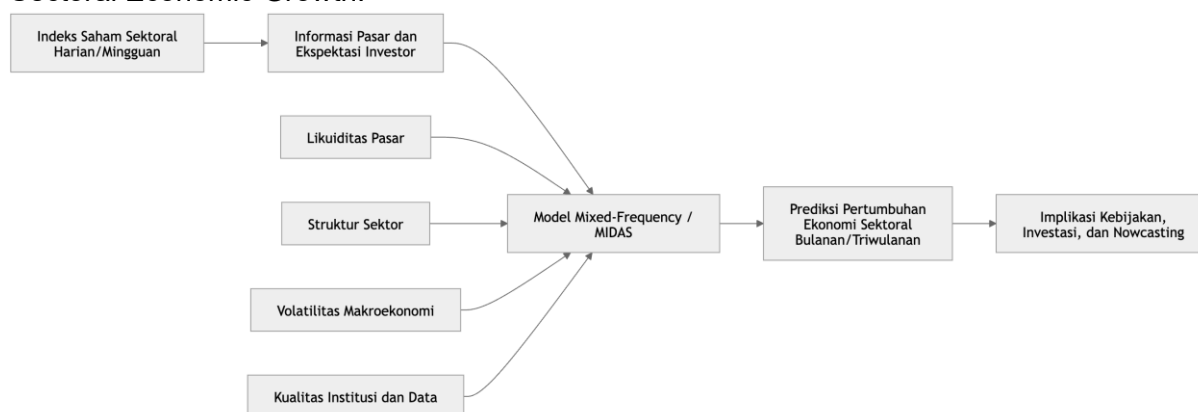


Figure 2 : Conceptual Framework

DISCUSSION

The literature synthesis indicates that sectoral stock indices have a strong theoretical foundation for serving as predictors of sectoral economic growth. Stock prices reflect investors' expectations regarding future earnings, market demand, production costs, capital costs, industrial conditions, and business prospects. Since these expectations are formed before official economic statistics are released, sectoral stock indices have the potential to function as leading indicators of sectoral economic performance. However, their predictive validity cannot be assumed to be universal, as it largely depends on market efficiency, sectoral characteristics, institutional quality, and the estimation methods employed.

A major contribution of mixed-frequency forecasting is its ability to bridge the mismatch between the frequencies of financial market data and real economic data. In macroeconomic forecasting, frequency differences are often addressed through simple aggregation methods, such as converting daily stock returns into quarterly average returns. Although practical, this approach may discard valuable information regarding the timing, intensity, and dynamics of market responses. The Mixed Data Sampling (MIDAS) approach provides a more flexible solution by assigning different weights to high-frequency observations within a lower-frequency forecasting period (Ghysels et al., 2007).

The relevance of this approach is even greater in emerging markets, where sectoral economic data are typically released with considerable publication lags and are often subject to revisions. In contrast, stock market data are available almost in real time. Consequently, sectoral stock indices can serve as timely information sources for both nowcasting and forecasting sectoral economic activity. Such models may assist central banks, ministries of finance, financial market regulators, and institutional investors in identifying sectoral slowdowns or accelerations before official statistics become available.

Despite these advantages, several challenges remain. First, the sectoral composition of the stock market does not always accurately represent the structure of the real

economy. Sectors that contribute significantly to gross domestic product (GDP) may not necessarily have large market capitalization. Second, sectoral stock indices are often dominated by a small number of large firms, causing index movements to reflect firm-specific performance rather than the overall condition of the sector. Third, emerging markets frequently experience episodes of high financial volatility, capital flow reversals, exchange rate depreciation, and unexpected policy changes, all of which may weaken the stability of the predictive relationship between stock prices and economic growth.

From a methodological perspective, future research should compare alternative forecasting approaches, including the standard MIDAS, unrestricted MIDAS (U-MIDAS), mixed-frequency vector autoregressive (MF-VAR) models, dynamic factor models (DFM), machine learning-based mixed-frequency models, and Bayesian nowcasting models. Previous studies by Foroni et al. (2015) and Kuzin et al. (2011) demonstrate that alternative mixed-frequency models provide greater flexibility, particularly when the optimal lag structure cannot be specified a priori. Model comparison is therefore essential not only to establish statistical significance but also to determine whether sectoral stock indices genuinely improve forecasting accuracy relative to conventional benchmark models.

The primary research gap identified in this literature concerns the limited number of studies that explicitly examine the relationship between sectoral stock indices and sectoral economic growth using mixed-frequency data in emerging markets. Existing studies generally focus either on the aggregate relationship between stock markets and overall economic growth or on mixed-frequency forecasting of aggregate GDP. Relatively few studies adopt the sector as the primary unit of analysis, despite the fact that sector-level analysis provides richer insights into the transmission of information from financial markets to the real economy.

Accordingly, the current state of the art lies at the intersection of finance, macroeconomics, and forecasting methodology. The novelty of the proposed research is to examine whether daily sectoral stock indices improve the prediction of quarterly sectoral economic growth in emerging markets by comparing mixed-frequency forecasting models with conventional benchmark models. The originality of the study can be further strengthened by focusing on countries with distinctive sectoral market structures, such as economies dominated by commodity industries, financial services, domestic consumption, or infrastructure sectors.

Proposed Conceptual Framework

Sectoral Economic Growth

$t=f$ (Lagged Sectoral Economic Growth

$t-1$, Daily Sectoral Stock Index Returns t , $t-1$, $t-k$ Macroeconomic Controls, Global Risk Factors, Exchange Rate, Commodity Prices, Interest Rate)

Econometric Model

$$\text{GROWTH}_{s,t} = \alpha + \beta \text{MIDAS}(\text{RETURN}_{s,d}) + \gamma X_t + \varepsilon_{s,t}$$

where:

$\text{GROWTH}_{s,t}$ = sectoral economic growth of sector s in period t ;

$\text{RETURN}_{s,d}$ = daily return of the sectoral stock index for sector s on day d ;

$\text{MIDAS}(\cdot)$ = mixed-frequency lag weighting function;

X_t = vector of macroeconomic control variables;

$\varepsilon_{s,t}$ = error term

CONCLUSION

This article concludes that sectoral stock indices have theoretical and empirical potential as predictors of sectoral economic growth, especially when analyzed through a *mixed-frequency forecasting* approach. The main basis is that stock prices reflect market expectations of the sector's outlook, while sectoral economic data is often available with lower frequency and publication breaks. Using MIDAS or other *mixed-frequency* models researchers can leverage daily information from the stock market to predict monthly or quarterly economic indicators without losing too much information due to aggregation. In the context of emerging markets, this issue has high academic and practical significance. Emerging markets face greater volatility, more frequent policy changes, and stronger economic data constraints than developed markets. Therefore, the ability to use sectoral stock market data as an early signal of sectoral growth can make an important contribution to investment decision-making, industrial policy, financial stability, and macroeconomic planning.

Nonetheless, the available evidence still points to important gaps. The existing literature discusses the relationship between the stock market and economic growth at an aggregate level, not sectoral. The *mixed-frequency* literature is also more often applied to aggregate GDP than sectoral output. Therefore, future research needs to directly test whether sectoral stock indices actually improve the accuracy of sectoral economic growth predictions in *emerging markets*, as well as whether such predictive power differs between sectors, time horizons, and economic conditions.

The conceptual contribution of this article is to formulate that the relationship between sectoral stock indices and sectoral growth should not be seen only as a correlational relationship, but as a process of transmitting information from market expectations to real economic activity. His methodological contribution is to place *mixed-frequency forecasting* as a more appropriate approach than conventional data aggregation. Thus, this article provides the initial foundation for further empirical research on sectoral stock index-based economic growth predictions in emerging markets.

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