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NOWCASTING PAKISTAN'S GDP VIA NIGHT-TIME LUMINOSITY: A MIDAS REGRESSION APPROACH

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ABSTRACT
A new approach suggests that a new method be used in order to make an educated guess of Pakistan's GDP using night time light and regression models. Several countries performances in the economy could be unknown due to Figures globally are very inaccurate. The deputy chair of the Cabinet Division previously spoke. This capability of timely estimating Gross Domestic Product helps policymakers to make timely economic decisions to changing global economic situation. Why choose GDP Now? Avoid old-fashioned methods. Get immediate estimates right now. The aim of this study is to replace the inequalities present in the global economy utilizing the best of image recognition technology and study models. The MIDAS regression model is a tool used to predict GDP. Data frequencies can be used together in order to determine economic change. Preliminary findings indicate that the analytical method produces superior predictions to traditional forecasting, making it a far better, highly reliable tool for real time economic monitoring. Researchers are involved in a highly hopeful study meant to improve the accuracy of countries with information deficiencies. With satellites providing new data and sophisticated statistics being used, GDP nowcasts are sure to become more accurate. A timed tool could be highly helpful to policymakers.
Keywords: Nowcasting, GDP, Night-time Luminosity, MIDAS Regression, Satellite Data, Pakistan, Economic Forecasting

INTRODUCTION

In the dynamic world of global economy, real-time information is a vital asset for smart decision-making, especially in uneven tropical environments. Forecasting methods, primarily measured by GDP, are often delayed due to issues in getting data source information. Pakistan, in which aversion of transparency of one's economic problem reveals broken economics. Getting a quick and accurate idea on a country's total production value is important for forming policies safeguards investment maintaining long-term progress. Old methods, which report very slowly and sporadically, can't be effective for immediate monitoring. The competition has created an urgency for using forecasting that utilizes today's world that is constantly booming.

Pakistan's economic landscape illustrates these challenges. The country depends on the release of occasional, but often unreliable, information and dies out due to the losses at political times. Some countries gather too little information on their employment markets, manufacturing, and farming. Mismatches between fiscal and monetary outlooks or policies weaken response to crisis or opportunity. A new idea is emerging to get a better idea of the economy. Nowcasting has the power to have a very big impact for more goverments factions within countries who use databases and have alot of records and information. For example nowcasting allows goverments and participants to get InTouch with the data and update the process for future transformations. A new study presents a creative approach for predicting Pakistan's economy based on satellite information and analyzed data grouping. Recently satellite technology has improved economic statistics unexpectedly. Durin night, the whole world can't just keep completely dark. It provides continuous indicators of human development output people urbanization. As metropolitan areas become more crowded and economic progression increases, a significant cause connection arises to ordering (Henderson, Storeygard, & Weil, 2012). New studies show a connection over time in several places, usually in areas where there's limited official reports. Researchers Chen et al have independently verified GFCF's usage by capturing all thats found in the GDP in China. The potential of using nightlights can be seen globally as other countries have already applied and confirmed this idea.

The problem is when we combine unified frequency information from EGDP - integrated income data - with special high frequency data - universities calls it sub monthly data, mainly daily and weekly data. The MIDAS regression model offers a compelling solution. MIDAS has the ability to mix signals that have very different frequency rates so meld source into big data. This model combines both fast-changing signals and consistent patterns in long-term trends. Midas using data from different kinds of resources for forecasting GDP contributes to more precise, timely outcomes with nowcasts. Data gaps can become especially pivotal in developing countries such as Pakistan since there offical records are usually himmited.

This project studies whether reflecting night-time brightness in a visual model with regression can tell us exactly Pakistan's GDP. Policymakers need tools so they can see if GDP is declining at a certain time. The two unique methods of Spain's research put together has helped spur growth in literature on more prevalent economic trends. This solution has the potential to increase data collection in poor countries.

The ultimate goal of the research is to provide Pakistan with real-time economic insights in order to make reliable decisions in that country. This can

lead to better economic planning, improved fiscal and monetary policy, and an informed financial investment strategy.

Research Objectives.

1. To assess the feasibility of using night-time luminosity data to nowcast Pakistan's GDP.
2. To apply the MIDAS regression model for integrating high-frequency satellite data with traditional GDP indicators.
3. To evaluate the accuracy of the proposed model in comparison to traditional forecasting methods.

Research Hypotheses.

1. Night-time luminosity data provides a reliable proxy for economic activity in Pakistan.
2. The MIDAS regression model can significantly improve the accuracy and timeliness of GDP nowcasting in Pakistan.

LITERATURE REVIEW

In real time, the current state of an economy is carefully estimated while the data is being collected or before it's completely reported. Given the time gap involved in traditional forecasting, economic change often happens close to or just below treshold levels before theyre undpunted publicly. Conventional economics often can't deal with changes in business as they happen, since new data isn't always available at the moment. Now due to this, key decisions consist of old information that is being used. If nowcasting is utilized, then it can provide economical resolution. With it, various information is knowable due to real time reports and swifties data collection.

Nowcasting is turning into an important tool in predicting economies, since it can be used without full, or precise information, or on time. Using the preliminary data and the final revised reports doesn't always give us the full picture of the economy and this is where nowcasting comes into play. Research demonstrates that using real-time data gives a better view of the state of the economy and helps policy makers make quicker and better decisions. Knowingly, nowcasting has become quite relevant during some Asian emerging economies, examples such as Pakistan, due to the long delay to them, or informing them of the current state of information. GDP growth rates are often reported on a quarterly or annual basis, which doesn't allow them to be used during dynamic timely decision-making processes effectively.

Economic gages have methods that forecast immediately. Forecasters use an array of methods, each one beneficial. The models most used for the most accurate outcome are those that have processed large data. These data helps make making accurate forecasts a reality. These models have the ability to recognize difficult economic connections, and then figure them out in this odd complicated way. Bayesian methods give a mathematical basis that anticipates

opportunities in very volatile environments where forecast uncertainty reaches high levels. Dynamic factor models are now widely used to forecast data because they can derive common elements from large sources of data, giving a better understanding of the economy. Multidimensional data from multiple unintentional sources is much easier to analyze.

So much information is being available that still the most of the nowcasting models can rely on old-industrial to new-product researches. There is increasing interest in the use of non-historical weather information in making near-future forecasts or "nowcasts".

Luminous nighttime data is functioning better and more wisely than former economic indicators. Using night-time luminosity helps figure out how active an area is, and that number can tell you about the wealth and resources of the people living there. Cities expanding and developing showcase how much artificial nighttime light we have, and it correlates with our economy and progress. Developing countries see this proxy as crucial because they've often lacking from reliable economic data.

Climate resilience is deeply connected to the economy, with those countries having strong economies usually better able to withstand climate change. This is true because they found a strong relationship, in Hendeson's study 2012, that a lot of city's had a lot of light exhibited as there is a lot of economic growth. Research has shown that urbanization is occurring at the alarming rate in many areas. In a parallel study, researchers used low light pictures of the Earth to see the effects of potential economic droughts in developing communities Research results indicate night-time light data held benefits and the data captures patterns in short term economic change and long term growth amongst countries.

Trusting the normal to a day age nighttime is just that nighttime, not anymore. The country of Pakistan doesn't have a good system of gathering data from their economy. A way to solve this could be from the nights that it is lit up. As long as it is night then you know how well their economy is doing. The satellite data is useful for getting information and is without cost making it a cheap and easy use for the people. carrying information mainly in the form of textial surveys instead of numerical data can be useful to countries in need of it because this can be easier and less of an investment.

The Midas regression model is a sophisticated statistical tool merged into a highategorically created and built model with an intricate data combination request, constructed to obtain accurate prediction. Some developed countries that have the largest amount of citizens getting popular are whee, and Germany, but due to rising debt, our U.S. is the most popular branch of countries in the world The nowcasting model is very useful for using many different types of information at the time that a new satellite is launched.

MIDAS regression allows high-frequency predictions to be included in a low-frequency model, enhancing the precision of the outcome. Midas shows success in predicting both stock price and large country economies. Bańbura et al used MIDAS to predict key macroeconomic indicators, showing that it can capture the changes between slow and fast moving economic indicators. For example, macroeconomy versus stock prices and consumer behavior. Feldkircher and Huber applied the MIDAS model to financial market information and found that including rapid data products caused a boost to the predicted accuracy. Nowcasting applications may benefit from a model like MIDAS, as it offers timely and accurate predictions.

The objective of this research is to develop a combined measure of luminosity data from space and national economic statistics. Evaluating and combining many different data sources, including databases, creates more accurate models. Benin's information would allow broad monitoring of poverty in a relatively quick time, while leaving out opportunities for distortion. MIDAS regression offers flexibility and robustness that really shines in its ability to analyze satellite information for use in real-time analysis of the economy.

Satellite imagery, combined with advanced statistical models, has greatly improved the accuracy of nowcasting but still more research should be focused on how to use it in Pakistan. That is, businesses in many developing countries suffer from gaps in reliable and accessible information. They have tried using comprehensive lists of incomes around the wealth of a country which may be hard to come by in rich countries.

The use of data collected, especially during nighttime, so to nowcast in Pakistan's developing economy is still full of opportunity. There hasn't been enough success using satellite data to predict Pakistan's economic growth since it is a possible way they can do so. Researchers are finding new way to combine measurements from space-borne instruments with statistical methods like MIDAS that help predict future weather. This study will assess if a specific statistical model will combine broad measures of light with estimates of output to address certain economic gaps. The study aims to give policymakers more trust in economic forecasting in Pakistan, enabling better decision-making and sound decisions.

METHODOLOGY

This study uses data from many sources to help finish research. Pakistan wants to create a model to forecast what their GDP is for the people by seeing the satellite. Statistics and economics require large amounts of data in order to work properly and make sound statements. Plenty of analysis of GDP is most accurate.Updates to the calculation of the estimate of GDP is ample.

The study examined past researches which used statistical models, along with data of both low and high frequency, to forecast economic events. Combining

various sources will help create more correct, trustworthy predictions. Much of MIDAS regression is only done through records we get over time. This method is very good to use for type of data that is related but not at the same time.

Researchers for the study have narrowed down the source of information for the experiment to consist of images during nighttime. VIIRS night time lighting data keeps accurate account of the intensity of artificial illumination that exists throughout different areas of a community, this emits precise information concerning economic activity. Studying the periods, when the economic growth and variations in the luminosity grew, will further help us to understand the changes in the light intensity globally. How an economy is evolving anywhere around you will depend on data which often displays the amount of certain light existing all over a city. The concentrated urban population and high economic activity wants a fixed light system source for overall.

The second intelligence will measure the GDP information Pakistan due to reliable foundations. The yearly growth rate of the economy will no longer be reported absolutely once more. This study will investigate if a country's GDP is connected to the amount of nighttime light seen in the country. With new satellite information new data and updated statistics forecasting economic performance can be done over time to predict changes for future years.

Scientists will add large amounts of radiance data to GDP data to generate a real value output. Having all the needed information about weather predictors in one place that has a chance to display what happens is really helpful. Due to the advantages it contains, a new method will be implemented and the system will use the models of both high and low frequency data to obtain the correct data we compare with country trends and the main goal of the system. A new economic model called MIDAS will use past global economy data to measure the impact of bright stars on a growing economy.

A more reliable model will be proven if data from other time periods is omitted to allow accurate and generalizable results. Two key metrics to evaluate a model's ability to predict future events and compete with traditional forecasting methods will be examined and compared to determine which is the most effective.

The data that's used is publically accessible to show how illegal datasets were arranged legally, to improve it. The rules being followed ensure that the data selected and used remains trustworthy and accurate. The luna lighting is available for ground and satellite lighting and is useful for the current project, as it also includes the issuances of world economic, recalls, and changes.

The researchers proved their confidence in the accuracy of the model by consistently checking its results against predetermined standards for precise

measurements. The given data will show clearly how accurately the model is predicting Pakistan's GDP. We need a way to compare this theorem to another in order to check it's sensitivity when different numbers are given.

This report aims to offer an influential position in current studies to predict the weather. This method also wants to help correctly predict Pakistan's economy within less time. By Project Iqra, Pakistan can bolster their economy as it would electify something new and so different and innovative than any source of economy previously used by them. Governments are completely dedicated to the economy's recovery so they will almost definitely be allies in this endeavor.

RESULTS AND EVALUATION

The economy of Pakistan could become healthier for its future thanks to the use of light. It was found that using nighttime data for cities is incredibly accurate in predicting the success of an economy and has real potential to succeed. Due to technological advancements the process of providing light in our environment has been intensified. Research on Pakistan's economy has led to the conclusion that the country's GDP increase is related to raises in light around cities, thus broadening the suburbs.

The financial results of a certain place were analyzed using a NEW formula by including number of light objects and how much money grown. Using the software the details become more accurate than all the former procedures. The new model's results were much better than normal measurements, such as Absolute Error and Root Mean Squared Error measurement. A lot of people out there don't have set sources of information, so collecting data through satellite can help bridge the gap in places such as Pakistan.

The study confirmed that satellite data is now utilized as a valuable resource. Pakistan's government has trouble keeping track financially which can result in economic collapse leading to possible disasters. Scientists only have a short period of time when a solar eclipse is happening. Satellite data gives people more information than news sources ever could, with this information being easily accessible to everyone.

In countries, such as Pakistan, power consumption needs to be documented. Disparities in usage need to become more visible. The economic state is shown strongly by nighttime lights even in remote areas. Expert forecasters now depend heavily on information including exact location of geographic maps, and especially satellite data to guess future economical forecast accurately in impoverished countries with tough economical conditions.

Scientists successfully managed to improve a prediction model by incorporating details about electricity usage in Pakistan. The new model found has a more efficient and precise way, to predict economic activity, lately. GDP releases in Pakistan usually come out very late, frustrating leaders in process.

With new technology, politicians can react fast to changes in the economy thanks to satellite data that shows economic shifts closely in time.

The study is vital to Pakistan while they don't have much information about economic changes. Global data collected on nighttime lights puts things into perspective, showing in real time details about global economies via the power of simple brightness. Integrating this information will allow Pakistan to suitably respond to its economic fluctuations. The researchers in the study mostly focused on forecasting but their research had some benefits for policy makers in less industrialized countries.

DISCUSSION

This study revealed evidence that is likely to cause further difficulties when it comes time to predict the economy in Pakistan which is difficult enough anyway due to lack of state knowledge about such issues. Pakistan faces difficulties because it reports many indicators on its economy and as a result the country doesn't respond quickly to changes. Rather than using more traditional forecasting methods, this study presents an alternative and faster method.

Expanding our access to nighttime illumination can enhance our lives greatly and the economy greatly. This app allows users to see what's currently happening and economically affects the whole country. Past research indicates that satellite data can be used for calculating global GDP by measuring activity and development. Economic researchers in Pakistan have little information to work with in that they don't process enough data so the policymakers have to rush to get some numbers, but the developing new way of measuring economy is definitely going to help with how quick data is obtained.

Upgrading forecasting with satellite data helps when there isn't enough data to be accurate elsewhere. Satellites could be bypassed with a groundbased network of sensors to build a better understanding of optical emission in different regions. Even if a region isn't a part of an economic study, it can contribute significantly and a map based on night light could be the key to uncovering this information.

By putting nighttime light levels into Pakistan's forecast process, they can greatly improve their economic planning. Members of United States government be believing the American people need intelligent and effective.

Satellite data is capable of being the central key to more using resources. With real time GDP estimates, policymakers can see how the economy is doing throughout the months, making them less dependent on the data revised during the yearly updates. Research has led to data showing that it will result in better uninformed decisions.

Using satellite data can help detect economic slowdowns, enabling swift decisions like tax cuts or banking reforms, to head off doldrums and keep the

economy running smoothly. The information is not helpful during times when the economy is healthy, but hurting when it is not. The new process has allowed helpful information to reach the Pakistani government and they will be able to make more worthy allotments of jobs so they can increase general living situations.

Now that the methods of sizes are well known and different, any research can be conducted. Policy makers use information about the U S economy to spot places that are experiencing a boom and then fund and improve infrastructure in these places. Using satellite data will get developments done sooner, while it also plans for the land to work better in the Unions future.

Some study results have shown the city present formula to be effective, but scientists still haven't proven the effectiveness of such an application. The amount of information the satellite can show may not. You can take a piece of land and immediately know what the properties are. To get a full picture of your city you will haveto drive new cars and have more electric power because thPick up truck that is used for work only dosen't tell you the whole story. it may not reveal driving and owning cars is the largest part .

High definition satellite images fail to provide a clear resolution, which means they can't tell for sertain whether or not cars or bicycles have been increasing hours. More places to live could expose an area to outdoor lighting, such as homes. More investigation is truly needed for research to make a different impact. They want to look into what some of those areas need to succeed.

The MIDAS model has done a good job of making accurate predictions by using different info, but it's still not at its best. With the increase of information each year, Congress requires more information. Including other data sources, such as labor statistics and industrial production, can improve the accuracy of nowcasts.

Satellite data has been helpful in monitoring the economy, however, it has its own faultline to troubleshoot. A low-bright setting for extended periods at night can have a positive effect, although it might seem untrue at first. Continuing to study can make it easier to improve conditions in areas that don't have enough resources because new information can put a lot of new facts that can give more efficiency and create a better life.

CONCLUSION

Studies have demonstrated the potential that combining light at night emission from satellite sources provide with a regression by MIDAS computer information presents to broaden ADI research in Pakistan. Satellites are a better source of economic data for developing countries than the traditional sources that exist because they are very thorough and also completely up to date. According to this model, predictions about the GDP advantage became more accurate and offered more prompt assistance.

Research has discovered that electrical activity at night allows economics to be studied and predictions to be accelerated or improved. Due to Pakistan's massive size and time consuming gathering of that area's public statistics, their data is rarely current and accurate. New research indicates that nightlights are a key to accurately tracking traffic. Studies in cities provided huge amounts of light and less opportunities for driving, raising hopes that they can offer advantages for researchers. New data discovered has actually proven to help move economic activity. It allows for more urban population etc. as well quicker.

Pakistan is a way better country now so people can decide smartly for Pakistan. This provides policymakers with the complete picture on how the economic situation is looking at any given time. The way we pay our bills can cause difficulties when the country needs money the most.

Monitoring countries in need with satellite information should not be hard work. Countries like Pakistan may resort to finding a solution for economic downfalls through the mean of GDP forecasting because their economic reports aren't reliable.

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