Chapter 70
How Does Public Attention Influence Natural Gas Price?
New Evidence with Google Search Data

Xin Li
University of Chinese Academy of Sciences, China

Jian Ma
City University of Hong Kong, Hong Kong

Wei Shang
Chinese Academy of Sciences, China

Shouyang Wang
University of Chinese Academy of Sciences, China & Chinese Academy of Sciences, China

Xun Zhang
Chinese Academy of Sciences, China

ABSTRACT

Public attention on natural gas price, which reflects the demand dynamics, is considered as a new factor to influence the movement of price. So investigate the impact of public attention on natural gas price is an innovative research issue in energy economics. This paper innovatively constructs a measure of public attention and examines its impact on natural gas price. A data set generated from Google Trends is used to measure public attention and then rigorous econometric models are applied to evaluate its predictive ability. The empirical study shows that (i) public attention is closely related to natural gas price, with contemporaneous positive correlation coefficient being 0.59, (ii) public attention leads natural gas price, (iii) the model including public attention data outperforms benchmark model. By using a more direct and representative way of forecasting based on the knowledge collected from the users, this paper also has important implications for applying Internet knowledge to improve the forecast accuracy of other energy price.

1. INTRODUCTION

Natural gas is one of the major energy resources in the world. It has been widely utilized in a variety of aspects, such as residential, commercial, industrial, and power generation. Natural gas is a commonly used fuel for residential cooking and heating, and an essential energy material for commercial electricity

generation (U.S. Energy Information Administration, 2013). Therefore, the timely and accurate prediction of natural gas prices is of great importance. The natural gas price is determined by many complicated factors reflecting its demand and supply. Existing studies on natural gas price forecast consider traditional statistical data source like production, storage, import and export of this resource, as well as economic growth, oil price, and even weather (e.g., Buchanan et al., 2001; Mu, 2007; Brown and Yucel, 2008). However, little effort has been devoted to applying massive user data from Internet, which seem to be a more direct way to represent natural gas demand. To fill this gap, this paper puts forward a new perspective by incorporating user search data generated from Internet to represent public attention in order to improve natural gas price forecast accuracy.

In the Big Data Era, public attentioninformation established from Internet-based knowledge has become a new influencing factor on price for the following two reasons (Barber & Odean, 2008; Da et al., 2011). Firstly, the price variation of natural gas is closely related to the public's daily life. Both residents who need gas to cook and keep warm and the business managers who need it to keep operation of the company should pay attention to natural gas price. Secondly, the public attention represents their demand dynamics, which determines the natural gas prices in turn (Krichene, 2002; Huntington, 2007). Accordingly, to investigate whether public attention could improve the forecast accuracy of natural gas prices is an innovative and meaningful research topic.Due to the development of Internet technologies and massive data processing methods, it is possible to timely collect the public behaviour data. Thisused to be difficult because seldom data sets provided timely public behaviour information in the past. Nowadays, people carry out many online activities, such as searching information, expressing opinions, and communicating with others through social media platforms. Besidesbehaviour data like search keywords, page views and the re-tweets,some personal information that is not conflict with privacy policy are recorded by software. These online data contain abundant knowledge and couldpossibly reflect the public demand.

Among all the online data, search data through search engines can be viewed as a direct way to measure public attention since search shows one's interests. The search data in terms of phrases or terms reflects the public attention (Da et al., 2011). Google is the most popular search engine in U.S., which accounts for 67.1% market share in 2013 following the report issued by comScore(http://www.comscore.com/Insights/Press_Releases). Google Trends is a public tool of Google Inc. providing such type of search data. It shows the search queries of terms or phrases from January 2004 at weekly frequency. Google search data (GSD for short) represents the public's attention to price dynamics in terms of search terms or phrases. Therefore, it is feasible to use the collected search data series through Google Trends to measure the public attention. Since public attention wouldaffect price, there could have been a high probability to improve the forecast accuracy of price. When the terms relevant with natural gas prices are searched frequently, it probably means that natural gas demand is strong.Since the demand could possibly determine natural gas prices further, it is promising to measure public attention with search data series and apply the public attention data to improve the forecast accuracy of natural gas price.To the best of our knowledge, none of the literature predicted natural gas price by incorporating the collected search data series generated from the Internet to reflect public attention on natural gas. This paper innovatively incorporates user search datainto natural gas price forecasting models and highlightsthe predictive power of the search databy comprehensively evaluatingdifferent criteria. In the conducted empiricalstudy about U.S. natural gas price forecasting, two unique datasets that are obtained from search engines and officially released institution respectively,are used to examine the relationship between public attention and natural gas price. The public attention data set is constructed according to search frequency of specific terms about

Related Content

Water Demand and Quality Management

Avinash Kumar, Dyvavani Krishna Kapugantiand Rubeena Vohra (2024). *Advanced Geospatial Practices in Natural Environment Resource Management (pp. 38-66).*

www.irma-international.org/chapter/water-demand-and-quality-management/342210

Statistical Analysis of Major Flood Events During 1980-2015 in Middle Ganga Plain, Ganga River Basin, India

Aman Arora, Masood Ahsan Siddiquiand Manish Pandey (2020). *Spatial Information Science for Natural Resource Management (pp. 225-241).*

www.irma-international.org/chapter/statistical-analysis-of-major-flood-events-during-1980-2015-in-middle-ganga-plain-ganga-river-basin-india/257705

Soil, Water, and Agricultural Adaptations

Gaius D. Eudoxieand Mark Wuddivira (2017). *Natural Resources Management: Concepts, Methodologies, Tools, and Applications (pp. 739-757).*

www.irma-international.org/chapter/soil-water-and-agricultural-adaptations/165318

Future of Energy Transition Relies on Prosumer-Based Smart Grid-Integrated Renewable Distributed Generation System

Manish Kumar, Bharat Singh Pateland Cherian Samuel (2024). *Advanced Geospatial Practices in Natural Environment Resource Management (pp. 149-166).*

www.irma-international.org/chapter/future-of-energy-transition-relies-on-prosumer-based-smart-grid-integrated-renewable-distributed-generation-system/342215

Sensitivity Analysis with Calibration of Natural Resource Variables under Climate Change: Comparing Computable General Equilibrium (CGE) and Econometric Frameworks

Nilanjan Ghoshand Somnath Hazra (2017). *Natural Resources Management: Concepts, Methodologies, Tools, and Applications (pp. 681-691).*

www.irma-international.org/chapter/sensitivity-analysis-with-calibration-of-natural-resource-variables-under-climate-change/165315