Information demand and stock market liquidity: International evidence

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ARTICLE INFO

ABSTRACT

The aim of this paper is to investigate whether information demand is a significant determinant of stock liquidity. For a large sample of 209 firms from 7 countries over the 2004–2014 period, we show that information demand, as proxied by daily search volume in Google, is positively associated with stock market liquidity. Most importantly, this relationship is found to be shaped by the firm's overall visibility and information asymmetry levels. We test the robustness of our results by employing different estimation methods and alternative proxies. Thus, it may be that investors and managers who are concerned with stock liquidity should consider investor information demand in addition to specific investment fundamentals.

1. Introduction

According to recent research, factors such as information asymmetry and idiosyncratic risk are likely to be relevant for determining trading activity levels. Particularly, several research studies on stock markets have investigated the issue of liquidity under information asymmetry (Admati and Pfleiderer, 1988; Easley et al., 1996; Kyle, 1985; Li and Wu, 2006). Actually, illiquidity is primarily caused by asymmetric information (Akerlof, 1970; Bagehot, 1971).

To reduce the cost arising from information asymmetry, investors naturally demand more information before making financial decisions (Drake et al., 2012; Peng and Xiong, 2006; Vlastakis and Markellos, 2012). Thus, information demand increases with information asymmetry from the perspective of investor rationality. In response to such information demand, firms attempt to improve the quality of information disclosure in the hope of reducing information asymmetry, and in turn improving trading activity.

The present paper proposes investor demand for information as a determinant of stock liquidity. In particular, relying on international data, we provide original evidence that information demand, as proxied by Google research volume (GSV), tends to be positively associated with liquidity. Apart from this basic relationship, we rely on previous theories and empirical findings (Brandt and Kavajecz, 2004; Green, 2006; Grullon et al., 2004) and suggest more specific mechanisms for how the link

between information demand and stock liquidity might work. First, we control for firm visibility proxied by advertising expenditures, firm size and stock performance. Interestingly, we find that information demand reduces information asymmetry, but only for low-visibility firms, while the relationship becomes weaker for high-visibility firms. Then, we split our sample with respect to information asymmetry levels, as proxied by quoted spread, stock volatility and analysts' forecasts dispersion. We find that information demand and stock liquidity are positively related only for high information asymmetry firms.

Overall, our empirical findings suggest that investors demand more information via the Internet when trading in the security is more difficult, which would be reflected in more liquid stocks. In addition, as suggested by Drake et al. (2015), it may be that investors focus on their search where the benefits from acquiring information are the highest (i.e., where information asymmetry is the highest, as proxied by high bid-ask spreads and idiosyncratic volatility). Finally, to control for endogeneity issues, and to explore attributors of substantial increase in stock liquidity, we employed alternative estimation methods and continue to find a significant positive association between the liquidity and information demand.

There is a vast empirical literature which had tried to explore the contribution of information retrieved from the internet in the context of developed markets. The importance of information demand in explaining stock market activity is first suggested in Drake et al. (2012) and

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Vlastakis and Markellos (2012). Information demand proxies were derived from Google Trends, a free application which provides Google search volume of search queries in a timely fashion. For instance, Drake et al. (2012) attempt to explain investor information demand around earnings announcements and find that abnormal GSV increases around two weeks before the earnings announcement, peaks significantly at the announcement, and sometimes remains high after the announcement. Further, when investors search for more information before the announcement, stock prices and volume are significantly affected as compared to the actual announcement date. Drake et al. (2012) suggest that the act of seeking information proxied by GSV allows investors to partially anticipate the information content of the earnings announcement.

Using Google search volume, Vlastakis and Markellos (2012) investigate the relation between investor information demand and several measures of stock volatility, after controlling for the market return and information supply. Similarly, Zhang et al. (2013) employ the number of information appeared in Baidu News as the proxy for information flow and find that this Internet-based information proxy can reduce the volatility persistence of the SME price index. In their seminal paper, Da et al. (2011) find consistent evidence that online search frequency as a proxy for retail attention is related to IPO first-day returns and subsequent return reversal. Taken together, these studies suggest an important role for information demand levels as proxied by Google search volume. However, the issue of whether information demand matters for stock liquidity has not yet been investigated, especially with high-frequency data and apart from the US stock market.

So far, theoretical models (Glosten and Milgrom, 1985; Kyle, 1985) predict that information asymmetry among market participants increase the adverse selection risk for liquidity providers. In response, liquidity providers demand a higher compensation and widen the quoted spread, thereby lowering liquidity and increasing the cost of capital. However, this literature was mainly based on the assumption that investors have infinite information processing abilities and that all relevant information available is instantaneously processed and incorporated into stock prices (Fama, 1970).

Investors actually have scarce cognitive resources. Thus, information acquisition costs with respect to tracking, collecting and processing firm news limit the set of information that can be assimilated by them (Barber and Odean, 2008; Merton, 1987). Constrained by limited attention and time, investors often retain in their investment choices set the stocks that first garner their attention (Barber and Odean, 2008). Consequently, new information cannot be automatically impeded into stock prices. It is not unrealistic to suggest that investors are increasingly using the internet as a source of information. Further, Google is, undoubtedly, the unbeatable market leader with 9 net surfers of 10 using Google in all over the world.[1] In addition, there is strong academic evidence that investors tend to use the internet for information and brokerage services (Barber and Odean, 2001; Blankespoor et al., 2013; Rubin and Rubin, 2010). Searching for firm news on the internet is also more likely to capture interest. Furthermore, there is ample evidence that Google search volume is a predictor for a number of social, economic and financial outcomes and especially stock market activity. For instance, GSV appear to be a significant predictor of cancer-related trends (Cooper et al., 2005), flu outbreaks (Dukic et al., 2012), automobile sales (Choi and Varian, 2012), jobless claims (Choi and Varian, 2009), inflation Guzman (2011) and IPO returns (Da et al., 2011).

Our paper differs from other papers such as Drake et al. (2012) and Vlastakis and Markellos (2012) that examine information demand and stock market activity as we provide unique international evidence that information demand reflects reduced information asymmetry which in turn improves stock market liquidity. As previously mentioned, the relevance of information demand was only suggested for stock volatility

and earning announcements with a focus on the US stock market (Drake et al., 2012; Vlastakis and Markellos, 2012). While, our contribution is to show that daily information demand as proxied by GSV has a significant impact on liquidity levels in different financial markets.

Based on the analysis of S&P 500 stocks, Ding and Hou (2015) suggest that Google search volume as a measure of investor attention improves the shareholder base and stock liquidity. Our paper differs from Ding and Hou (2015) as we do not only focus on the US stock market and provide new international evidence that Google search volume do enhance stock liquidity, but under some conditions such as firm visibility and information asymmetry levels.

This paper further complements and links prior literature in two ways. First, to the best of our knowledge, we are the first to bring new international evidence that daily information demand as proxied by GSV improves stock liquidity. This suggests that Internet search activity may partially resolve information asymmetry problems. Furthermore, prior studies investigate the explanatory power of Google data on price dynamics and volatility clustering without exploring the underlying mechanisms (Bank et al., 2011; Drake et al., 2012; Vlastakis and Markellos, 2012). In this study, we attempt to identify underlying mechanisms, i.e., information asymmetry and firm visibility, to explain the stock liquidity reaction to investor information demand (Zhang et al., 2016).

The remainder of this paper proceeds as follows. The next section describes the data, sample construction and methodology. Section 3 reports our empirical results and discusses theoretical and practical implications. In Section 4, we address some methodological concerns by employing a battery of validity check tests. Section 5 sets forth concluding remarks.

2. Variables, sample and descriptive statistics

2.1. Measuring information demand

The question of whether information demand matters for stock liquidity has been difficult to test due primarily to the absence of a valid proxy of information demand. Da et al. (2011) introduce Google search volume of ticker symbols as provided by Google Trends as a proxy of investor attention. They also provide consistent evidence that, in an average week, GSV is positively associated with market capitalization, abnormal returns of IPOs, turnover, and media attention. GSV could also proxy for information demand as in Drake et al. (2012) and Vlastakis and Markellos (2012). Google Trends is a free tool provided by Google which covers the query records from January 2004 to present. In particular, for any given term, this application can report the search volume index, which quantitatively measures how often this term is searched via Google by internet users.

In this study, Google Trends provides the raw inputs for information demand proxy. In particular, to identify investor demand for firm-specific information (SID hereafter), we use the stock ticker as the search criterion submitted to Google Trends.[2] One of the shortcomings of this application is that Google data with a daily frequency are available only for 90 days, whereas weekly data are available for an extended period.[3] To create daily data for periods longer than 90 days, we have developed an R code to automatically download daily data for all stocks under

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[2] Using search volume for the company name to identify a stock is potentially problematic since people may be searching the company name for reasons unrelated to investing. Conversely, searching for a stock using its ticker is more precise and relates to people acquiring financial information about the company. The use of tickers instead of firm names increases the likelihood that the user is an investor, rather than an individual searching Google for other company information, such as products.

[3] Some other minor concerns with Google data are: (1) the search volume does not include searches from other major search engines such as Bing and Yahoo!; and (2) the data do not include searches using other major search mechanisms, such as Google Finance.