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journal homepage: www.elsevier.com/locate/jfecLocal investors, price discovery, and market efficiency[☆]Sophie Shive^{*}

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ABSTRACT

This study examines the effect of locally informed investors on market efficiency and stock prices using large power outages, which are exogenous events that constrain trading. Turnover in stocks headquartered in an outage area with 0.5% of U.S. electrical customers drops by 3–7% on the first full day of the outage, and bid–ask spreads narrow by 2.5%. Firm-specific price volatility is 2.3% lower on blackout dates. This effect is larger for smaller, lesser-known stocks and in higher income areas. Consistent with a valuation discount and higher expected returns for stocks with more informed traders, firms with a one-standard-deviation higher local trading propensity have market-to-book values that are 5% lower, Tobin's Q that is 6% lower, annualized four-factor alphas that are 1.2% higher, and average spreads that are 6.5% higher. Together, the evidence suggests that informed investors contribute disproportionately to both liquidity and price discovery, and that these contributions are reflected in valuations and expected returns.

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1. Introduction

There is evidence that investors of all stripes prefer to hold and trade local stocks.¹ It is plausible that some investors have privileged information about firms that are local to them, and studies of several classes of investors' holdings show that they realize superior profits on local stocks.² Little is known, however, about how local

investors' firm-specific information advantage affects market quality in these stocks, and whether this advantage in turn affects prices and returns.

This study uses large local power outages to address these questions. The first advantage of power outages is that they are a sudden, unexpected, and significant trading friction for local investors. For example, on Thursday, December 15, 2005, beginning at 4:00 AM, an ice storm caused power outages to 683,000 electrical customers in parts of Piedmont North Carolina and South Carolina. Schools were closed and power was not fully restored until six days later.³ The blackout area was home to the headquarters of 57 firms with Compustat, Center for Research in Security Prices (CRSP), and Trade and Quote (TAQ) data. Although U.S. aggregate market trading volume was higher on December 15 than the daily average of the previous month, volume was lower for 41 out of the 57 firms headquartered in the outage area. Closing spreads dropped for 38 of the firms on the blackout date, and idiosyncratic price volatility dropped for 37 of the firms.

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¹ Some examples are Huberman (2001), Ivković and Weisbenner (2005), Seasholes and Zhu (2010), Bodnaruk (2009), and Becker, Cronqvist, and Fahlenbrach (2011).

² Coval and Moskowitz (2001), Hau (2001), Malloy (2005), and Baik, Kang, and Kim (2010), for example.

³ Sources: Energy Information Administration (EIA) and "Retailers welcome big crowds," *Winston-Salem Journal*, N.C., 17 December 2005.

Surprisingly, even the most sophisticated traders do not seem to be equipped with backup power systems. In February 2010, a localized outage hit Nomura Securities in the World Financial Center at 200 Liberty Street in New York. The following messages were published in real time on Businessinsider.com:

Original: We got a tip that the World Financial Center at 200 Liberty Street just lost power. The source says the building 'just shorted.' The elevators may not be working. Can anyone confirm or deny? We have a call into the building currently, though the telephone system is looping.

Update: We've confirmed that at least one firm, Nomura, there was a major power outage. We're still trying to confirm whether it's affected the entire building. We hear traders were flipping out.

Update: As far as we can tell, only Nomura was affected, and the power is back on. This is clearly a huge relief to all involved. GO back to work!

Even if some traders do have backup power in their office and are able to trade, power outages are a source of distraction for local traders.

The second advantage of power outages is that the data they provide encompass all trading, at high frequency, in a large cross-section of stocks, not subsets of investor portfolios. This makes it possible to examine effects on aggregates such as volume, stock prices, and returns. This setup is not as well suited to answer questions about portfolio holdings and profits, which prior research has examined, but is better suited to examine local investors' effects on liquidity, price discovery, prices, and average returns, which remain relatively unexplored.

This study makes several contributions to our understanding of the impact of local investors, and more generally informed investors, on market efficiency. First, in a sample of large power outages that occurred between 2002 and 2010, local investors as a group represent 3–7% of the trading in stocks headquartered within a 500,000-customer area. According to the Energy Information Administration (EIA), there were 124,937,469 electrical customers in the United States in 2008, so this represents less than 0.5% of the customers. Effects of a local blackout on turnover are larger for areas without a major city, for higher income areas, and in the periods leading up to mergers and earnings announcements.

Second, this study investigates how local investors affect price discovery. Changes in idiosyncratic volatility indicate that, for the average stock, 2.3% of stock-specific price discovery is associated with the trading of 500,000 local customers. The drops in idiosyncratic and total volatility remain when controlling for the lower turnover, and are stronger when the blackout area is not a large city, for higher income areas, and in periods leading up to mergers or earnings announcements. Drops in idiosyncratic volatility are larger for firms that are below the sample median in size measured by total assets, are not a member of the Standard and Poor's (S&P) 500 index, and have no analysts.

Third, when local traders are constrained, quoted spreads are at least 2.5% narrower, suggesting that there is less adverse selection in the market. Stocks with a one-standard-deviation higher ratio of normal turnover to blackout-date turnover, a measure of local trading intensity, have 6.5% higher average spreads in the years before and after the blackout, suggesting that traders of these stocks face higher adverse selection.

The fourth contribution of this study is to investigate whether high levels of local trading, as measured by the drop in turnover during a local blackout, are reflected in the stock prices and expected returns of stocks, as would be predicted by, for example, Easley, Hvidkjaer, O'Hara (2002) and O'Hara (2003). These authors argue that in markets with information asymmetries where some information about assets is private rather than public, assets with a greater proportion of private information earn higher risk premiums. I find that stocks with a one-standard-deviation higher ratio of normal turnover to blackout-date turnover have market-to-book values that are 5% lower, and Tobin's Q values that are 6% lower. These stocks also have returns and annual four-factor alphas that are 1.2% higher. Together, the evidence suggests that local investors contribute substantially to price discovery, and that their contributions are priced.

This study builds on a growing literature examining local investors. It is well established that investors tilt their portfolios towards local stocks. For example, Huberman (2001) shows that investors prefer to hold their local telephone company's stock rather than that of another telephone company, and attributes this to a preference for the familiar. Ivković and Weisbenner (2005) and Seasholes and Zhu (2010) find that households investing with a large retail broker from 1991 to 1996 strongly prefer local stocks. Bodnaruk (2009) shows that when Swedish investors move, their portfolios change to favor the local stocks in their new location. Becker, Cronqvist, and Fahlenbrach (2011) show that block holders often live close to the company's headquarters. There is some debate about whether the overweighting of local stocks reflects preference for the familiar, or a perceived or real information advantage.

Several studies find that large local investors have privileged information. Coval and Moskowitz (2001) show that the average fund manager generates an additional return of 2.67% per year from local investments relative to out-of-town holdings. In addition, local stocks that fund managers hold outperform the local stocks they avoid by a risk-adjusted 3% per year. In another look at sophisticated investors, Hau (2001) shows that German high-frequency traders who are located close to the firm's headquarters earn abnormal trading profits compared to traders who are not close. Malloy (2005) finds that local analysts are more accurate in their forecasts than analysts located further away from a firm's headquarters. Baik, Kang, and Kim (2010) show that higher ownership of a stock by institutions located in the same state and quarterly changes in this ownership are associated with higher returns in future quarters. Large, sophisticated investors seem to have an information advantage in stocks that are local to them.

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