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## **DO TERRORIST ATTACK AFFECT STOCK PRICES?**

In this paper we examine the impact of terrorist attacks and mass shootings on the US stock market by analyzing the price dynamics in the aftermath of the attacks. We identify terrorist attacks that occurred during US stock market trading hours in 12 developed countries and combine it with high-frequency intraday data on stock prices. The results show that the market didn't respond in one certain way to terrorist attacks. In the 16 attacks included in this study, effects on both price and variability were mixed, and there is no evidence that the terrorist attacks and mass shootings have much of an impact on the stock markets. We also find that attacks that occurred in other countries have virtually no impact on the U.S. stock market. The results of this study should be interpreted with caution because they are based only on a small sample of 16 events.

There are many studies that look at the effects of terrorism attacks on the stock market. Abadie and Gardeazabal (2003) concluded that an increase of terrorist activity resulted in a 10% average GDP gap between Basque County and the rest of Spain that didn't experience terrorism, based on intensity of terrorist attacks at the time. Arin et al (2008) use a GARCH-in-mean model to find that stock market volatility increases more in developing countries. Broun and Derwall (2010) compared the impact of terrorist attacks to natural events, such as earthquakes. They find that terrorist attacks have more pronounced effect on stock prices than natural disasters, but markets generally rebound shortly after the attacks. They also find that the effect is the strongest for local markets and industries directly affected by the attack.

In this paper we attempt to contribute to the literature by using high-frequency data to get a more detailed look at the immediate effects of the attacks. To our knowledge, none of the papers in the literature attempted to use high-frequency data in this context – most of the studies are based on daily data. We also examine whether small-cap and large-cap stocks react differently to the attacks. Our results largely confirm the findings in the existing literature – there is not much evidence of terrorist attacks having a large impact on the stock markets.

In our analysis, we use data from the Global Terrorism Database (GTD) as well as other public sources and select events that occurred since 2011 because that is the earliest year for which the stock prices are available at high frequency. The study is limited to terrorist attacks and mass shootings that occurred in developed countries, and only to those attacks that occurred during trading hours. We limit our attention to developed countries mostly because the attacks there are rare compared to countries like Iraq or Afghanistan, and hence are likely to have more impact on the financial markets. We selected 16 events during which a significant number of people were

killed or wounded (e.g. San Bernardino or Parkland shootings) or attacks with smaller number of casualties that targeted either popular tourist sites, public events or government institutions (e.g. 2014 shootings at Parliament Hill in Ottawa, April 2017 attack in Champs-Élysées in Paris, or Boston Marathon bombing in 2013). We also limited our sample to attacks that occurred at a distinct point during trading hours because our intent was to identify the immediate impact of an attack on the stock market. After identifying the attacks, we extracted price level data from Center for Research on Stock Prices Intraday US Index History Files for the days on which the attacks occurred. This dataset contains second-by-second values for various portfolios of stocks (e.g. large cap, small cap, growth, value etc.) traded on major U.S. exchanges. To compare the effect of the attacks on large versus small stocks, we examine changes in price level and variation in price level for Large Cap and Small Cap indices.

To examine the effect of an attack on the price level, we computed the cumulative return for each day:

$$Ret_t = \ln P_s - \ln P_0, \quad (1)$$

where  $P_s$  is the index level in second  $s$  and  $P_0$  represents the first recorded value of the index for that day. To study changes in volatility, we compute minute-by-minute variance for the indices:

$$Var_m(\Delta p) = \frac{1}{60} \left( \sum_{s=(m-1) \times 60 + 1}^{m \times 60} (\Delta p_s - \overline{\Delta p_m})^2 \right), \quad (2)$$

where  $\overline{\Delta p_m}$  is the average change in log price during the minute  $m$  and  $\Delta p_s$  is the log difference in the index value  $P$  between seconds  $s$  and  $s - 1$  is defined as

For most of the attacks there was almost instantaneous decline in market price for the next 30 – 60 trading minutes and sometimes for the rest of the trading day. It's not always obvious, however, whether the markets declined because of an attack or due to overall market sentiment on that day. For majority of the events it appears that the effect, if it is there, is rather short-lived. For example, Brussels Mosque Bombing, Parliament Hill Shooting, Notre Dame Attack and Parkland Shooting were all followed by small dips in stock prices immediately after those attacks, but the markets seem to quickly bounce back. Small cap stocks appear to drop more than the large cap stocks (e.g. Boston Marathon Bombing and Wurzburg Train Attack) but overall there doesn't appear to be a strikingly different pattern.

Across various attacks, large cap stocks experienced more variability after the attack time as compared to their small cap counterparts. This is most pronounced for the attacks that occurred in the U.S., most notably the Boston Marathon Bombings, Sandy Hook Shooting, and San Bernardino. Overall, U.S. stocks don't appear to react to attacks that occur in other countries because the levels of volatility don't appear to be noticeably different from what was observed on that trading day prior an attack.

Among the attacks that occurred in the United States, all except one were mass shootings. Boston Marathon attack is the only bombing in our sample. Obviously, this is too small of a sample to draw general conclusions but all shootings appear to have much smaller effect on volatility compared to the Boston Marathon Bombing.

The evidence presented in this paper suggests that terrorist attacks that occurred over the last decade, have had little to no impact on the U.S. stock markets. Therefore the findings in this paper partially support what's been reported in the literature – the effect of terrorist attacks on the stock market, is short-lived to non-existent. There appears to be little evidence of contagion as the attacks in European countries had no immediate effect on the stock market in the United States.

### References

1. Abadie, A., and J. Gardeazabal (2003) The Economic Costs of Conflict: A Case Study of the Basque Country. *The American Economic Review* 93(1), 113-132
2. Arin, P. D. Ciferri, and N. Spagnolo (2008) The Price of Terror: The Effects of Terrorism on Stock Market Returns and Volatility. *Economic Letters* 101(3), 164.
3. Lebedinsky, A. and K. Scanlon, (2018), Effects of Terrorism on Stock Prices: Evidence From High-Frequency Data, Working paper.

УДК 338.9:658

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### **АНАЛІЗ СТАНУ ТА ТЕНДЕНЦІЇ РОЗВИТКУ МАЛИХ ТА СЕРЕДНІХ ПІДПРИЄМСТВ УКРАЇНИ**

Економічна наука за останні десятиліття сформувала багато шкіл та підходів до вирішення проблем забезпечення стійкого розвитку різних господарських систем. Нині в нашій економіці є загальноприйнята точка зору щодо стійкості, яку трактують як здатність протистояти зовнішнім, внутрішнім та змішаним факторам, зберігаючи рівновагу в структурі, характері функціонування, траєкторії руху щодо довготривалого періоду [4, с. 28]. Це означає, що в умовах зміни зовнішнього та внутрішнього середовища малі і середні підприємства здатні генерувати потік доходів, як мінімум на рівні простого відтворення. Проте, кризи 2008-2009 рр. та 2014-2018 рр. і становлення економічної динаміки в умовах економічної рецесії засвідчує, що механізми стійкого розвитку попереднього десятиріччя себе вичерпали. Сучасне ринкове господарство, в тому числі мале підприємництво, характеризується переходом до нової стійкості розвитку і росту, який вирізняється виключно інтенсивним та інноваційним характером на основі досягнень науково-технічного прогресу [2]. При цьому, підтвердженням стійкого розвитку є не лише абсолютні кількісні показники на конкретний період часу, але і налагоджений механізм роботи, принципи ведення бізнесу (легальний та тіньовий характер), безперечна репутація й імідж, перевірені і надійні контрагенти тощо.