
Chapter 2: Armed Conflict and Terrorist Attacks

War, huh, yeah,
What is it good for?
Absolutely nothing.

—Norman Whitfield and Barrett Strong, “War”

Wars and armed conflict in general are a recurring phenomenon in geopolitics. In fact, I would guess that the first thing that comes to readers’ minds when they think about the influence of geopolitics on investments is the potential impact of wars and—more recently—terrorist attacks.

The past hundred years have been marked by two world wars that led to two major shifts in the global political and economic power structure. First, the United States emerged victorious in both World War I and World War II. Moreover, both wars were fought outside the mainland United States, and, as a result, the country’s infrastructure and economy remained intact. As the United States emerged as both the economic and political superpower after 1945, it was rivaled in the political dimension by only the Soviet Union. In the Western world, the end of World War II marked the beginning of the Pax Americana, an era of relative peace that was policed by the US military. Of course, wars continued to break out around the world, but those conflicts were taking place mostly in small countries in the developing world, where one side was supported by Western countries while the other was supported by communist countries or was fighting for self-determination.

The second major shift triggered by the two world wars was the decline of the British Empire and other colonial powers. Unlike the United States, all European colonial powers were physically devastated by the two world wars, and their infrastructure and economy were destroyed. Whether the countries had been on the winning or losing side of the wars did not matter, though losing countries, such as Germany, suffered heavier losses than victorious countries, such as the United Kingdom. The result for every major European nation was an economy on its knees and an enormous amount of war debt that needed to be paid off.

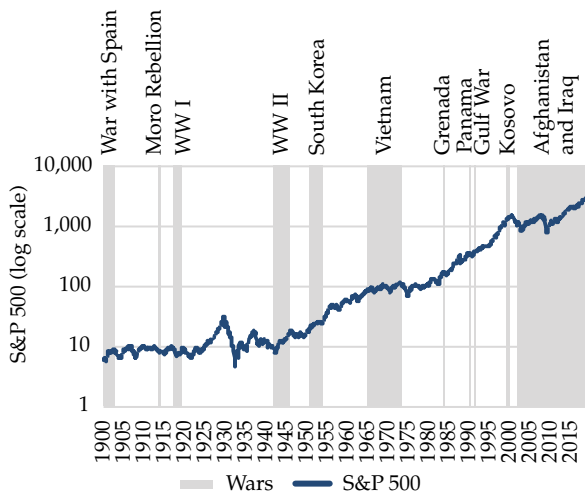
This chapter is from the book *Geo-Economics: The Interplay between Geopolitics, Economics, and Investments* by Joachim Klement, CFA. For more chapters, go to <https://www.cfainstitute.org/en/research/foundation/2021/geo-economics>.

In the years following World War II, the colonial powers suffered the loss of many of their colonies, and the United Kingdom lost, to the United States, its status as the preeminent economic and political superpower. Until World War II, the world's reserve currency had been the British pound, and commodities were traded in sterling. Similarly, London had been the financial capital of the world, a position it lost to New York City after 1945. The Bretton Woods agreement of 1944 established the US dollar as the world's reserve currency and introduced the World Bank and International Monetary Fund to improve international economic cooperation and prevent the kind of economic warfare and trade conflict that marked the world wars and the Great Depression.

Stock Market Reaction to Wars. The two world wars led to tectonic shifts in the global economy, but many more wars were occurring throughout the 20th century. **Exhibit 1** shows the wars and invasions that the US military has been directly involved in since 1900 together with the S&P 500 Index. The stock market is shown in logarithmic scale, so similar percentage losses and gains lead to similar declines and advances in the chart.

The first thing to notice is that the United States became far more involved in warfare after it took on the role of the world's police force after World War II. The second thing of note is that you would be hard pressed to identify the impact these wars had on the US stock market. For example, you could not identify the Vietnam War years or the War in Afghanistan years

Exhibit 1. US Wars and the Stock Market



Sources: R. Shiller's website; Correlates of War project (COW); Uppsala Conflict Data Program (UCDP).

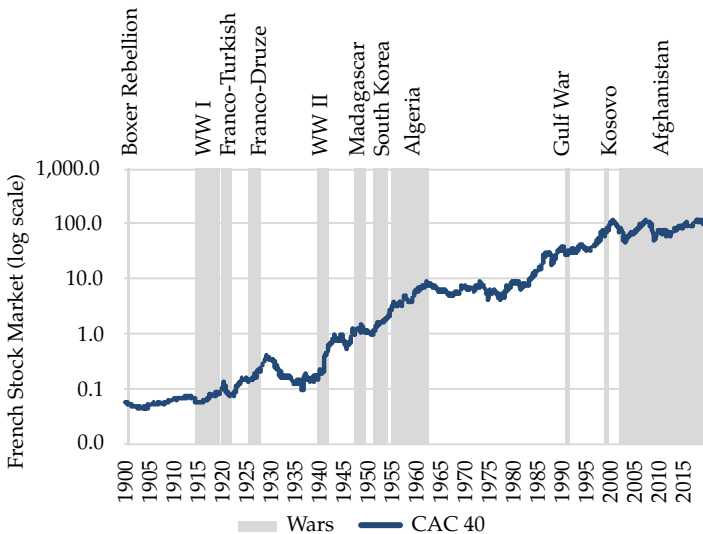
in the S&P 500 data if I had not shown them in Exhibit 1. And no common pattern appears in the stock market for every war. Sometimes, the stock market would rally during the war, as was the case with the Korean War, and sometimes, it was mired in an extended sideways movement, as was the case with the Vietnam War. If any pattern comes close to being recognizable, it might be seen in the two world wars, when the stock market first declined strongly before entering an extended rally.

This lack of influence of wars on the US stock market (with the possible exception of the world wars) might not hold, however, for other stock markets. Remember that the US economy and infrastructure were almost unharmed by the wars of the past century, whereas countries in Europe and Asia suffered heavy destruction. Thus, these latter countries' stock markets might have reacted very differently to wars.

To see whether reactions might have been different in war-torn countries, look at the French stock market and the wars France has been involved in during the 20th century, which are shown in **Exhibit 2**.

France was much less involved than the United States in armed conflicts after World War II but in a state of almost constant war during the first half of the 20th century. During that period, the country fought a number of wars against colonial insurrections that eventually led to the independence of many of its colonies. What is probably the most prominent colonial war in which

Exhibit 2. French Wars and the CAC (Cotation Assistée en Continu) Index



Sources: Global Financial Data; UCDP.

France was involved, the conflict in Vietnam, is not even marked in the chart. That conflict would eventually lead to the involvement of US troops in the country for several years. But just as in the case of the United States, I challenge readers to pinpoint the exact start and end dates of France's participation in the Vietnam conflict from the data in Exhibit 2.¹

Given the (seemingly) limited impact of wars on the stock market, you might be tempted to dismiss the influence of wars altogether, but if you look at the behavior of the French stock market during the two world wars, you see a remarkable similarity to that of the US stock market. In both world wars, the French stock market first declined and then rallied strongly. Compared with those of the US stock market, however, the gyrations of the French stock market seem to be more pronounced. France was a main theater of war. All the main battlefields on the Western Front during World War I were in France, and although France was occupied by Germany for most of World War II, it was the starting point for the Allied invasion of Germany in 1944. Allied forces had to literally fight their way through the French industrial heartland to reach Germany.

As the reader will see in the remainder of this chapter, these stylized facts about wars—namely, that most wars do not really have a lasting impact on stock markets and that the wars that do have an impact often have a negative impact at the onset of war—are two key findings of the research on wars and their influence on financial markets.

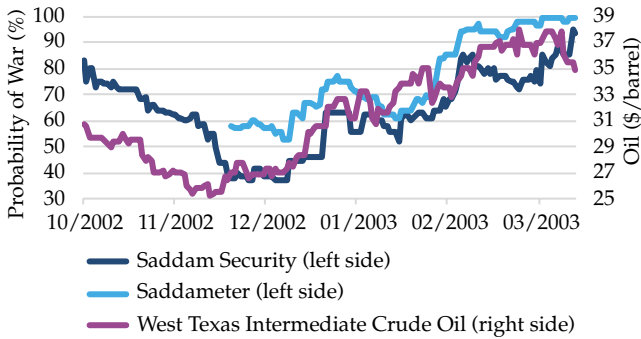
Before I explain the typical investment risks and opportunities emanating from wars, however, a helpful approach will be to zoom in on one particular case study: the US invasion of Iraq in 2003.

Case Study: 2003 Invasion of Iraq

The academic research on the influence of wars on financial markets got a boost with the US invasion of Iraq in 2003. The reason for this boost was twofold.

First, a lot of criticism of the planned US invasion in Iraq arose at the time. Internationally, the US government did not manage to convince even some of its closest allies that Iraq had weapons of mass destruction or was involved in the terrorist attacks of September 11, 2001 (9/11), which started the “war on terror.” In a speech at the annual Munich Security Conference in February 2003, German Foreign Minister Joschka Fischer looked directly at US Secretary of Defense Donald Rumsfeld and uttered in English, “Excuse me, I am not convinced”—words that caused some consternation and anger in the US administration and have become part of the political folklore in Germany.

¹Answer: The Vietnam War for France lasted from November 1946 to June 1954, a time frame during which the country also fought a war in Madagascar and participated in the Korean War.

Exhibit 3. Measures of Risk of War in Iraq, 2002

Source: Wolfers and Zitzewitz (2006).

Within the United States, the invasion was also heavily criticized. William Nordhaus called wars “the ultimate negative-sum game in which the spoils of the victors are much less than the losses of the vanquished” (Nordhaus 2002). He also criticized the US government for not making any in-depth efforts to estimate the true costs of the war and claimed that the government probably underestimated both its duration and cost. He estimated that the cost to the US economy of an invasion of Iraq could be anywhere between \$100 billion and \$1.9 trillion. In 2010, the US Congressional Research Service estimated the total costs of the Iraq War to be \$784 billion (Daggett 2010).

The second reason the Iraq War became a popular case study for economists is that before the action, for the first time, several measures intended to assess the probability of war were available in real time. Wolfers and Zitzewitz (2006) collected data from the website Tradesports.com that launched futures contracts (so-called Saddam Securities) that paid \$100 if Saddam Hussein were to be ousted before a certain date. At the same time, William Saletan of *Slate* gave his assessment of the likelihood of war (the Saddameter) in his daily column.²

As **Exhibit 3** shows, the probability of war as determined by the Saddam Securities and the expert assessment of the Saddameter tracked each other reasonably well. The increasing probability of war also was reflected in the rising price of oil at the time. These data allowed researchers to quantify the impact of rising war threats on stock markets. Brune, Hens, Rieger, and Wang (2015) found that an increase in the Saddameter of 1 percentage point

²William Saletan, “The Saddameter: Are We Going to War? Slate Updates the Odds,” *Slate* (November 2002–March 2003), <https://slate.com/news-and-politics/saddameter>.

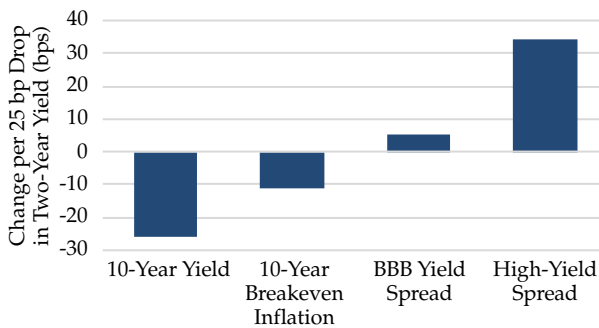
led to a decline in the S&P 500 of 1.1 points (given the level of the S&P 500 at the end of 2002, approximately 0.13%).

Safe Assets Gained . . . A more comprehensive analysis of the impact of the run-up to the Iraq War was done by Rigobon and Sack (2005), who looked at the transmission of war threats across asset classes. They concluded that a 25 basis point (bp) decline in the yield of two-year US Treasuries led to an almost equal decline in 10-year US Treasuries, as shown in **Exhibit 4**, indicating that war threats lead to a parallel shift of the yield curve rather than a tilt or shift in convexity. Investors seem to react to rising war threats with a general flight to safety that does not discriminate much between different maturities of Treasuries.

An interesting observation is that inflation expectations declined as the threat of a war in Iraq increased. This response is in contrast to the rise in oil prices that happened simultaneously. Inflation expectations are caught between two competing forces when investors evaluate the effects of war. On the one hand, a war in a major oil-producing country, such as Iraq, is likely to reduce the supply of oil and should thus lead to higher oil prices and higher inflation, at least as long as the oil supply remains disrupted. On the other hand, wars are costly and might have a negative impact on household consumption and investment, leading to lower economic growth. As a result, inflation expectations should decline in anticipation of this economic slowdown.

Evidently, in the case of the war in Iraq, fears about a potential oil supply shock were dominated by fears about an economic slowdown, possibly because other major oil producers, such as Saudi Arabia, were committed at the time to increasing oil production while Iraq went offline.

Exhibit 4. Impact of Rising War Threats on Fixed-Income Markets, Early 2003



Source: Rigobon and Sack (2005).

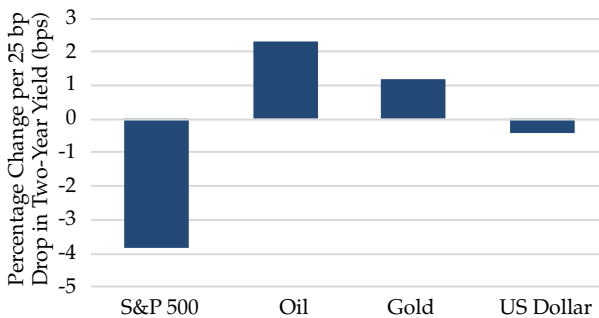
The hypothesis that growth concerns dominated in the reaction of fixed-income markets is also reflected in the rising spreads of investment-grade and high-yield bonds over Treasuries. As the threat of war increased, yield spreads widened significantly because investors priced in higher default risks for risky issuers in a slowing economy.

... while Risky Assets Lost. The flight to safety triggered by rising war fears in early 2003 was also visible in the returns of the S&P 500, as shown in **Exhibit 5**. Rigobon and Sack (2005) estimated that a 25 bp decline in two-year Treasury yields was commensurate with a 3.85% drop in the S&P 500. Both oil and gold acted as safe havens in this episode, however, and rallied substantially as Treasury yields declined. The effect on the US dollar exchange rate, measured in the Rigobon and Sack study as the broad trade-weighted exchange rate, was minimal.

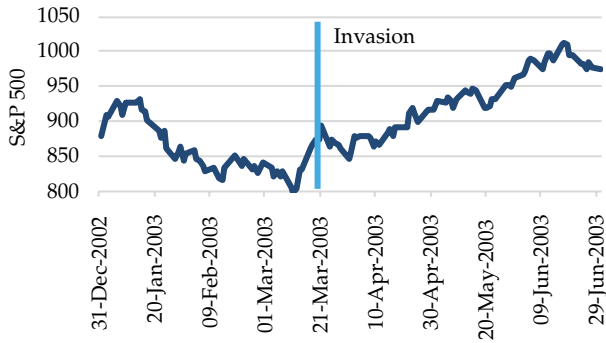
With the Invasion ...? Then, something strange happened as war with Iraq became all but inevitable in early March 2003. Stock markets started to rally, and around the time of the invasion on 20 March 2003, the S&P 500 experienced a regime shift, as shown in **Exhibit 6**. Looking back on these events today, we know that the S&P 500 reached its low point for the 2000–03 bear market on 13 March 2003. Apparently, the onset of war triggered a “relief” rally in the stock market that turned out to last until late 2007.

Given these observations, you might conclude that the stylized pattern regarding the impact of war on financial markets is a general flight to safety in the run-up to a major war, with government bonds, gold, and (potentially) oil rallying and with both stocks and risky bonds dropping. With the onset of the war, a relief rally is triggered (in the case of the Iraq War). Many investors continue to believe that this pattern is a common feature of the

Exhibit 5. Impact of Rising War Threats on Risky Assets and the US Dollar, Early 2003



Source: Rigobon and Sack (2005).

Exhibit 6. The S&P 500 at the Onset of the Iraq War

Source: Bloomberg.

influence of wars on markets. The situation calls for almost the inverse of the old Wall Street adage “buy on the rumor, sell on the fact.” In the case of wars, the right thing for investors to do appears to be “sell on the rumor, buy on the fact.”

With Wars, Anything Can Happen

However, extrapolating from one case study to all wars is dangerous. As Exhibits 1 and 2 make amply clear, there are no universal truths with respect to the impact of wars on financial markets. In fact, the impact of wars on financial markets is so complex that time-series regression methods and other common econometric tools typically indicate no statistically significant effect of war on stocks, currencies, or bonds. As a result, researchers today primarily use “event studies” to identify the impact of wars on markets.

The basic idea of an event study in this case is to compare the behavior of a market just before the onset of a war with the behavior of the same market shortly after. For example, you might calibrate the return of the S&P 500 in the 50 days before the onset of war with the help of a simple capital asset pricing model (the CAPM of Sharpe [1964] and Lintner [1965]) or a Fama–French three-factor model (Fama and French 1993). Then, you could look at the return of the S&P 500 on the day of the event or a number of days after the event (typically, 6 or 11 trading days) to determine the cumulative abnormal return (CAR) of the market relative to what could be expected from the calibration.

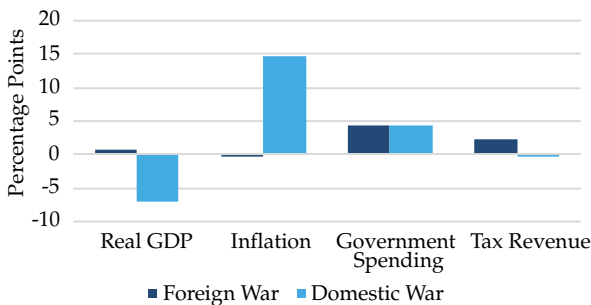
The problem with these event studies is that the results depend on the calibration used. A calibration based on the CAPM will give a different

result from a calibration based on the Fama–French factor models. And more importantly, because stock markets are dynamic, the length of the calibration window is crucial. A calibration based on the behavior of the stock market in the 50 trading days before the event might give different results from a calibration based on the 10 trading days before the event. Similarly, how long you observe the market after the event might lead to different results, particularly if rallies or corrections are short-lived, lasting only a few trading days, as is often the case.

With these caveats in mind, we can look at the stylized facts of wars and their impact on capital markets that researchers have found over the years. Probably the best starting point for a summary of these facts is the economy itself. Caplan (2002) examined two datasets. The narrow dataset covered 15 industrialized nations from 1881 to 1988, whereas the broader set covered 66 countries (both industrialized and developing countries) from 1950 to 1992. Because the broad dataset covered a shorter time span and a broader range of countries, it often produced results that were less pronounced than those of the narrow dataset. I thus restrict myself here to the results of the narrow dataset, which covered only industrialized countries. The main results of Caplan’s study are summarized in **Exhibit 7**.

One of the most important findings of the Caplan (2002) study is that whether a war is fought on foreign or domestic territory matters tremendously. As I pointed out at the beginning of the chapter, the United States benefited from the fact that both world wars were fought mostly in Europe and Asia. The domestic US infrastructure was left intact. Europe and Asia, as well as most of northern Africa, were not so lucky. The domestic economies of these areas suffered significant destruction.

Exhibit 7. Macroeconomic Impact of Wars



Source: Caplan (2002).

The difference between foreign and domestic wars is particularly pronounced for GDP growth and inflation. Wars fought on foreign territory tend to be mildly positive for economic growth, whereas wars fought on domestic soil quickly destroy the economy. Caplan (2002) found that on average, foreign wars provided a boost of 0.7 percentage points per year to the domestic economy of the belligerent, while domestic wars cost approximately 7.1 percentage points per year.

For a country that is mired in a war on its territory, these costs are severe. The costs are nonlinear and accelerate as the war continues. On average, after three years, the size of the GDP of such a country is expected to have shrunk by one-fifth, and after five years, the size of the GDP is expected to have halved. In other words, three years of domestic war have approximately the same impact on a country's economy as the Great Depression had on that of the United States and approximately two to three times the impact of the Global Financial Crisis of 2008. That most investors react to the onset of wars with a shrug of the shoulders is primarily a result of the fact that industrialized countries have not gone to war for more than seven decades. Wars have been fought exclusively in small countries with GDPs a fraction of the output of the United States. So, on a global scale, the wars of the past decades did not seem to matter. Of course, investors who specialize in emerging and frontier markets have a very different perception. For them, the outbreak of war in one of the countries in which they are invested might have a significant impact on their investments.

Another important difference between foreign wars and domestic wars is the impact they have on inflation. Because countries that fight a war on home soil face rapid destruction of their economies and, at the same time, an exponential growth of debts to finance the war, they are often forced to resort to a rapid expansion of the monetary base. Thus, on average, prices rise by 14.5 percentage points per year for as long as the war continues. Remember the strong rally of the French stock market during the two world wars shown in Exhibit 2? Those rallies were driven mostly by the rapid inflation at the time. Because stocks are real assets, they can protect investors from the inflationary effects of domestic wars.

On a more uplifting note, the inflationary effect of World War I is also responsible for Paris's rise to become the center of the art world. In the 1920s, artists such as Picasso and writers such as Ernest Hemingway and F. Scott Fitzgerald all moved there. Saddled with crippling war debt, France faced extremely high inflation, with annual inflation rates as high as 57% in 1920 and averaging 29% per year between 1917 and 1921. The result was that living in France was extremely cheap as long as you were paid in hard currency, such

as the US dollar, which appreciated rapidly. Thus, relatively poor artists from the United States or, in Picasso’s case, Spain could afford a lavish lifestyle in France, which created a wave of immigration to Paris throughout the 1920s.

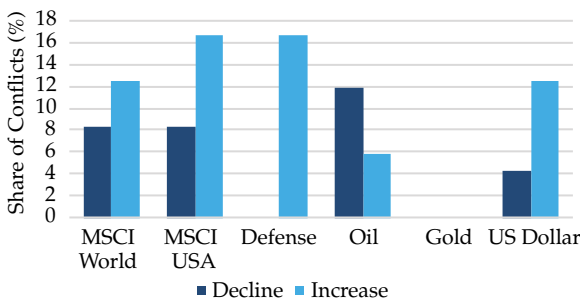
Caplan’s (2002) research contains some stylized facts about wars that are virtually identical for foreign and domestic wars. Because wars are expensive, they have to be financed, leading to increased government spending and rising budget deficits. In fact, wars are, economically speaking, little more than large fiscal stimulus packages driven by rapidly rising defense spending and by stable to declining nondefense spending. No wonder GDP growth accelerates when a country engages in a foreign war. Government spending increases while other businesses in the domestic economy continue with business as usual.

The (Mostly) Unpredictable Impact of Wars on Investments

Given the substantial impact wars can have on GDP, government spending, and inflation, a measurable impact likely also occurs on the returns of financial assets. Yet, as I mentioned before, most traditional econometric studies have found few clear signals. Guidolin and La Ferrara (2010) used event studies to investigate 112 conflicts between 1974 and 2004. They looked at both internal conflicts (civil wars) and international conflicts, and they did not differentiate between foreign and domestic wars. **Exhibit 8** shows only the results for the 28 international conflicts they studied.

Guidolin and La Ferrara (2010) examined the behavior of asset prices in the week of the onset of war and calculated the abnormal return relative to a baseline estimated from the 100 weeks of trading before the onset of war. They then calculated what share of events showed abnormal returns in the week of the onset of war that was statistically significantly different from zero with a 5% confidence level.

Exhibit 8. Share of Wars with Significant Impacts on Asset Prices



Source: Guidolin and La Ferrara (2010).

Of the 28 international conflicts studied, two showed a statistically significant negative reaction by the MSCI World Index, and three showed a positive reaction. Similarly, in the case of the MSCI US Index, two events triggered a negative stock price reaction and four triggered a positive stock price reaction. So, the majority of the wars (22 or 23 out of 28) did not create a stock market reaction that was significantly different from zero! In other words, most wars simply do not seem to matter for stocks, and those that do sometimes trigger a rally (as in the case of the Iraq War) and sometimes, a correction. I focus on this result in greater depth in the next section.

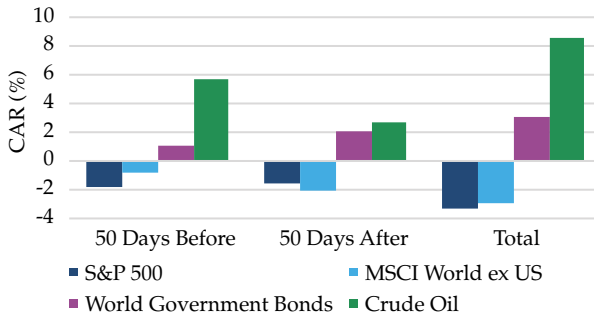
Guidolin and La Ferrara (2010) found two relatively clear results. First, if a war matters, it seems to be unanimously positive for defense stocks because these companies are the main beneficiaries of the increased government spending. Surprisingly, however, although the US dollar tends to appreciate in reaction to the onset of war, the authors could not find a statistically significant reaction of the gold price for any of the events they studied. This result flies in the face of the common perception of gold as a crisis hedge. More detailed studies have recently shown, however, that gold does act as a crisis hedge, just not in the way many investors think it does. I discuss this phenomenon further when the discussion involves the way investors can hedge the risk of war. First, however, we need to consider why stocks sometimes rally and sometimes drop at the onset of war.

The War Puzzle

The most commonly found research result about the reaction of asset markets to the onset of war is that risky assets, such as stocks, decline, whereas government bonds rally. Omar, Wisniewski, and Nolte (2017) examined international conflicts between 1995 and 2007 and found the CAR of stock markets in the 100 days surrounding the outbreak of war to be negative, on average. For the S&P 500, they found an average decline of 3.4%, which was about equally split between the 50 days before and the 50 days after the outbreak of war. For the MSCI World Index, they found a similar average decline, though this decline was more pronounced after the outbreak of war.

Meanwhile, as **Exhibit 9** shows, the Omar et al. (2017) research revealed that both government bonds and oil can provide a hedge against the risk of war because both asset classes tend to rally in this environment.

This general finding leaves us with a puzzle. Why do stock markets rally in some cases after the outbreak of a war? The puzzle becomes even more confounding if we look at the behavior of the stock market in, for example, the run-up to the Iraq War in 2003. Before the outbreak of war, a higher probability of war led to lower stock prices, but once the probability of war

Exhibit 9. CARs before and after the Outbreak of War

Source: Omar et al. (2017).

jumped from, say, 95% to 100%, stock prices rose. Rational investors should not behave like that. Either war is bad for stocks, in which case the outbreak of war should lead to further stock market declines, or it is good for stocks, in which case stocks should rally as war becomes more likely, even before the actual outbreak of war.

A Matter of Attention—or Lack Thereof. When Brune et al. (2015) investigated this so-called war puzzle, they found that wars that have a prolonged build-up phase tend to provide a relief rally at the onset of war; wars that happen suddenly or come as a surprise to markets lead to stock market corrections. The Iraq War that started in 2003 was a much publicized event discussed both in policy circles and among the general public and investors for months. Thus, the stock market had sufficient time to incorporate all the ups and downs of the political process in the prices of stocks and bonds. In such an environment, the stock market acts like the proverbial “weighing machine”—incorporating the views of millions of investors around the world. A sudden war, in contrast, just like a terrorist attack, does not provide the market with sufficient time to fully assess the impact the event might have on various companies. In these cases, markets react in the short term with a sudden flight to safety, and stock markets correct while government bonds rally.

This insight provides investors with a potential competitive edge. Although most wars do not really matter for global stock markets, some do. But both the media and financial markets are often oblivious to the political developments that can lead to the outbreak of war. Investors who are able to monitor geopolitical risks can often identify “wars that could matter” before other investors. They can then monitor these geopolitical risks and protect their portfolios to some extent against the price shock at the onset of war.

The war puzzle, however, remains a puzzle. Why do stock markets rally after a long-lasting run-up to a well-publicized war? Why does it make a difference if the probability of war is 95% or 100%? Two explanations for the war puzzle are possible—one psychological and one rational.

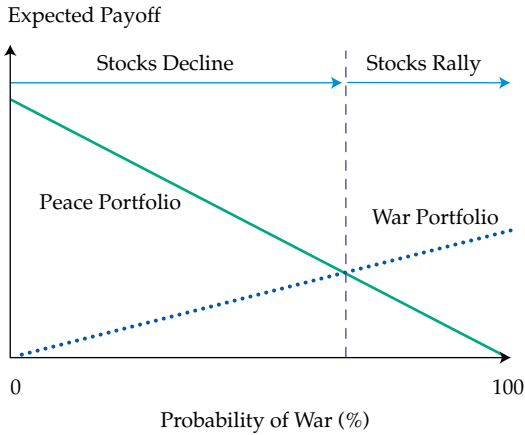
Explanation 1: The Challenge of Probabilities. The psychological explanation of the war puzzle focuses on our inability to assess probabilities. To understand this approach, assume that in the case of peace, you hold a specific portfolio that contains a lot of stocks but mostly stocks that do well in peacetime. In times of war, however, you would prefer to invest in a war portfolio—one that still invests in stocks but preferably in stocks that do well in times of war, such as defense stocks. Now assume a conflict starts to escalate, and war is becoming increasingly likely. At first, war is relatively unlikely, and investors stick with their peace portfolios, but the more likely war becomes, the more stocks they start to sell out of this portfolio. Because most investors do not invest in the war portfolio at this point, the selling pressure for peace stocks dominates the buying pressure on war stocks, and stock markets decline as war becomes more likely.

At some point, however, the likelihood of war reaches an inflection point when the war portfolio becomes the dominating portfolio. In this instance, investors abandon their peace portfolios altogether and switch into the war portfolio. What happens then is that the selling pressure for peace stocks is suddenly dominated by the buying pressure for war stocks, so stock markets start to rally as the outbreak of war becomes more likely, as shown in **Exhibit 10**.

Where exactly is the tipping point? Nobody knows, and it might well differ from crisis to crisis, but it is rooted in the phenomenon of subjective probabilities (Tversky and Kahneman 1992). Most human beings tend to think that extremely unlikely events are more likely than they truly are and that extremely likely events are less likely than they truly are. Or, as I usually put it,

Most investors have only three probability settings: It will not happen, it is 50/50, and it will definitely happen.

What this tendency means is that, most of the time, investors will remain in the peace setting until a certain threshold for the probability of war is passed, at which point investors essentially behave as if the chance of war and peace is 50/50. In reaction, they reduce their portfolio holdings in assets that seem at risk. Once war becomes so likely that investors think it must happen, they shift the portfolio again, this time into the war portfolio, and they abandon the peace portfolio.

Exhibit 10. A Behavioral Explanation of the War Puzzle

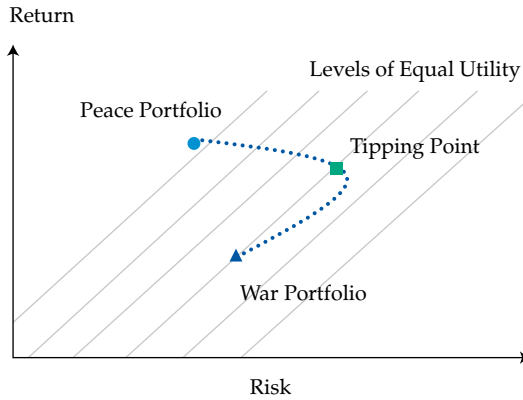
Source: Brune et al. (2015).

Explanation 2: A Rational Shift between Portfolios. The rational explanation for the war puzzle does not require investors to be too stupid to handle probabilities. Instead, all you have to assume is two different portfolios—a peace portfolio and a war portfolio—with different risks and returns. The peace portfolio has a higher expected return, so most of the time, investors remain invested in it. As the probability of war increases, investors start to invest in a mix of the peace portfolio and the war portfolio.

This mix of two portfolios increases risk and reduces return, however, so investors remain reluctant to increase their allocations to the war portfolio and the resulting decline in utility. For a high probability of war (i.e., beyond the tipping point in **Exhibit 11**), the combination of war portfolio and peace portfolio has a lower utility than investing in the war portfolio outright. Thus, once the probability of war increases above that tipping point, investors shift their portfolios altogether into the war portfolio and create a stock market rally.

Hedging War Risks

Which brings us neatly to the question of what such a war portfolio looks like. Given that wars tend to trigger stock market declines, investors need to be able to either construct an all-weather portfolio that has the optimal allocation to stocks and hedging assets (so that in case of war, the portfolio will suffer as little as possible), or investors need to shift from a peace portfolio to a war portfolio as the risk of war increases.

Exhibit 11. A Rational Explanation of the War Puzzle

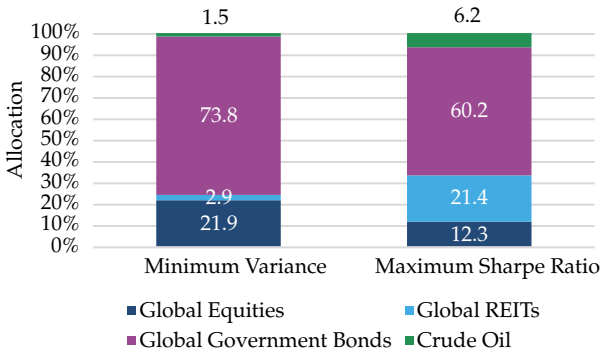
Source: Brune et al. (2015).

Based on their analysis of the behavior of stocks, government bonds, and oil around the outbreak of war, Omar et al. (2017) calculated the optimal hedge portfolio consisting of these asset classes. Exhibit 9 shows that both government bonds and crude oil tend to rally in the six months surrounding the outbreak of a war. On the one hand, the rally in government bonds reflects the flight to safety that takes place as the risk of war increases. The rally in oil, on the other hand, seems likely to be the result of the fact that most wars that have really mattered for financial markets since the end of World War II have been wars fought over the access to such natural resources as oil. And if war breaks out in a major oil-producing region, you must expect a significant spike in oil prices that can hedge the decline in stocks.

Such a hedge seems to be conditional, however, on the supposition that wars are fought over resources. As I show in later chapters, not all wars are fought over access to natural resources, and, as the global economy becomes less and less reliant on fossil fuels, future wars might not be fought over oil but, rather, over access to other resources that are valuable inputs in the modern economy.

Nevertheless, Omar et al. (2017) calculated the optimal hedge portfolios shown in **Exhibit 12**. Of course, no investor should implement these portfolios as they are because the optimal portfolio will depend on the individual circumstances of the investor. But these portfolios at least give us some guidelines on how best to hedge against war risks. And here, the message is simple: Government bonds provide the best hedge against war risks, especially if you are looking for a low-volatility hedge. For portfolios that aim for higher

Exhibit 12. Optimal Portfolio Allocation in the Case of a Sudden Outbreak of War for the Investor Goals of Minimum Portfolio Variance and Maximum Sharpe Ratio



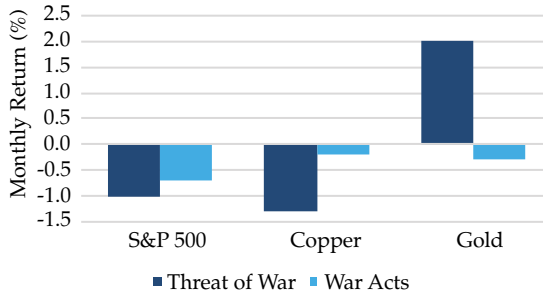
Note: Portfolios calculated for US dollar investors. REIT stands for real estate investment trust.
Source: Omar et al. (2017).

volatility, a small allocation, in the region of 1%–5%, to crude oil can be considered as an additional hedge.

The Curious Case of Gold as a Crisis Hedge

A traditional crisis hedge that so far has not been discussed much is gold. Klement (2014) and Erb and Harvey (2013) argued that gold is not a good crisis hedge, at least not if we are looking at correlations between gold and the Cboe Volatility Index (VIX) or gold and the S&P 500. In a recent study, however, Baur and Smales (2018) used the Geopolitical Risk (GPR) index that we encountered earlier as a way to measure the relationship between the price of gold and rising geopolitical risks. Unlike the VIX and the S&P 500, the GPR index is specifically designed to measure only geopolitical risks; it does not react to financial risks or other triggers of stock market angst.

Even so, Baur and Smales (2018) found no general correlation between the price of gold and the overall GPR index. They did find a significantly positive correlation between the price of gold and the threat of war. The GPR index can be split into two subindices—one measuring the threat of war based on news reports of political actions that might lead to war and one measuring actual acts of war, such as the invasion of one country by another. As **Exhibit 13** shows, both stock markets and cyclical commodities, such as copper, tend to decline when geopolitical risks increase. Gold, however, behaves differently. The price of gold tends to rally by 2% for every 100-point increase in the GPR index, but the price remains virtually unchanged once war breaks out.

Exhibit 13. Effect of a 100-Point Increase in the GPR Index

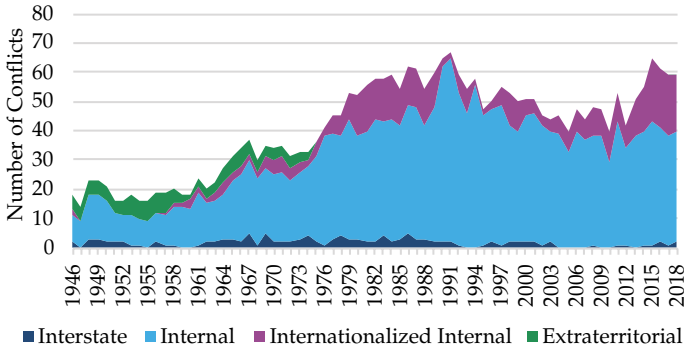
Source: Baur and Smales (2018).

Thus, the research of Baur and Smales (2018) indicates that gold is, indeed, a global safe haven that might protect against the rising risk of war. Gold prices seem to anticipate the risk of war, however, and rally as war becomes more likely. By the time wars break out, gold prices have seemingly incorporated the news already and show little reaction. With gold, it really seems to be a case of “buy on the rumor, sell on the fact.”

Terrorism and the Changing Nature of Armed Conflict

So far in this chapter, I have focused on international wars. Historically, however, such interstate wars have been only a small fraction of all the armed conflicts at any time. The UCDP has collected information about all armed conflicts globally since 1946 and categorized them into four major types, as shown in **Exhibit 14**:

- *Interstate conflicts*: The “traditional” wars between two sovereign countries that we have investigated so far.
- *Internal conflicts*: The classic civil wars and insurrections that remain within the boundaries of an individual country. On average, approximately two-thirds of all active conflicts at any time are such internal struggles.
- *Internationalized internal conflicts*: The internal conflicts in which either the government or the insurrection troops receive support from other international forces that actively participate in the armed conflict. The classic examples of this kind of conflict are the war in Iraq and the war in Afghanistan fought by US and allied troops together with government troops in the affected country in their struggle against terror organizations.

Exhibit 14. Number of Conflicts Worldwide

Source: UCDP.

- *Extraterritorial conflicts:* The conflicts between a government and an insurrection or rebel group that take place outside the territory of the government. In essence, these types are the colonial wars for independence in Africa, Asia, and Latin America. The last extraterritorial conflict ended in 1974.

Historically, internationalized internal conflicts have been rare, but they became significantly more common in the 1980s and then again after the 9/11 terrorist attacks. A key trigger for the first wave of internationalized conflicts was the increasingly assertive role that both the United States and the Soviet Union played in the 1960s–1980s. In those roles, they supported governments aligned with them (e.g., the United States in Vietnam and the Soviet Union in Afghanistan). Another important factor for the increasing internationalization of civil wars was the shift in tactics by Islamic rebel and terrorist organizations.

In Islam, as in almost all religions, suicide is forbidden. The holy Qur’an (4:29) states, “And do not kill yourselves [or one another]. Indeed, Allah is to you ever Merciful.” Moreover, Thabit Ibn Al-Dahak narrated that the Prophet Mohammed said, “Whosoever kills himself with anything in this world will be tortured with it on the Day of Judgement.” Yet beginning in the early 1980s, some militant organizations, such as Hezbollah during the Lebanese Civil War, resorted to suicide bombings as a means of psychological warfare and armed struggle. The tactic has been extremely difficult for government troops and police forces to prevent.

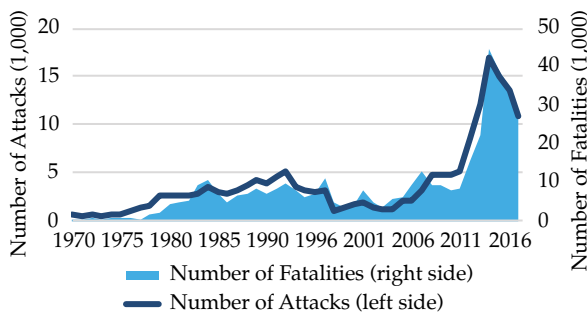
To justify suicide attacks, these extremist groups have redefined and misconstrued the meaning of such crucial terms as “jihad” (Hutchins 2017).

Jihad has a variety of meanings within Islam but is commonly translated in English as “struggle.” However, in keeping with Islam as a peaceful religion (the word Islam is rooted in the Arab word “salaam,” meaning “peace,” and the holy Qur’an uses the word salaam 129 times), the mainstream interpretation of jihad is to follow an internal struggle to fulfill God’s will. Yet Islamic extremists have redefined jihad to mean a violent struggle or “holy war” and to circumvent the prohibition of suicide in the holy Qur’an (Esposito 2015), framing the act of suicide bombing as an act of martyrdom. This misconstrued interpretation of jihad is used by extremist organizations to recruit followers and justify their acts of terror.

Exhibit 15 shows that the number of terrorist attacks began to rise significantly in the 1980s and with them rose the fatalities caused by terrorists. Of course, not all these terrorist attacks were performed by Muslim extremists, but the violence spread by Muslim terrorists was the most fateful insofar as it provoked a reaction by the local governments. In the Lebanese Civil War, for example, the local government was eventually forced to allow an intervention by US troops to help stop the violence—a decision that led to even more terrorist attacks by Hezbollah—on both local civilians and US troops. Thus, a vicious cycle was created in which overwhelmed local governments asked for military interventions by allied forces, which, in turn, led to more terrorist attacks and casualties among the international forces, and this escalation provoked, in turn, more intensive intervention by allied forces, and so on.

With the rise of Al Qaeda in the 1990s, terrorist organizations became increasingly well organized and well funded, which has allowed them to bring the struggle to the homeland of what they perceived to be Western invaders. The 1993 World Trade Center bombing might have been unsuccessful, but eight years later, the attacks of 9/11 proved to be the first successful attacks

Exhibit 15. Number of Terrorist Attacks and Casualties



Source: Global Terrorism Database. Retrieved from www.start.umd.edu/gtd.

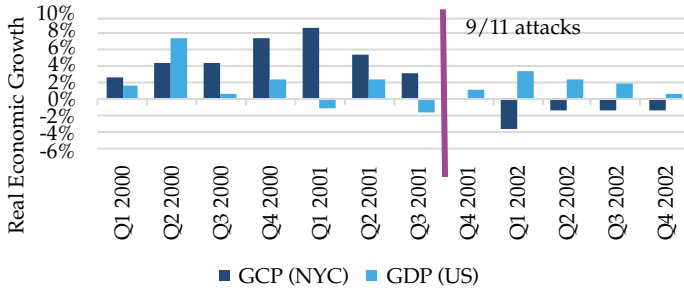
on the home soil of the United States since the 19th century. As Western forces ramped up the pressure on these next-generation global terrorist organizations, the terrorists intensified their efforts to spread their terror globally. Today, more than 10,000 terrorist attacks are conducted each year, most of them by Al Qaeda, the Islamic State (IS or ISIS), and other terrorist organizations linked to these two organizations, including al-Shabaab (associated with Al Qaeda) and Boko Haram (associated with IS).

Of course, global financial markets most of the time have not cared about terrorist attacks because the vast majority of such attacks happen in developing countries—hence, under the radar screens of most investors in the developed world. As a result, academic research on the economic and financial impact of terrorist attacks before 2001 was confined mostly to niche areas covering emerging markets. The watershed moment for the research in this area was the 9/11 terrorist attacks, which have been investigated thoroughly by now and triggered a rich literature on the impact of terrorist attacks on the economy and financial markets. So, to discuss what we have learned about terrorist attacks, I turn to this event.

Case Study: 9/11

If you wanted a terrorist attack to have the maximum impact, you could hardly have done any better than 9/11. At the time of the attacks, the US economy was already slowing down. Job creation was declining, and the unemployment rate was rising. The dot-com bubble had burst a year earlier, and many formerly high-flying investments were in free fall. Then, right in the middle of this softening economy, the terrorist attacks managed to hit the financial capital of the United States, wiping out most of the employees of the largest Treasury dealer in the country (Cantor Fitzgerald) and forcing the NYSE and the New York Mercantile Exchange to close for several days, thus reducing stock and commodity market liquidity dramatically. The total economic costs of the 9/11 attacks are generally estimated to be \$50 billion to \$100 billion (0.5%–1.0% of US GDP at the time); the lowest estimates come in at approximately \$35 billion and the highest estimates at approximately \$109 billion (Rose and Blomberg 2010).

At the time, many economists thought the attacks would push a fragile US economy into recession, but in fact, as **Exhibit 16** shows, growth in the United States accelerated from -1.7% in the third quarter (Q3) of 2001 to $+1.1\%$ in Q4 (with quarterly changes stated as annualized rates, as is the custom). But although the nation overall did well, the epicenter of the attacks, New York City, suffered a strong decline in economic output. The growth of the Gross City Product (GCP) of New York City was zero in Q4 2001 and

Exhibit 16. Economic Growth around the 9/11 Attacks

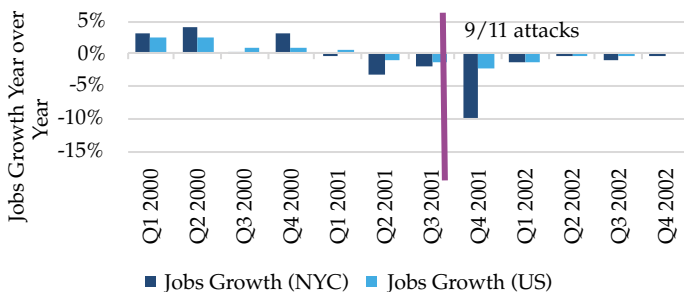
Source: Office of the Comptroller of New York City.

dropped sharply to -3.6% annualized in Q1 2002 as the loss of businesses unfolded.

The biggest impact for the city of New York was the loss of jobs as a result of the destruction of many businesses in downtown Manhattan. Payroll jobs growth fell off a cliff in Q4 2001 because of the terrorist attacks, as shown in **Exhibit 17**, significantly diminishing the city's tax revenues.

What kept the US economy afloat (relatively speaking) was the quick reaction by both the Federal Reserve and the US government (Makinen 2002). Immediately after the attacks, the Federal Reserve issued a crucial statement to reassure markets that the central bank was operating as normal and that the discount window was available to any bank that needed liquidity. This statement immediately calmed down financial markets and prevented a liquidity crunch.

Additionally, the Federal Reserve immediately started to buy Treasuries in the open market, thereby injecting \$100 billion in liquidity per day in the

Exhibit 17. Payroll Jobs Growth around the 9/11 Attacks

Source: Office of the Comptroller of New York City.

three days following the attacks. On top of that, the Federal Reserve coordinated with central banks in Europe, Canada, and Japan to support the US dollar. In this way, another \$90 billion was injected into the currency markets.

Nevertheless, the cash system suffered some disruptions. All flights were grounded across the United States for several days, which meant that some regional banks were at risk of running out of cash because banknotes could not be delivered from the regional branches of the Federal Reserve. Luckily, flights were restored in time to prevent any significant disruptions in cash transactions.

The medium-term effects of the terrorist attacks were mitigated by the Federal Reserve's 0.5 percentage point rate cut on 17 September 2001, the day the NYSE reopened, and again on 2 October 2001. An additional 0.25 point cut was enacted by the end of 2001. Arguably, these rate cuts were motivated not only by the terrorist attacks but also by the slowing economy. Regardless, cutting the federal funds rate from 3.5% in August 2001 to 1.75% at the end of 2001 certainly helped prevent the terrorist attacks from causing more extensive economic damage than they did.

The second pillar of the policy reaction to the 9/11 attacks was a set of US government fiscal stimulus measures designed to prevent household consumption from faltering. At the time, a major concern for policy makers was that consumer confidence would be severely hit by the terrorist attacks, causing households to curb consumption. As I will discuss later, one of the key characteristics of terrorist attacks is to trigger a decline in consumer confidence.

Immediately after the attacks, the federal government authorized \$40 billion in emergency funds to help with the relief efforts. In January 2002, the tax cuts of 2001 initiated by President George W. Bush were phased in as planned, which increased the federal budget deficit by an additional \$31 billion in 2002. Finally, six months after the terrorist attacks, Congress enacted a stimulus bill that extended unemployment benefits and allowed for accelerated depreciation of business investments. This stimulus bill increased the federal budget deficit by another \$50 billion in 2002 (Makinen 2002).

We know today that the fiscal stimulus matched or even exceeded the total economic costs of the terrorist attacks and thus helped overcome their medium- to long-term economic impact. Yet if policy makers had known back then what we know today about the impact of terrorist attacks on consumer sentiment and consumer behavior, the fiscal response would probably have looked different. The fiscal packages were deployed after much delay and were not focused on the regions that were hit the hardest. Much of the impact of the stimulus measures was lost because of this scattershot approach.

The impact of the terrorist attacks was felt particularly by four segments of the US economy—airlines, insurers, agriculture and the food industry, and small businesses:

- *Airlines.* Among the hardest hit industries was the airline business. The industry was already incurring losses in the first half of 2001 as a result of the slowing economy. The grounding of all flights immediately after the attacks and the subsequent reluctance of many people to fly dramatically worsened the financial situation of most US airlines. On 22 September 2001, the federal government granted airlines an aid package of \$15 billion, \$5 billion of which was paid directly to the airlines to cover the indirect losses emerging from the attacks in New York City and Washington, DC, such as lost passenger revenues because of grounded flights. The remaining \$10 billion was made available as government-guaranteed loans. The vast majority of these loans, however, were never issued to the airlines. Despite this aid package, the financial situation of many airlines worsened dramatically. US Airways entered Chapter 11 bankruptcy protection on 11 August 2002, followed by United Airlines on 9 December 2002. The only US airline that remained profitable throughout 2001 and 2002 was Southwest Airlines, though the company suffered a 53% drop in net income in 2002 from the previous year.
- *Insurers.* Until the 9/11 terrorist attacks, most insurance contracts covered damages from terrorist attacks. As a result, insured losses of the event amounted to more than \$40 billion. But the main issue for insurers was not so much the direct costs of the attacks but their inability to calculate appropriate insurance premiums in the aftermath. Because of the lack of historical data, insurers and reinsurers could not calculate premiums that would adequately cover the risk and potential damages of a future terrorist attack. Most reinsurance contracts are underwritten on a calendar-year basis, so many insurance companies were unable to reinsure potential losses from terrorist attacks starting in 2002. Reinsurance companies would either deny coverage or ask for premiums that were so high as to be unaffordable. As a result, insurance companies petitioned their state regulators to allow them to drop coverage for terrorist attacks. In most states, insurance contracts now exclude terrorist attacks from coverage if damage exceeds \$25 million, if the insured has more than 50 fatalities, or if the attack involves nuclear, biological, or chemical weapons.
- *Agriculture and the food industry.* These businesses were also hit hard by the terrorist attacks because in the aftermath, all ports of entry on the borders to Canada and Mexico were shut down, which endangered

perishable food items. Even after the borders reopened, inspections were much tighter than before, leading to longer wait times and higher spoilage. The situation escalated dramatically with the anthrax mail attacks that started in October 2001. These attacks demonstrated how vulnerable the US food system could be to bioterrorism. In reaction to these events, the federal government stepped up its inspection activities. The US Food and Drug Administration hired an additional 400 employees to inspect imported food, and the Animal and Plant Health Inspection Service of the US Department of Agriculture (USDA) hired an additional 350 inspectors and 20 veterinarians to help process imports at the borders. Additionally, the USDA's Food Safety and Inspection Service employees were put on high alert to watch for signs of bioterrorism.

- *Small businesses.* Finally, the hardest hit segment of the economy was small businesses located at or around the centers of attack. The attacks disrupted or destroyed more than 18,000 small businesses, most of them located near the World Trade Center in New York City. Because small businesses tend to have few cash reserves, a significant disruption such as the 9/11 attacks can quickly become life threatening for them. The US Small Business Administration reacted to the terrorist attacks by increasing its staff in New York City and Maryland and by offering emergency loans. Within a year, more than 5,000 loans totaling \$435 million were made to businesses in downtown Manhattan and more than 100 loans for a total of \$16.6 million had been made to businesses in and around Ronald Reagan Washington National Airport. Nevertheless, loans were made slowly, and the bureaucratic hurdles associated with them meant that many small businesses believed they did not get the assistance they needed.

The Impact of 9/11 on Financial Markets

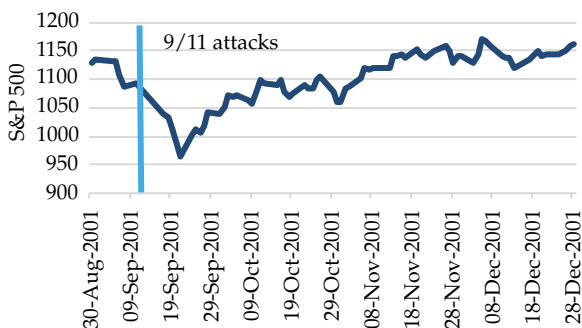
Despite the shortcomings of some of the fiscal and monetary policy measures taken after the 9/11 attacks, the responses were effective overall, both in preventing a major disruption of the US economy and in avoiding a lasting impact on financial markets. The US dollar did start to weaken in the aftermath of the 9/11 attacks—despite the purchases of central banks around the world. Three days after the attacks, the US dollar was down more than 3% on a trade-weighted basis. Remember, however, that the US economy was already in recession at that time (the National Bureau of Economic Research later determined that the recession had started in March 2001, six months before the attacks) and that the weakness in the US dollar was likely more

a reflection of the economic slowdown and the significant rate cuts by the Fed than a general concern about the dollar as a safe haven. In fact, later terrorist attacks around the world all showed that the 9/11 attacks did not make a dent in the perception of the US dollar as the world's reserve currency and of Treasuries as the world's ultimate safe-haven asset.

Because of the (relatively) quick and effective response to the terrorist attacks, stock markets around the globe also quickly recovered their losses. **Exhibit 18** shows the S&P 500 around the time of the 9/11 attacks. The NYSE remained closed for four days following the attacks, but the S&P 500 still dropped 4.8% on the day the exchange opened again. Yet only 19 days were needed for the index to recover all its losses. The DJIA was harder hit than the S&P 500 by the events of 9/11 because of its larger allocation to airlines and the aircraft manufacturer Boeing. The immediate drop of the DJIA was 7.1%, which increased to more than 10% after a week. Nevertheless, after 40 days, the DJIA also had recovered its losses.

An interesting question to ponder is how international markets reacted. Unlike the NYSE, international markets did not close and thus had to digest the news in real time. One would assume that financial markets in countries that are likely to be terrorist targets or that have a high share of exporters that are hit by the disruption in international trade and flights would have suffered big losses and taken a long time to recover. Chen and Siems (2004) showed, however, that reactions of international stock markets to the 9/11 attacks were all over the place, with seemingly no correlation between the size of the local stock market's drop and the structure of the market. They did find a tentative correlation between the structure of the financial services industry in the local market and the drop (i.e., countries with more robust and better developed banking markets suffered less), but the evidence the authors presented

Exhibit 18. S&P 500 around the 9/11 Attacks



Source: Bloomberg.

is weak. For instance, the United Kingdom has one of the deepest and most liquid banking systems in the world, but both British financial stocks and the Financial Times Stock Exchange (FTSE) 100 Index dropped more than their US counterparts in the aftermath of 9/11 and took longer to recover. Furthermore, keep in mind that the major central banks coordinated their efforts to supply liquidity in the days following the attacks, a fact that further complicates the assessment of the international impact of the 9/11 attacks.

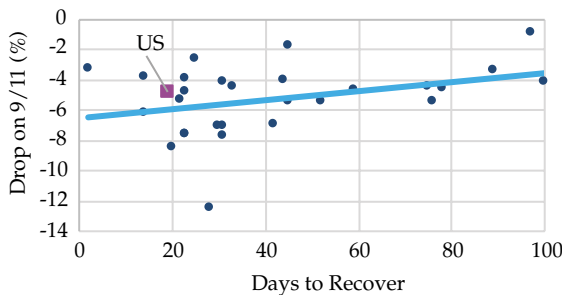
Finally, **Exhibit 19** shows an inexplicable result: On average, markets that suffered more on the day of the attacks recovered their losses more quickly than markets that suffered less. In fact, US stock markets suffered losses that were in line with the global average but were among the first to recover, even though the US economy and US capital markets were the ones hit by the attacks.

To my knowledge, no studies have been undertaken to systematically investigate the international spillover effects of the 9/11 attacks and the relationship of 9/11 to local stock market performance. What has been done in the years since the attacks, however, is a systematic analysis of the impact of terrorist attacks in general.

The Impact of Terrorist Attacks on an Economy

The attacks of 9/11 launched an intense research effort into the economic causes of terrorism, the reaction of governments to terrorism in the form of counterterrorism measures, and the impact of terrorism on society. This research was recently summarized by Gaibullov and Sandler (2019). The economic consequences of terrorist attacks are only one dimension of the big picture. Although the writings on the economic causes of terrorism and the costs of counterterrorism are particularly important for analysts covering

Exhibit 19. The International Impact of 9/11



Source: Chen and Siems (2004).

individual stocks in the defense and security sector, those findings are beyond the scope of this book. So, I focus here on the macroeconomic and financial market reactions that are relevant to all investors.

The main result of the studies on the macroeconomic impact of terrorist attacks is that, in general, the impact is small and transitory. Blomberg, Hess, and Orphanides (2004) found that if a country experienced transnational terrorist attacks, the effect on GDP per capita was a statistically significant but small reduction of 0.048% per year. Tavares (2004) found a similarly small growth impact of 0.029%–0.038%, depending on the specification of the economic test. These numbers indicate that terrorist attacks generally are not able to derail an economy, but there are significant exceptions to this generality to keep in mind.

Blomberg et al. (2004) showed that large economies, such as the United States and most Western European countries, are much less affected by terrorist attacks than small economies, which suffer more from terrorist attacks, as do less developed countries. In regional regressions, they found that African countries suffered growth impacts that were approximately ten times worse than those seen by countries in the Organisation for Economic Co-operation and Development and that Asian economies suffered GDP declines that were approximately three times worse.

Unfortunately, as Sandler and Enders (2008) pointed out, no studies have investigated the differential impact of terrorist attacks on developing and developed countries. In the Blomberg et al. (2004) study, the Asian economy sample included both developed Asian economies, such as Japan, and developing economies.

The African countries were all emerging markets, however, so you can infer from the strong negative effect that emerging markets are likely to be most severely hit by terrorist attacks. This effect makes sense intuitively because these developing nations, unlike developed countries, often have a less developed monetary system. Given the example of the need for rapid monetary and fiscal stimulus after the 9/11 attacks, developing countries are at a disadvantage in deploying emergency measures to dampen the macroeconomic effects of terrorist attacks.

Investors should also be aware that terrorist attacks are isolated events in most countries. Some countries, however, such as Israel, have suffered from prolonged and persistent terrorist activities. Eckstein and Tsiddon (2004) looked at the macroeconomic impact of Palestinian terrorist attacks in Israel and estimated that the country's GDP per capita growth per year could be approximately 2.5% higher if all terrorist activities ceased. They also estimated the likely impact of the Second Intifada, which started in September

2000. In the three years that the researchers covered (the Intifada eventually lasted until February 2005), they estimated it had cost the Israeli economy approximately 10% of GDP.

Abadie and Gardeazabal (2003) focused on the Basque Country in Spain, which was under constant threat from the ETA terrorist organization (for *Euskadi Ta Askatasuna*, meaning “Basque Country and Freedom”) in the 1980s and 1990s. They found that over a 20-year period, the GDP per capita of the Basque Country was approximately 10% lower than in a counterfactual scenario without terrorism. This finding indicates that prolonged terrorist activity in a small economy can have effects similar to those of a war and reduce GDP by double digits.

As in the case of the 9/11 attacks, several industrial segments are particularly vulnerable to terrorist attacks—in particular, segments that require foreign direct investment and tourism:

- *Foreign direct investments* (FDI). Outside investment in a country tends to be significantly negatively affected by terrorist attacks because foreign investors consider the country riskier than elsewhere. Furthermore, the expected return on investment in a country that suffers regular terrorist attacks is lower than elsewhere. Large businesses in large open economies tend to reallocate their investments from troubled to calmer countries. Although this effect is generally small, it can be 5% of the GDP of the recipient country in the case of a small economy experiencing a significant increase in terrorist activity (Gaibulloev and Sandler 2019). Sandler and Enders (2008) estimated that a single terrorist attack in Spain causes net FDI to drop by approximately \$23.8 million. Transnational terrorism in Spain reduced FDI by approximately 13.5% per year. For Greece, they found similar effects. In their estimate, transnational terrorism reduced FDI in Greece by approximately 11.9%. In these cases, local businesses that relied on foreign investments (e.g., industrial companies that are part of global supply chains) could suffer severe declines in revenues and investment activity.
- *Tourism*. The tourism industry can also be hit significantly by terrorist attacks, though (surprisingly) the empirical evidence is mixed. The impact of terrorist attacks is not immediately visible because tourists typically take time to revise their vacation plans, but the effect can be substantial. The biggest decline in tourism manifests itself after two to five quarters. The impact on the tourism industry can also be measured in neighboring countries because tourists tend to avoid the entire region rather than a single country. In reaction to declining bookings, however, both airlines

and tourism companies quickly provide rebates for vacations in affected countries so that the negative effect on tourism tends to be short-lived. These rebates might also explain why some countries (in particular, Spain, Greece, and Austria) show significant lasting effects on tourism, whereas others (e.g., France and Denmark) do not.

The Main Victim of Terrorist Attacks: Sentiment

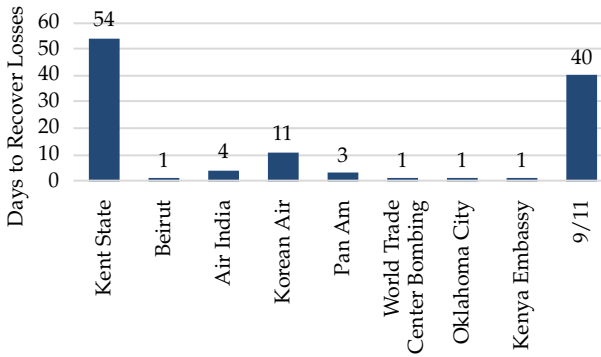
Terrorist attacks are as much a means of causing fear as they are a way to destroy buildings and infrastructure. One of the main aims of terrorists is to shake the confidence and feeling of security of everyday people. In the equation in Chapter 1 for the present value of financial assets, terrorist attacks should increase the risk premium on stocks and bonds and thus reduce their price. Furthermore, a general feeling of uncertainty should keep people from consuming more and thus hurt the economy through that channel.

Drakos and Kallandranis (2015) measured the impact of terrorist attacks in the European Union on macroeconomic sentiment indicators. Looking at 604 terrorist incidents between 1985 and 2009, they found that overall economic sentiment indices declined significantly in the aftermath of a terrorist attack. They found no significant impact of terrorist attacks, however, on manufacturing, service, or construction sentiment indicators. The entire decline in economic sentiment was concentrated in “consumer sentiment.” But terrorist attacks are estimated to have reduced consumer sentiment indicators by approximately 1.88 percentage points in the years since the 9/11 attacks—a small effect that, furthermore, does not translate into a significantly negative impact on consumption.

In short, the research on the impact of terrorism on consumer sentiment has shown that the decline in consumer sentiment tends to be transitory and typically does not constitute a significant threat to consumption and economic growth. No wonder that the causality between terrorism and economic growth tends to be stronger in one direction than the other. Low economic growth typically causes an increase in the risk of terrorist activity, but increased terrorist activity does not always causally affect economic growth (Meierrieks and Gries 2013).

Because terrorist attacks affect the risk premium of stocks and bonds but generally do not have lasting macroeconomic effects, the stock market reaction to terrorist attacks also tends to be transitory. **Exhibit 20** shows the time needed for the US stock market (measured by the S&P 500) to recover its losses from certain disruptive events. Since the 1960s, most terrorist attacks in the United States have caused only intraday swings; the stock market recovered its losses within one trading day. The attacks of 9/11 and the Kent State

Exhibit 20. Impact of Terrorist Attacks on US Stocks



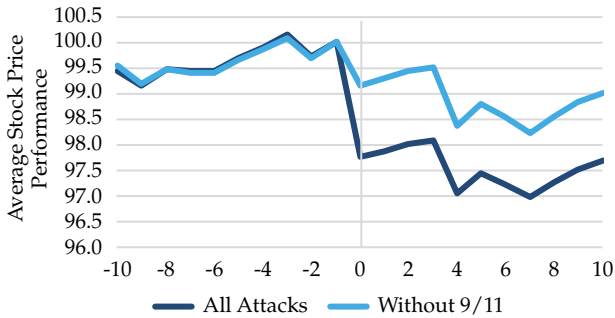
Source: Chen and Siems (2004).

shootings of 1970, both of which happened during a prolonged bear market, took longer for a market recovery. The other outlier was the Korean Air bombing on 30 November 1987, a few weeks after the October 1987 stock market crash.

In essence, we can conclude that in normal times, terrorist attacks cause only small declines in stock markets, and the declines are recovered within a few days. Hence, investors should typically consider terrorist attacks a buying opportunity (cynical as this might sound). The recovery seems to take longer if terrorist attacks hit when investor sentiment is already depressed as the result of a bear market or other factors. Even then, however, the impact is usually digested within a few weeks or months.

The size of the market correction after a terrorist attack also tends to be small. **Exhibit 21** shows the average stock performance in the days after a terrorist attack. For this chart, Karolyi and Martell (2010) did not look at aggregate stock indices but instead at companies directly affected by individual terrorist attacks. They examined a sample of 75 global companies that were directly hit by terrorist attacks; many of them were oil companies, such as Royal Dutch Shell and BP, or international consumer companies, such as Coca-Cola, operating in developing countries—for example, Colombia and Nigeria. The authors found that, on average, the share price of affected companies lost 0.83% on the day of the attack, for a drop in market value of \$401 million. But the losses were typically recovered quickly, and within a few weeks, share prices were back to preevent levels.

Analyzing stock market aggregates and indices, Nikkinen and Vähämaa (2010) found that the UK FTSE 100 Index experienced a significant decline in returns of approximately 0.2% on the day of a terrorist event. Unsurprisingly,

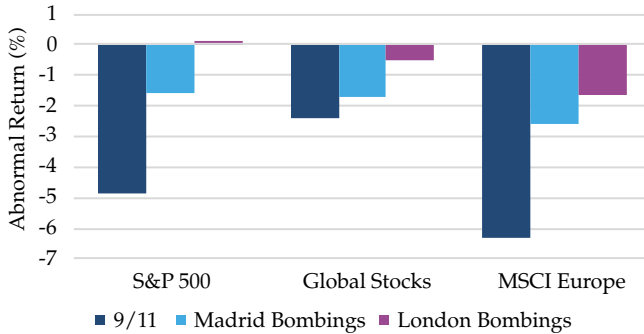
Exhibit 21. Average Stock Behavior 10 Days Before/After Terrorist Attacks

Source: Karolyi and Martell (2010).

the volatility of the FTSE 100 also increased a bit (approximately 0.2 percentage points), and the distribution of returns became more skewed to the downside and more fat tailed. An international study by Chesney, Reshetar, and Karaman (2011) showed a similar sized return impact—on the order of 0.2%–0.4% for global stock markets. US markets tend to suffer less than European markets after terrorist attacks, even if the attacks happen in the United States.

From a sector and industry perspective, the study by Chesney et al. (2011) does not provide any surprises. The industries that tended to be most adversely affected in their sample were airlines, insurance companies, and banks; the defense companies, pharmaceutical companies, and commodity producers tended to rally. Keep in mind, however, that just like wars, most terrorist attacks do not trigger a statistically significant stock market response. For example, in the case of the FTSE All World Index, only 30 out of 77 days with terrorist attacks had a significant negative impact, and of those 30 days, only 15 were considered extreme.

Nevertheless, in some circumstances, terrorist attacks can have a large and persistent impact on stock markets. As discussed, countries that experience frequent and long-lasting terrorist attacks, such as Israel, suffer significant economic damages. Arin, Ciferri, and Spagnolo (2008) found a larger impact of terrorist attacks for Indonesia and Turkey than for the United Kingdom. Eldor and Melnick (2004) looked at the impact of the persistent terrorist attacks in Israel with a special emphasis on the Second Intifada that started in 2000. By comparing the development of the Israeli Tel Aviv 100 Index (by now the Tel Aviv 125 Index), which was affected by the Intifada, with the S&P 500, which was not, they estimated that the terrorist attacks

Exhibit 22. Market Habituation to Terrorist Attacks

Source: Chesney et al. (2011).

caused the Israeli stock market to be approximately 30% below the level it would have been without terrorism. They also found that Israeli stock markets reacted more to terrorist incidents that caused fatalities than to those that did not and that stock markets did not become accustomed to terrorist attacks; that is, the reaction remained the same even after several attacks.

This last finding is in contrast to a series of studies on stock market reactions to terrorist attacks that show a habituation effect. In essence, investors become accustomed and desensitized to terrorist attacks. For a terrorist attack to have the same stock market impact as a previous one, it needs to be more destructive. Chesney et al. (2011) showed this effect nicely in the series of three major Al Qaeda terrorist attacks in the West. **Exhibit 22** shows that the 9/11 attacks in New York City and Washington, DC, caused US stock markets to decline by almost 5% on the day and caused European markets to drop even more. The Madrid train bombings on 11 March 2004 caused a decline of only 1.5% in the United States and 2.6% in Europe, and these losses were recovered within a week. Finally, the London bombings on 7 July 2005 caused merely an intraday swing in the US markets and a 1.6% decline in European stocks, which was recovered within two days.

Conclusions

Both wars and terrorist attacks tend to have only a transitory impact on financial markets, but clear exceptions test that tendency. The macroeconomic impact of wars tends to be significantly bigger in small economies and developing countries that cannot digest the negative effects of war as easily as large, open economies—such as that of the United States—can. More importantly, wars that are fought on a country's home territory are usually more devastating

for the countries involved. As a result, extended wars on home turf are often very negative for stock markets at the onset of the war. As domestic wars progress, however, governments are typically forced to print money to pay for the war effort, causing a significant spike in inflation, which in turn benefits real assets, such as stocks, but destroys the value of the currency.

Foreign wars, in contrast, tend to have only a minor effect on stock markets, one seemingly driven by the increase in defense spending of the participating countries. As a result, foreign wars act like a fiscal stimulus program geared toward the defense industry.

Investors also need to be aware that financial markets react differently to, on the one hand, wars that slowly build up with an extended prewar period and, on the other hand, wars that happen suddenly. The anticipation of a war tends to depress stock markets and leads to a downward shift in government bond yields. Gold and oil prices often rally in anticipation of a geopolitical crisis, such as a war. At the onset of war, these effects are frequently reversed, and a short-term stock market rally occurs while gold prices stall. This reaction is in contrast to the effect of sudden wars, which typically depress stock markets and lead to a classic flight to safety, with government bonds rallying and all kinds of risky assets suffering.

Because terrorist attacks cannot, by definition, be anticipated, stock market reactions to such attacks tend to be initially negative, except for countries that suffer from extended periods of frequent terrorist attacks (e.g., Israel). However, the macroeconomic impact of terrorist attacks is vanishingly small. Thus, stock markets generally recover quickly after terrorist attacks, and the only lasting impact tends to be on the microeconomic level. Some industries, such as the travel and insurance industries, suffer sustained negative effects, while others, such as the defense, pharmaceutical, and commodity-related industries, typically gain.

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