Assessing the Cost of Terrorism

On the Impact of Terror-News on the German Economy

by
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Measuring the cost of terrorism is never an easy task–even when restricted to the narrow realm of economic costs. Nevertheless, a growing literature is producing evidence that acts of terror bear significant economic costs in addition to the suffering and uncertainty that is commonly associated with terrorism. In a recent survey, Frey et al. (2004) discuss a small but growing number of empirical studies that report results along these lines for specific areas such as tourism, foreign direct investment, domestic investment, stock markets, foreign trade, and general economic activity. Other papers focus on the repercussions for fiscal policy and the insurance sector. As a rule, this literature is concerned mainly with the effects of terrorism on economic activity within the country where an act of terror occurs.

Less is known, however, on the effects of terrorism on third countries—and in this sense the current literature might underestimate the negative consequences of terrorism on a global scale. There are at least two ways through which third countries might be affected. A first effect works through trade. For countries trading with a region hit by a significant act of terrorism any negative shock to overall real activity in the partner economy is, for instance, likely to imply a reduction in exports and, thus, domestic production and employment. This, obviously, is more important when the country directly exposed to terror activity is an important trading partner and when exchange rate movements work in the same direction–for instance, an appreciation of the domestic currency vis-à-vis the directly affected country (or, more generally, an overall increase in exchange rate volatility) would further lower exports. And, indeed Nitsch and Schuhmacher (2004), looking at bilateral trade flows between more than 200 countries over the period from 1960 to 1993 within an augmented gravity model framework, find evidence that terrorist actions reduce the volume of trade; a doubling in the number of terrorist incidents is associated with a decrease in bilateral trade by some 4 percent.

The globalization of capital markets might also add to the transmission of the costs of terror. A terrorist attack has the potential to influence stock and bond markets in the directly affected country, for example, by decreasing stock prices and increasing bond yields. If the country is large in economic and financial terms, this might send ripples throughout the global markets. Depending on the ownership structure, there could also be more direct effects. Studying the impact of terrorist events (as well as military invasions) on a number of capital markets, Chen and Siems (2004) conclude that terrorist attacks have indeed the potential to affect financial markets on a global scale, even though the resilience in particular of the U.S. capital markets to absorb such events seems to have been increasing in recent years.

This paper provides evidence that third countries are indeed affected by international terrorism. Starting point is a unique data set from **Media Tenor** that
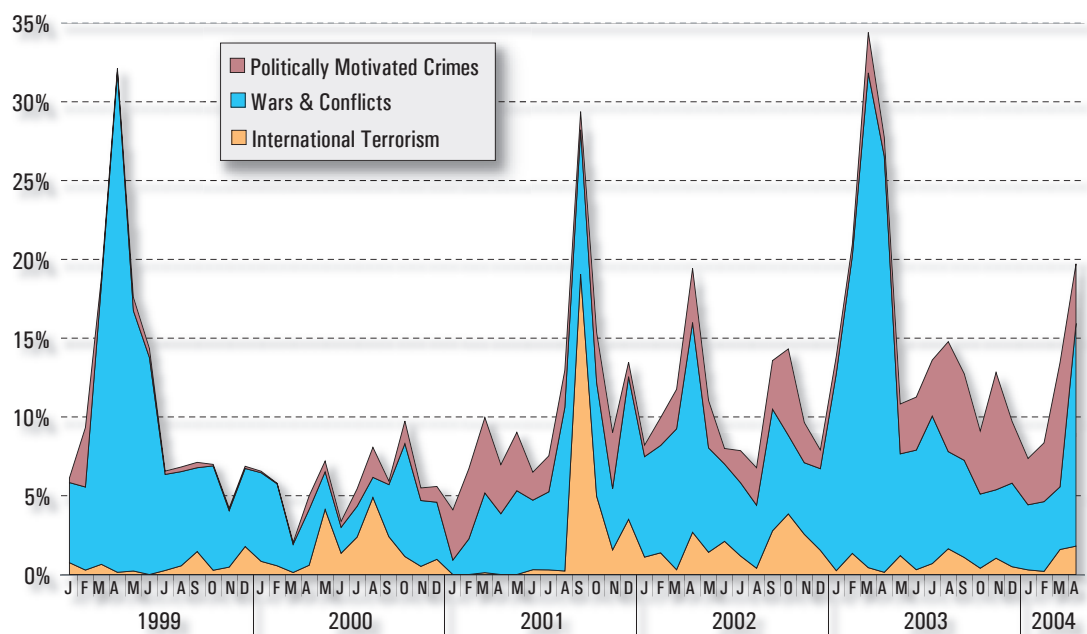

Figure 1: Terror News data — Source: Media Tenor; own calculations

measures the intensity of media coverage of terrorist events in Germany. Figure 1 reports the number of news reports on terror-related activities broadcasted on major German television networks in four of the more important nationally broadcasted news shows–**ARD Tagesschau**, **ARD Tagesthemen**, **ZDF Heute, ZDF Heute Journal**–relative to all news reports covered. The news reports have been classified based on content into three categories: (i) international terrorism, (ii) war and conflicts, and (iii) politically-motivated crimes. The sample period extends from January 1999 until April 2004, thus, including the events of September 11, 2001. The original information is collected on a daily basis but was transformed into monthly frequency to match our economic data.

Figure 1 shows that reporting on wars and conflicts is more frequent than on politically motivated crimes and international terrorism, but news falling into the latter two categories visibly add to the variance of the aggregate. Even though there is no systematic correlation between the three series (no correlation coefficient exceeds 0.15), there are indications that all three react to events such as September 11, 2001 and the military conflicts in Afghanistan and Iraq.

While the media data obviously reflects real-world events (for instance, the military conflicts in Kosovo, Afghanistan, Iraq, as well as the September 11 attacks are all notable in Figure 1), they have a number of advantages over event-based measures of terrorist activity when it comes to third country effects. Third countries, by definition, do not directly suffer from these events. They might, however, be affected through trade and global capital market effects. The likelihood of such indirect effects should be reflected in the media attention given to these events. Thus, terrorist events are likely to capture a larger share of the news when they occur in a country that, from a strictly national perspective, is more important in terms of trade and financial market size.

Moreover, using media data as an indicator might allow us to establish another third-country effect of international terrorism working through expectations. When terror news gets more frequently reported in major newscasts, this could have a dampening effect on the general sentiment of agents in the economy. And indeed, as we will discuss in some detail below, there is reason to believe that business cycle expectations play an important role in explaining the impact of terror on third countries.

A first approach to gauge the impact of terror events on the German economy is based on a standard VAR approach including German monthly real industrial production (monthly year-on-year growth), the DAX stock market index (level), and ifo business climate expectations, a forward-looking indicator or real activity, as well as–as a first step–the sum of all news reports on wars and conflicts, politically motivated crimes, and international terrorism in percent of overall news (see Figure 1). The VAR allows a dynamic description of the data by explaining each economic variable by its past, developments in terror news, and developments in all other economic variables. The evolution of terror news is modeled as an exogenous AR-process that depends only on its own past values and is independent from economic variables. In addition, the euro-dollar exchange rate and the oil price (in U.S. dollar) are included as endogenous variables, allowing, among other things, for indirect effects of terror news through the exchange rate channel. Selection of the general lag structure of the model is based on likelihood ratio tests.

The top panel of **Figure 2** shows that a terror news shock–that is, an increase in terror news that is not predicted by the model–has negative immediate effect on industrial production after the impact period that remains significant for almost a full year. Moreover, we also find significant, yet somewhat more short-lived, negative effect on the ifo business expectations indicator and the DAX stock market index, with both series' rebounding into after about half a year. The latter two results are relevant for the overall impact of terror news on real activity because of business expectations and, to a lesser degree, the DAX impact industrial production (middle and lower panel, Figure 1). In other words, there is room for indirect effects of terror news on real activity working through financial markets and business sentiment. There is only very weak evidence for indirect effects operating through the exchange rate channel (or oil prices, for that matter).

A more detailed analysis reveals that the immediate effects as well as the indirect effects of the composite "all terror news" indicator is mostly driven by news on international terrorism and news on war and conflicts, while politically motivated crimes hardly matter for either industrial production, DAX or ifo expectations. It is also interesting to note that international terror news has by far the shortest impact lag, while news on wars and conflict affect, for instance, industrial production only with some delay.

A problem with the symmetric VAR model might be that it is inefficient in econometric terms and interpretation of individual equations and coefficients is

Figure 2: Impulse-responses in VAR model using All-Terror-Related News
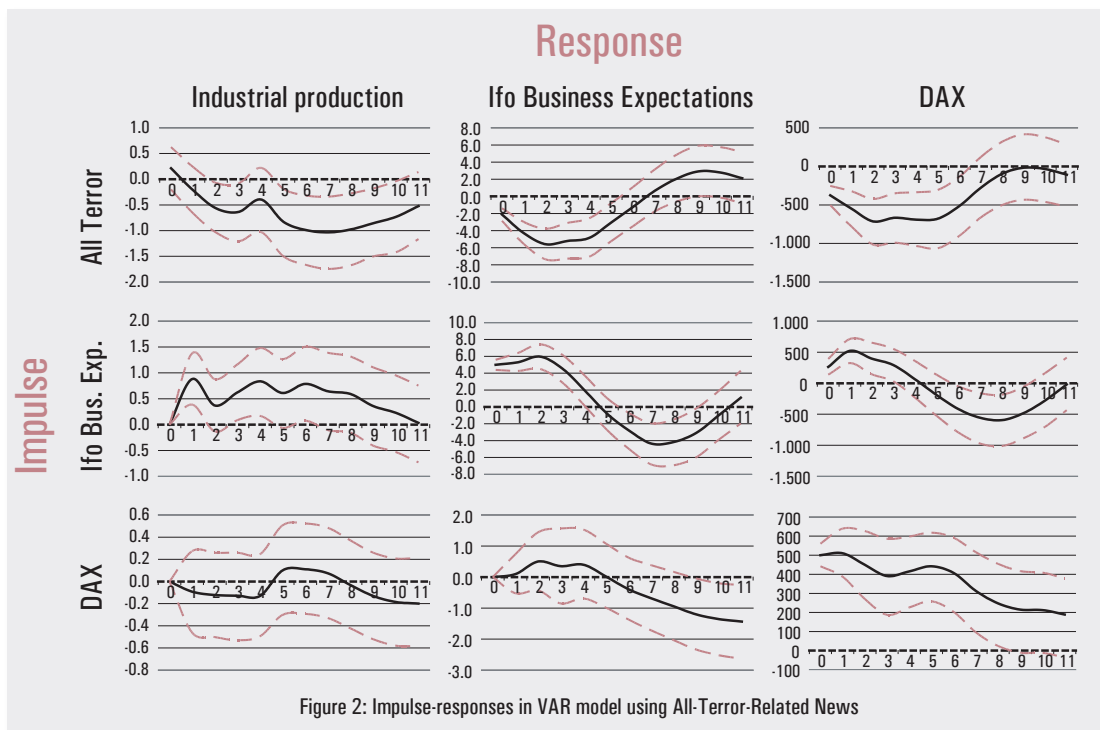
difficult. Condensing the model in a number of ways - including by focusing exclusively on international terror news and treating the exchange rate and oil prices as strictly exogenous variables; the lag structure is determined by the final prediction error, with a minimum lag length of one month - we can conduct a number of controlled counter-factual experiments to better gauge the economic impact of terror news on the German economy.

Reducing the number of channels through which terror news might influence the economy compared to the symmetric VAR yields a conservative estimate of the impact of terror news on the economy. Nevertheless, the basic results continue to hold. In particular, based on a maximum likelihood estimate of the condensed model, we find that the indirect channel working through the impact of terror news on business expectations (and the impact of expectations on industrial production) continues to be important.

Just how important are news on international terrorist activity in the German context? An illuminating thought experiment is to assume no increase of terror news from September 10, 2001 onward - that is, pretending that neither the September 11 attacks nor any other additional terrorist activity past September 11 happened. Basing our simulations on the condensed model, we find that real industrial production would have been higher by about 4 billion euro. That is, overall production would have been higher by an accumulated ¼ percent (or somewhat less than

¾ percent of average annual production) in the counterfactual world without terrorist activity during this period. A similar exercise based on the symmetric VAR model yields somewhat higher figures (0.8 percent of overall production or 2.2 percent of average annual production), stressing the conservative nature of the results stemming from the condensed model.

There is no straightforward way to translate the above results based on industrial production into GDP terms (German statistics do not offer a monthly GDP series), but the estimates above are probably close to the upper limit in this regard. A simple back-of-the-envelope calculation can provide some orientation. Industrial production contributes roughly one-third of overall GDP. If other GDP components, namely services, were completely independent of changes in manufacturing, the cumulated terror-induced losses from the thought experiment discussed above would amount to some ¼ to ¾ percentage point of average annual GDP. On the other hand, with industrial production known to effectively lead the German business cycle, the actual effects of terrorist activity on GDP are likely to be higher.

Even the most careful econometric assessment of the economic cost of terrorism should be taken with a pinch of salt, and the present exercise is no exception. The estimated effects are statistically significant and, while not exceedingly large, obviously relevant in economic terms. It would seem that, when it comes to terrorism, the proverbial bystander is also affected.

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