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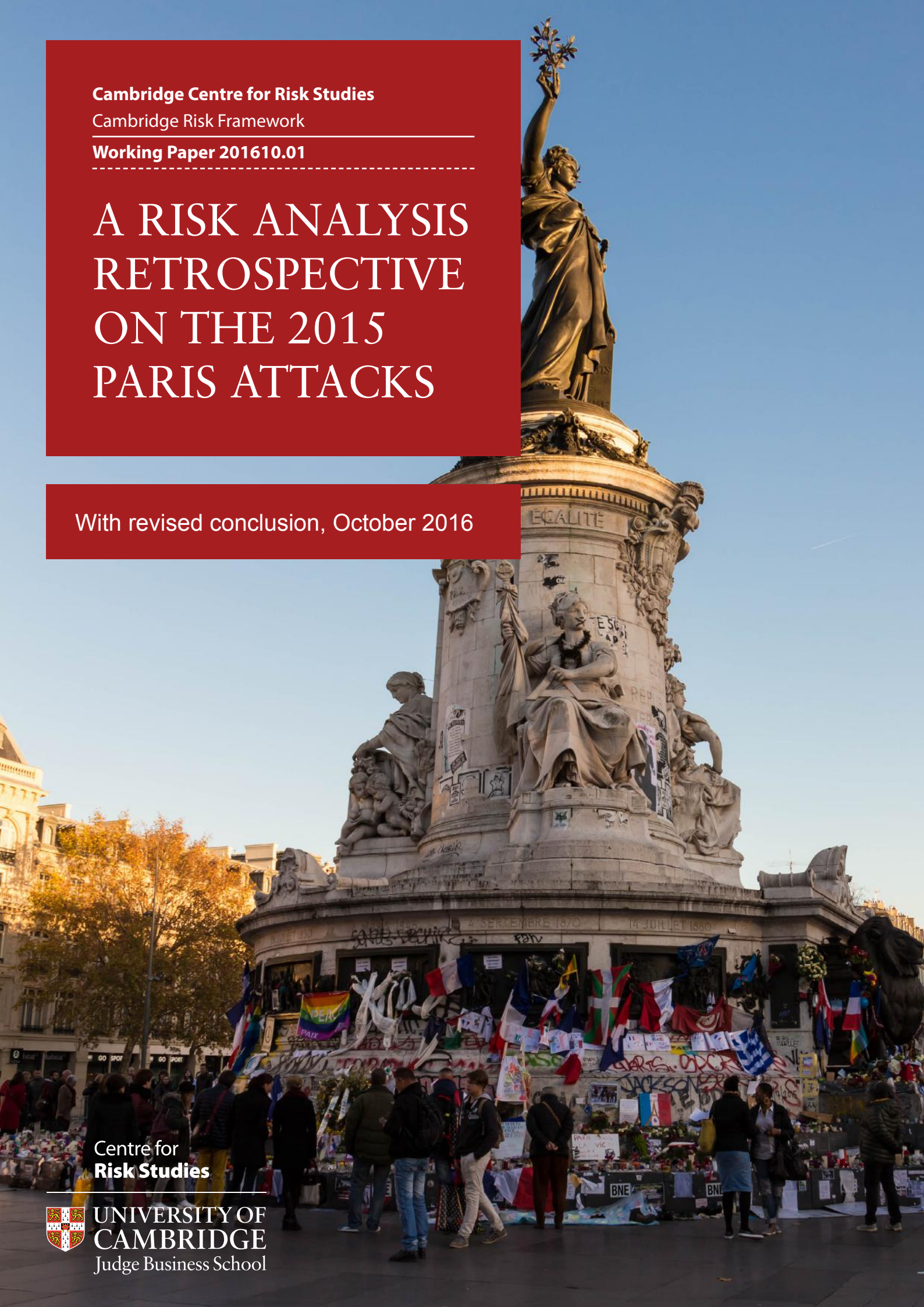
A RISK ANALYSIS RETROSPECTIVE ON THE 2015 PARIS ATTACKS

With revised conclusion, October 2016

Centre for
Risk Studies



**UNIVERSITY OF
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Judge Business School



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Abstract

In today's world we are threatened by failed states that foster terrorism. The Middle East is going through a transformation that will play out for another generation to come. Such change is unlikely to be at a low cost. In fact, the west is already seeing its repercussions. The aims of this paper are twofold. First, to assess the short term economic impact on the French economy using the share price index. Second, to analyse the medium to long term effects on the French and global economies. One of the key findings that emerged from this study is that in the short run markets tend to remain resilient to negative shocks whilst in the long run the cost (GDP@Risk) amounts to \$12billion for France and \$22 billion for the global economy.

Paris under attack

On 7 January 2015, three gunmen representing the terrorist group Daesh, broke into the headquarters of the satirical magazine Charlie Hebdo in Paris, France and assassinated 11 members of its editorial committee. At the time, it was the worst violence in France for more than half a century.¹ This fact was superseded on 13 November when eight terrorist operatives, equipped with assault rifles and suicide vests, divided into three teams and simultaneously went on a killing spree, attacking restaurants, bars, a sports arena and a concert venue, all within a 3km radius in Paris. Three members of the self-proclaimed terrorist group ISL/Daesh blew themselves up and killed a bystander in the process outside the Stade de France, where French president François Hollande, was amongst the spectators at a football match.² The remaining group shot 39 people at three different restaurants in the fashionable east district of Paris. Over three hours, 130 people were killed, including 89 at the Bataclan theatre following a three-hour hostage standoff, with over 350 injured.³

Prior to these attacks, concerns for public safety were already high due to the Charlie Hebdo attack earlier in the year. Meanwhile, France continued to support military strikes against Syria and Iraq, whilst disenfranchised youth of North African decent found solidarity and a sense of belonging within the Jihadi cells expanding in the country.⁴

As the terror unfolded on 13 November, stunned Parisians and French residents together with rest of the world, watched on and reached out via social media to share, condone and mourn. Local residents via twitter and Facebook, offered shelter to those civilians trapped on the streets of Paris, who now found themselves in the wrong place at the wrong time. Muslim organisations across France, such as the *Union of Islamic Organisations of France*, condemned the attacks in Paris which consequently impacted Muslim-owned businesses.⁵ Parisian residents were also concerned the attacks may lead to a marginalisation of Muslims in the city. France is still coming to terms with the horrific acts of violence in 2014 and 2015, and impact will unfold in the months and years ahead. Out of all this, however, we are seeing a trend emerging of an increased calculated assault on the most vulnerable.

Civilians - terrorism's soft target

The Paris attacks were an indiscriminate assault on civilians enjoying a Friday evening drinking at a pavement café, watching a rock concert and cheering on a football match at the national soccer stadium. Random and unpredictable terrorist attacks against civilians as soft targets are on the increase across the globe, as they are often easier to enact and require a shorter planning cycle.

Deaths from terrorism were up 80% in 2014, its highest level ever - with 32,685 people killed compared to 18, 111 in the beginning of the millennium. Within the past two decades, global terrorism has increased by 40% since 9/11.⁶

Europe now faces increased security threats, although surprisingly, only a few terrorist acts manage to achieve deadly

¹ Castillo, M., Haddad, M., Martinez, M. and Almasy, S. (2015) *Paris suicide bomber identified; ISIS claims responsibility for 129 dead*. Available at: <http://edition.cnn.com/2015/11/14/world/paris-attacks/> (Accessed: 5 October 2016).

² Alderman, L. (2015) *Suicide bombers tried to enter stadium*. Available at: <http://www.nytimes.com/live/paris-attacks-live-updates/suicide-bombers-at-stade-de-france-tried-to-enter-stadium/> (Accessed: 5 October 2016).

³ BBC News, (2015), Paris attacks: What happened on the night? <http://www.bbc.co.uk/news/world-europe-34818994> (Accessed December 15 2015)

⁴ Doherty, B., Henley, J. and Traynor, I. (2015) *Paris attacks: French police launch raids as military strikes Isis in Syria*. <https://www.theguardian.com/world/2015/nov/15/paris-attacks-car-found-with-kalashnikovs-as-gunmans-relatives-questioned> (Accessed: 30 September 2016).

⁵ Buchanan, R.T. (2015) *Paris terror: Muslim leaders around the world condemn 'heinous' attacks*. <http://www.independent.co.uk/news/world/paris-terror-muslim-leaders-around-the-world-condemn-heinous-attacks-a6734711.html>

⁶ The Peace Alliance, *Global terrorism index release; insights on Paris & other global attacks* (2016) , <http://www.peacealliance.org/global-terrorism-index-release-insights-on-paris-other-global-attacks>

fruition. According to Andrew Parker, director-general of the British Security Service, hundreds of attempted acts of terrorism are foiled, and often go unreported.⁷ Strengthening of surveillance powers, has taken precedence over the past decade as a result of the unpredictable attacks by terrorist group Daech on civilian society in Europe.

Macroeconomic impact on the French economy

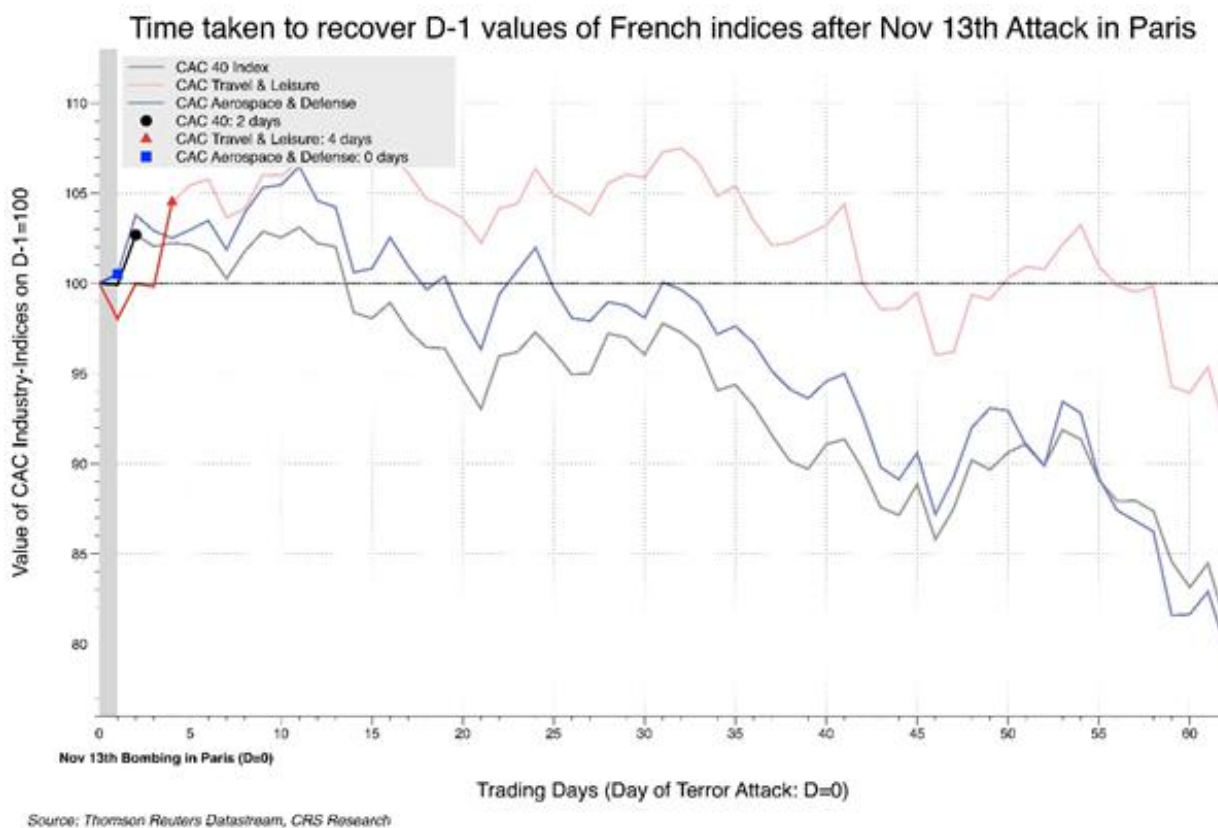
The economic impact from previous acts of terrorism, such as the 9/11 New York attacks, 2004 Madrid train bombing, and the 7/7 London bombings, has been closely analysed. In the aftermath of these events, it has been difficult to find a direct measureable effect on a nation’s overall GDP because GDP metrics capture the average performance of an entire country over the course of a year. Therefore, the effects of localised shocks, however significant, can be lost due to averaging and effects occurring elsewhere in the economy.

The Centre for Risk Studies estimates that there is a 1-in-80 probability of a first-order terrorism event scenario (TR1) occurring in Paris in any given year (with annual probability of 0.0125). Our definition of event TR1 in the model is defined as a terror campaign with small arms and limited resources. For example: shootings, poisonings or food chain sabotage with repeated attacks over a period of many months may cause anxiety and fear within the civilian population. These calculations are based on attempts that serious terrorist attacks occur once every four years, and counter-terrorism operations might fail to prevent the attacks about 5% of the time, with an expectation that 1 in 20 of attempts succeed. Generally speaking, terrorist attacks have a small probability of occurrence, however the economic and financial consequences can be significant.

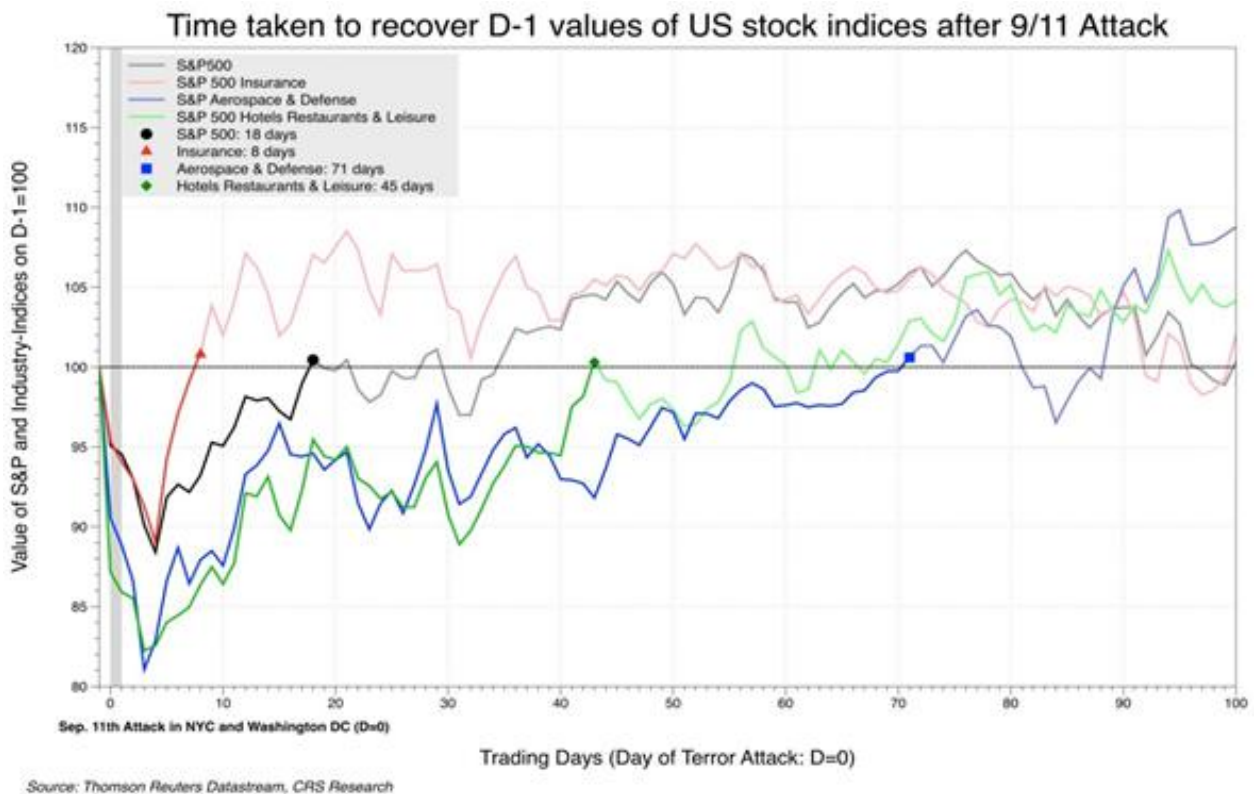
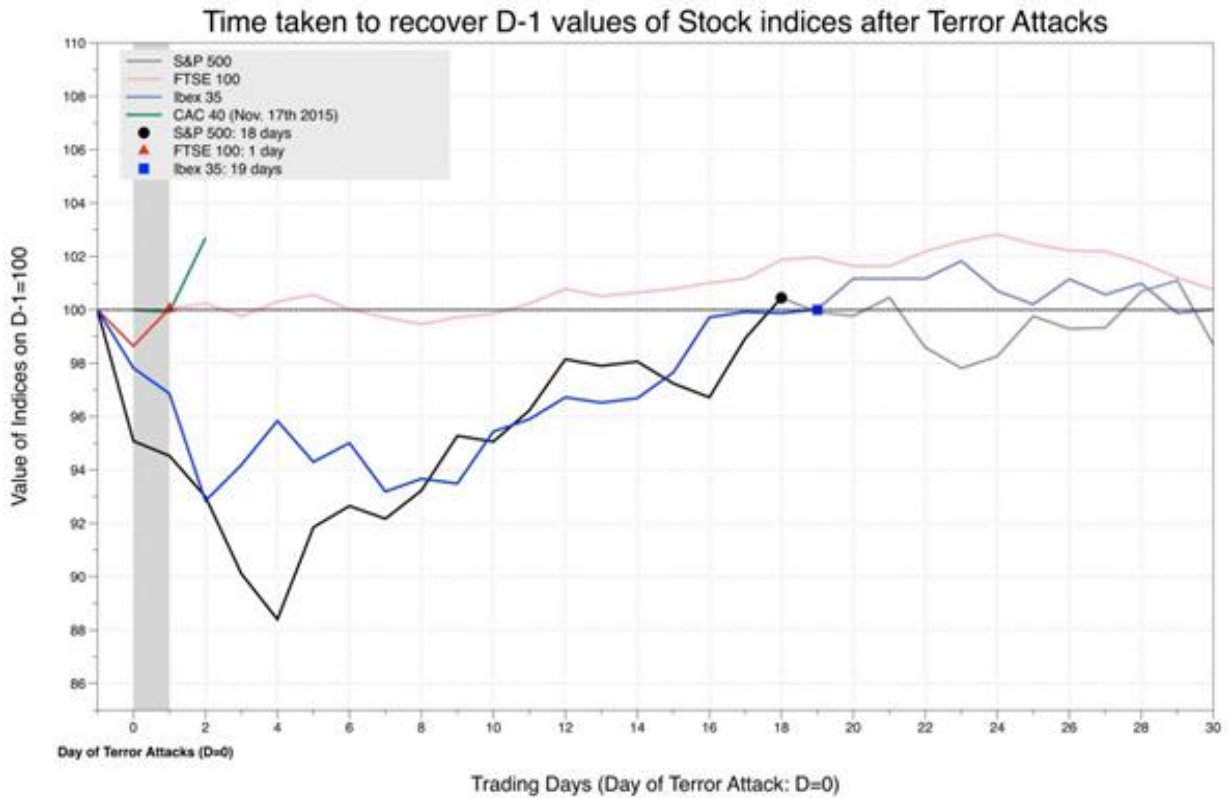
CRS research shows the economic impact of such incidents of terrorism, as demonstrated by the 13 November Paris attacks, and the Charlie Hebdo shootings in January 2015. These events arguably meet the definition of the TR1 terrorism scenario developed at CRS, and thus we are able to analyse their direct effects as a comparison to this part of our Taxonomy.

Short term economic consequences

The share price index can be used as an immediate indicator to reflect the short term impact of the November terrorist attacks in Paris:



⁷ 2016, C.C. (2015) *Director General speaks on terrorism, technology and oversight*. <https://www.mi5.gov.uk/news/director-general-speaks-on-terrorism-technology-and-oversight>.



Other terrorist attacks also display a similar market response. As illustrated in the graph above, following the 9/11 attacks, the Aerospace, Defence and Leisure sectors were the worst affected sectors dropping almost 20 percent within a few days of the attack. The share price index took approximately 70 days to recover to pre-crisis levels, while the New York Stock Exchange returned to pre-crisis levels within 28 days.

The 7/7 London bombings had a smaller financial impact than 9/11. The FTSE registered a drop of around 3

percent on the day of the attack and then recovering to pre-crisis levels the day after. The Travel and Leisure sector took a further 24 days to recover.

In the short term following the Paris attacks, the international markets will be concerned on two fronts. Firstly, they will worry about the impact on sentiment affecting consumer spending and corporate investments. The so called ‘fear factor’ will dampen confidence and decrease spending. Second, the markets will be concerned about how the attacks might affect the Tourism and Leisure sectors over the medium term, as Paris is a top destination for millions of global travellers.

Oxford Economics Model

To quantify both the direct and indirect economic consequences resulting from a terrorist attack in Paris to the French economy, a standard metric– GDP@Risk (the cumulative loss to GDP over 5 years) can be used. We use scenario narratives to quantify the effects of these catastrophes and report the impact of additional scenario variants, where greater shocks are factored into the model to estimate the impact of a more severe turn of events. Our ‘standard’ scenario is identified as S1. S2 refers to a similar scenario where the shock factors are more severe, with the most extreme variant being X1.

The macroeconomic consequences of this scenario are modelled using the Oxford General Equilibrium Model. The output from the model is a five-year forecast for the world economy. The impacts on each variant of this scenario are compared with the macroeconomic baseline projection of the global economy under the condition of no crises occurring.

Table 1: Macroeconomic scenario shocks applied to the Oxford Economics Model at the national scale

Scenario	Shock Duration	Consumption	Output shock	Exports & Imports shock	Share Price Index	Investment	Confidence (France)
S1	1 Qtr.	-0.10%	-2%	-0.10%	-1.5%	-0.05%	-3
S2	2 Qtrs.	-0.12%	-4%	-0.15%	-2%	-0.06%	-4
X1	4 Qtrs.	-0.24%	-10%	-0.30%	-5%	-3%	-5

The French economy suffers both supply and demand side shocks as a result of the attack. All of these factors have serious negative consequences on market confidence which is also modelled as a shock. It dampens the ‘animal spirits,’ reflected in domestic aggregate demand and supply side of the economy, resulting in a fall in consumption, trade in imports and exports, investment and output.

Table 2: Terrorist attack and GDP@Risk values for the three scenarios

Location	S1		S2		X1		
	5Yr GDP (US\$ Billion)	GDP@Risk (US\$ Billion)	5Yr GDP (US\$ Billion)	GDP@Risk (US\$ Billion)	5Yr GDP (US\$ Billion)	GDP@Risk (US\$ Billion)	GDP@Risk (%)
France	14.28	12.52	0.09%	38.41	0.27%	141.01	0.99%
World	392.13	21.82	0.01%	64.35	0.02%	235.29	0.06%

Table 2 summarises the results from the OEM. In S1 scenario there is a loss of \$12.5 billion for the French economy and a loss of \$21.8 billion to the global economy. The significant loss to the world economy could be explained by the ‘fear multiplier effect’ as recently identified by Kelly et al. (2014) in which the economic impacts of an Ebola outbreak were simulated.⁸ Under these circumstances, people stop travelling and cancel their holidays leading to a serious decline in leisure spending. In the period after the Paris attacks, Belgium remained in lockdown for a number of days and many European countries increased their level of security.⁹ In the X1 scenario the losses are much more significant equating to nearly 1% of French GDP and 0.06% of global output.

The graph below illustrates the decline in hotel occupancy in Paris, from November 2015 – August 2016, with an estimation of decrease for the 2016 pre-Christmas period. According to Matthias Fekl, Junior minister for tourism

⁸ Kelly, S., Coburn, A.W.; 2014; Ebola Contingency Scenario: Analysis of Economic Impact of Upper Bound Ebola Projections for US and Europe; Working Paper 2014: 2; Cambridge Risk Framework; Cambridge Centre for Risk Studies.

⁹ Morris, C., 2015. A difficult week in Brussels. BBC News [online]. Available at: <http://www.bbc.co.uk/news/world-europe-34935527>

in Paris, occupancy dropped to 32 per cent in the second half of July 2016, compared to 77 per cent the same period in 2015. According to the Paris Tourism Office Paris the city saw a 15% decrease in foreign visitors at the start of 2016.

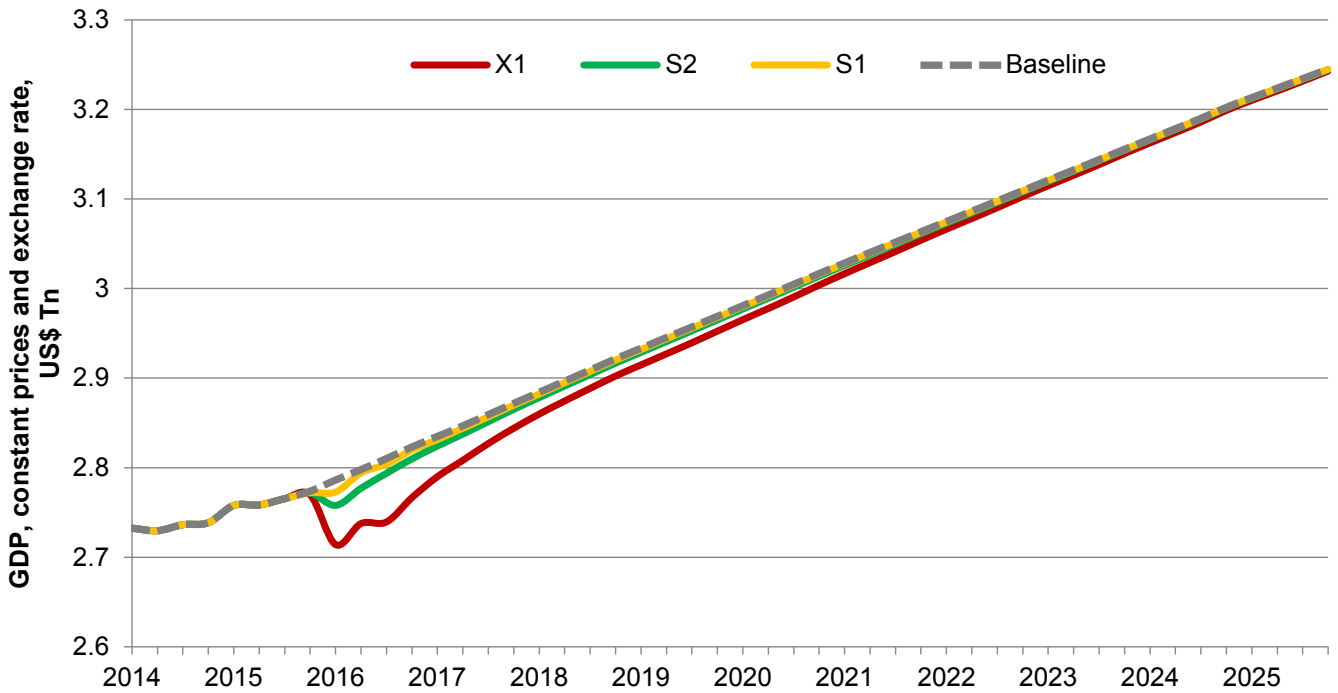


Figure 1: Estimated loss in French GDP as a result of a TR1 terrorist attack scenario

Figure 1 shows that a TR1 terrorist attack results in a notable fall in the expected trend in GDP growth in all of the scenarios. In the S1 scenario, the attack’s impact is shown as a temporary phenomenon with a small dip. However, the economy recovers soon after the attack with direct economic effects largely dissipating within a year of the event. While in the X1 scenario, the recovery takes place over a longer period of time with huge negative shocks to some of the most vital functions of the economy, such as investment and consumer confidence.

The surge of terrorist attacks in Europe gives precedence to finding a long lasting solution to terrorism. Terrorism has dominated the global political and social landscape for a number of years, and it is clear that the risk of violent attacks has become a feature of modern society. It poses threat to polities and leads to devastating economic and social consequences. Therefore it is vital to understand what the cost that may accrue by such acts. In this paper, we have estimated the GDP@Risk for France to be about \$12 billion and \$22 billion for the global economy. Whilst the economic cost of a terrorist act is significant, the psychological cost on humans from such atrocities must also be an important consideration.

New conclusions in October 2016

As we approach the first anniversary of the first wave of terrorist attacks in Paris, France is still coming to terms with the horrific acts of violence in 2014 and 2015. With more questions than answers France, the world’s most visited country, remains in a prolonged state of emergency, which was extended by the government in July 2016, following further terror attacks on civilians in Maganville and Nice.¹⁰ Several cities and towns decided to cancel summer festivities during the summer in wake of the Nice attack.¹¹

Since November 2015, a strong military presence has prevailed throughout the country, with 10,000 soldiers and 90,000 police officers patrolling its streets. Over the past 12 months, France has also increased the legal powers

¹⁰ UN World Tourism Organisation, Tourism Highlights; July 2016;

¹¹ Hardy, C.; 2016; France announces plans for increased security; Euronews [Online]; 3 August, 2016. Available: <http://www.euronews.com/2016/08/03/france-announces-plans-for-increased-security>

of its police force who are now permitted to conduct warrantless raids and detain people without court orders.¹²

The latter, a legal addition to prevent suspected jihadists from leaving the country, was introduced to intercept the “lone wolf” terrorist who act independently and outside a terrorist cell unit.

Acts of terrorism underscore the vast difficulty of monitoring would-be terrorist activity, and the difficulty French authorities face deterring random attacks on soft targets. The terrorist attacks in France represent a larger problem in global terrorism, which has risen 80 % in the past three years.¹³ And although terrorist organizations claim responsibility for the majority of the world’s terrorist attacks, 70% of deaths in western countries have been committed by lone wolves, not terrorist organizations.¹⁴

Additionally, a new layer has been added to the complex dichotomy of terrorism, as the changing profile of radicalised young men and women increasingly include educated men and women, who were born and raised in European nations.¹⁵ Social media has played a pivotal role in connecting people during a crisis, but it has also been used by terrorist groups to radicalise others and spread negative propaganda. In an attempt to curb the power of radicalisation online, France has introduced new laws to block internet sites which promote terrorism. Sentences for those who consult jihadist websites will be up to two years in prison and a €30,000 fine, although this law has yet to be enforced.

France welcomes approximately 85 million visitors a year.¹⁶ Tourism accounts for 7 percent of the country’s GNP, with the City of Paris and the Île-de-France region, being the most important economic centre of activity in France accounting for 30 percent of the French GDP.¹⁷ Following a wave of further terrorist attacks, and a combination of transport strikes, industrial actions, and severe flooding across parts of the country, 2016 has been a year of severe economic losses for the country. Paris has seen a €750 million loss in tourism revenue over the last year, according to the Paris region tourist board.¹⁸

As we approach the one year anniversary of the November 13th Paris attacks, media attention will once again be focused on the threat of terrorism in the West, which psychologists say continuous media coverage of terrorist attacks may contribute to depression, fear and psychological problems for some adults and children. We must note therefore a fear-based destabilized society cannot foster a healthy economic environment.

¹² Breeden, A.; 2016; French authorities given broader powers to fight terrorism. <http://www.nytimes.com/2016/05/26/world/europe/france-terrorism-laws.html>

¹³ Institute for Economics & Peace; 2015; *Global Terrorism Index*; [Online] Available: <http://economicsandpeace.org/wp-content/uploads/2015/11/Global-Terrorism-Index-2015.pdf>

¹⁴ Peace Alliance; 2016; *Global terrorism index release; insights on Paris & other global attacks*; Available at: <http://www.peacealliance.org/global-terrorism-index-release-insights-on-paris-other-global-attacks/> (Accessed: 5 October 2016).

¹⁵ Miller, D. (2015) *Economics 411: Monetary and financial theory*. Available at: <https://411w15.econ.lsa.umich.edu/?p=614>

¹⁶ Gouvernement.fr; 2016; France remains the world’s leading tourist destination; 11 April 2016; [Online] Available at: <http://www.gouvernement.fr/en/france-remains-the-world-s-leading-tourist-destination>

¹⁷ European Commission for Growth; *Ile-de-France*; [Online] Available: <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/ile-de-france>

¹⁸ Reuters; (2016) *Paris tourism lost 750 mln euros after attacks*. Available at: <http://www.reuters.com/article/france-tourism-idUSL8N1B31JN>

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