

Is the Repugnance about Betting on Terrorist Attacks Misguided?

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Abstract

Prediction markets designed to predict terrorism through traders' investments on the likelihood of specific terrorist attacks are, strictly speaking, enabling those traders to bet on terrorism. Betting on terrorist attacks, like some other forms of betting on death, has been accused of being repugnant. In this paper, it is argued that while government-backed effective intelligence-gathering prediction markets on terrorism (PMsoT) might elicit feelings of repugnance, those feelings are likely to be misguided. The feelings of repugnance arise because PMsoT are assumed to be associated with terrorism in encouraging and endorsing ways and with human death in a disrespectful way. However, it is argued that these feelings of repugnance are misguided in the case of government-backed effective intelligence-gathering PMsoT because the purpose and effect of such prediction markets, and (on balance) the trading they encourage, is to prevent and renounce terrorism and show respect for matters of life and death.

Keywords: prediction markets; terrorism; repugnance; prediction markets on terrorism; Policy Analysis Market

We will never know if the Policy Analysis Market would have been successful. But if there were even a small chance that it could have been a useful tool, there should be, at a minimum, further discussion of the idea. This is, after all, not a matter of just partisan politics but one of national security. (Dobbs 2003; c.f. Looney 2004, pp. 417-418)

1. Introduction

Like futures markets, modern prediction markets are websites in which anonymously registered traders buy and sell shares in predictions about real-world outcomes (Weijers 2013a). PMs usually pay out a set fee (e.g., \$10) for each share traders hold in a prediction that turns out to be true. If there are willing buyers, traders can also 'short' predictions by selling shares (even if they do not own any), which is in effect the same as buying shares in the prediction being false. As a result of this trading, the price moves. At any given time, the price of shares for a prediction can be understood as a prediction about the likelihood of the predicted event occurring. So, a price of \$5 per share means that the traders in this market can be understood as collectively predicting that the event has a 50% chance of occurring.

Prediction markets on terrorism (PMsoT; or PMoT for the singular form) allow participants to trade stocks in predictions about terrorist attacks and other terrorism-related events. For example, a trader might purchase shares in the prediction that there will be a terrorist attack on the United States in 2013 for \$2 per share because she thinks that the shares are under-priced—that such an attack is more likely than 20% ($\$2/\$10 = 20\%$ chance). If the trader holds on to the shares (instead of selling them to another trader), then she stands to make \$8 per share if the prediction is true, or lose \$2 per share if the prediction turns out to be false. PMsoT could be for the purpose of gathering information that might be useful for preventing terrorist attacks (intelligence-gathering PMsoT) or, like most existing PMs, they could be for the purpose of making money (for-profit PMsoT).

Inspired by prediction markets' impressive predictive performance in many areas, several authors have argued that intelligence-gathering PMsoT could help intelligence and security agencies predict, and thereby prevent, terrorist attacks (Hanson 2006; Looney 2004; Surowiecki 2004; Yeh 2006). The only government-

backed project to create an intelligence-gathering PMsoT (named Policy Analysis Market, or PAM for short)¹ was sponsored by the military technology branch of the United States' government. However, before PAM could be properly tested it was terminated because politicians heard about it and judged it to be "morally repugnant."² This sentiment was echoed by other politicians and in the media, effectively preventing any government from seriously considering setting up intelligence-gathering PMsoT again (Hanson 2006).

Unfortunately, as the recent Boston bombing attack demonstrates, terrorism does not seem to be a problem that will solve itself. The trend for fatal terrorist attacks has generally been increasing since 1970, despite a dip around the turn of the millennium (LaFree 2010), and the attacks have become more deadly, particularly the attacks against the United States (LaFree, Yang, & Crenshaw 2009). Hanson (2006; see also Pennock 2004) has argued that *effective* intelligence-gathering PMsoT would: elicit useful information that extant intelligence-gathering methods would not (and elicit the same information more quickly), be immune to manipulation, and enable the thwarting and possible capture of terrorists. Whether PMsoT could be effective is disputed (e.g., Richey 2005; Stiglitz 2003), but no one really knows the truth of the matter. It seems that only a field-test of a well thought out PMoT could settle this dispute. Furthermore, the widely documented repugnance expressed about PAM is currently preventing potentially effective versions of PMsoT from being tested. Therefore, whether PMsoT deserve to be labelled repugnant is the priority issue.

Privately backed (mostly for-profit) prediction markets exist, including some with predictions about terrorist attacks, but only governments are likely to have the requisite finances and expertise to set up PMsoT in such a way that they are likely to be effective in preventing terrorism (Weijers 2013a).³ Therefore, it seems pertinent to closely examine whether repugnance felt about effective government-backed

¹ See Hanson (2007) for more details on PAM.

² Senator Ron Wyden made this comment at a press conference. See the transcript here: <http://www.iwar.org.uk/news-archive/tia/futuremap-program.htm>, accessed 25 March 2013.

³ For example, (the now defunct) Intrade's prediction that "A successful WMD terrorist attack [will] occur anywhere in the world before... 31 Dec 2013" (rated as 11.4% likely shortly before trading ceased), is too general to provide much if any useful information to terrorism prevention forces. Available from: <http://www.intrade.com/v4/markets/contract/?contractId=745538>, accessed on 26 June 2013 (this link will probably not be available indefinitely; Weijers 2013a).

intelligence-gathering PMsoT is likely to be misguided. (Henceforth, all mentions of 'PMsoT' refer to 'effective government-backed intelligence-gathering PMsoT', unless stated otherwise).

In this paper, it is argued that while PMsoT might elicit feelings of repugnance, those feelings are misguided. In Section 2, PMsoT are explained in more detail and it is argued that it is plausible that PMsoT could be effective. Then in Section 3, repugnance, how repugnance might be misguided, and the argumentative strategy used in this paper are discussed. In Section 4, it is argued that the feelings of repugnance about PAM, and the potential feelings of repugnance about any future PMsoT, are likely to be based on a shared subconscious aversion to anything that is associated with terrorism in a non-detracting (e.g., non-preventing or non-renouncing) way, and to anything that is associated with human death in a disrespectful way. Also in Section 4, it is argued that the repugnance felt in these cases is misguided because the associations between PMsoT and terrorism are more appropriately viewed as preventing and renouncing (rather than encouraging and endorsing), and the associations between PMsoT and human death are more appropriately viewed as respectful (rather than disrespectful). Finally, Section 5 summarises the paper and identifies some implications.

2. PMsoT could be effective

As mentioned, some critics of PAM were concerned that PMsoT could not be effective. If these concerns are valid, then even effective PMsoT would be a waste of government money and there is little practical reason for arguing that the repugnance felt about PAM should not prevent the testing of PMsoT. Therefore, the main concerns about the effectiveness of PMsoT will briefly be addressed here. The goal of this discussion is not to show beyond reasonable doubt that PMsoT will be effective, since that would require a field test. Rather, the goal is to show that none of the concerns obviously give reason to think that PMsoT being effective is implausible. The concerns addressed in this section are: that the traders would not know enough for PMsoT to generate any useful information, that effective PMsoT would be self-defeating, and that PMsoT would enable terrorists to fund their activities.

To be effective, PMsoT need some traders to be somewhat knowledgeable. I.e., there needs to be some novel information brought to the PMsoT that is not based on other publicly available information. Will PMsoT be able to attract traders with such

information? Thomas Rietz, a director of the Iowa Electronic Markets,⁴ does not think so. Rietz argues that prediction markets are good for predicting election results, but not terrorist attacks, because individual investors have a decent amount of private knowledge about how others will vote, but not about the terroristic intentions of others (Biever & Carrington 2003). Indeed, only a minority of PMsoT traders are likely to have specific information about the terroristic intentions of others. To be effective, PMsoT would have to attract traders whose movements at least somewhat overlap with the movements of terrorists. This could include occasionally sharing a bus or a classroom with terrorists whose actions or perhaps even hushed utterances might betray their terroristic intentions. More obvious cases include disenchanted ex-terrorists and the terrorists themselves (this latter group is discussed in more detail below). Innocent people with information about the terroristic intentions of others might well use an anonymous PMsoT instead of contacting the relevant authorities because they fear that they will at least be subject to surveillance and possibly to interrogation and incarceration. Assuming that a major international PMsoT could attract traders from many nations, and given the high level of internal terrorism in the United States,⁵ it is not unreasonable to believe that PMsoT could attract several traders with information about the terroristic intentions of others.

A related concern is that the majority of traders (who are not trading on the basis of useful private information) might drown out any useful signals sent through the PMsoT. However, the nature of efficient PMs is that they aggregate the information in such a way that the uninformed trades tend to cancel out (because they are random) and the informed trades accumulate into the basis for an accurate prediction (Weijers 2013a). Furthermore, models of attempted market manipulation show that if the uninformed traders somehow become subject to an information cascade that directs their trades in a particular direction (such that they are no longer random in such a way that they cancel each other out), then the more incentive informed traders have to trade more heavily and thereby correct the market price (Hanson 2006; Wolfers & Zitzewitz

⁴ The Iowa Electronic Market is the longest-running electronic prediction market. It is widely known for predicting US election winners from 1988 onwards more accurately than political polls (Berg *et al.* 2008).

⁵ See, for more information:

http://en.wikipedia.org/wiki/Terrorism_in_the_United_States#2010.E2.80.93present accessed 22 Jan 2014

2004). As a result, a high proportion of uninformed traders is unlikely to make a PMsoT inaccurate.

It has also been argued that effective PMsoT would be irrational to invest in because the events they are designed to predict are not exogenous from the markets themselves (e.g., Looney 2004, p. 414; Richey 2005; Stiglitz 2003; Sunstein 2005, p. 1040). For example, the price of any particular prediction in a PMoT could affect security agencies' decisions about trying to thwart terrorist activity. Richey (2005, no page) poses the problem like this: "A rapid *rise* in the value of a futures contract for a terrorist event (say in one month) in a friendly country would serve as a market signal for an equal rise in the probability of that event... This would trigger a response to stop the event, drastically *reducing* the event's probability". But, as Hanson (2006) has argued, careful wording of the predictions can easily avoid this problem. For example, predictions about 'terrorist attacks' could instead be about 'attempted terrorist attacks', which would include attacks that were planned to an actionable extent. Alternatively, all trades on predictions about terrorist attacks could be refunded if an attempted attack was thwarted. Therefore, it is unreasonable to think that this kind of self-defeating endogeneity will be a major problem for a carefully planned PMsoT.

Finally, concerns have been expressed about the possibility that PMsoT would enable terrorists to fund their activities by enabling them to bet on a certain kind of terrorist attack occurring and then commit such an attack (Weijers 2013a). First of all, by buying shares in a particular terroristic prediction, the terrorists would be sending a message to the intelligence agencies using the PMoT as an intelligence-gathering tool. As a result, the intelligence agencies would be more likely to prevent the attack and capture the terrorists (Hanson 2006). How might this work? After noticing an unusual increase in the price of a prediction that there will be an attack in a certain city in the near future, intelligence agencies could investigate related leads more deeply. For example, searches for online terrorist chatter could be more effective by adding the name of a particular city. Furthermore, warrants for searching suspicious people and locations could be more easily obtained. Such actions could thwart the terrorist attack before it took place. Alternatively, increasing security and randomly changing the patterns of security personnel's movements might enable terrorists to be thwarted during their attempted attack. Furthermore, the likely depth and liquidity of PMsoT means that terrorists could only make a few thousand dollars in this way; a figure that

pales in comparison to what they could make with some intelligent trading on traditional stock markets, which react in predictable ways to major attacks (Hanson 2006, pp. 268-270). So, all things considered, trying to make money from their attacks seems like an option that would be too risky and imprudent, even for terrorists.

3. Repugnance, repugnant associations, and misguided repugnance

3.1 Repugnance

Leon Kass (1998) described repugnance, which he likened to a feeling of revulsion, as:

[When] ... we intuit and feel, immediately and without argument, the violation of things that we rightfully hold dear. Repugnance... revolts against the excesses of human willfulness, warning us not to transgress what is unspeakably profound. (Kass 1998, p. 687)

Kass defends repugnance as a source of wisdom by arguing:

Revulsion is not an argument; and some of yesterday's repugnances are today calmly accepted—though, one must add, not always for the better. *In crucial cases, however, repugnance is the emotional expression of deep wisdom, beyond reason's power fully to articulate it.* Can anyone really give an argument fully adequate to the horror which is father-daughter incest (even with consent), or having sex with animals, or mutilating a corpse, or eating human flesh, or even just (just!) raping or murdering another human being? Would anybody's failure to give full rational justification for his or her revulsion at these practices make that revulsion ethically suspect? Not at all. On the contrary, we are suspicious of those who think that they can rationalize away our horror, say, by trying to explain the enormity of incest with arguments only about the genetic risks of inbreeding. (Kass 1998, p. 687; emphasis added)

Essentially, Kass has defined repugnance as an extremely negative moral intuition. A regular negative intuition might be a bad feeling, as in the saying "I've got a bad feeling about this" uttered at the start of a daunting adventure. And, a negative *moral* intuition is a bad feeling that arises in response to moral considerations, such as considerations of what someone (including ourselves) has or hasn't done or may or may

not do (Haidt 2001). For example, thinking about a manager who knowingly disregarded safety advice in order to raise short-term profits might elicit a negative intuition strong enough to be considered repugnance.

Intuitions are created by a subconscious automatic and parallel probabilistic processing system that matches current novel stimuli with past experiences (Haidt & Joseph 2004; Lieberman 2000; Myers 2004; Woodward & Allman 2007). Intuitions feed into judgments, and are importantly different from judgments because intuitions are opaque to introspection—intuitions do not come with labels explaining what novel stimuli and past experiences combined to trigger them (Myers 2004). It is true that the causes of intuitions can be reconstructed, for example by trying to discern what novel stimuli we have recently encountered that hindsight can logically link to the intuition (Woodward & Allman 2007). However, our attempts at reconstruction can be hindered by various biases, oversights, and a lack of knowledge about how intuitive cognition works (Weijers 2013b).

In the case of moral intuitions, an important aspect of the current novel stimuli is moral in nature, that is to say an aspect of the current novel stimuli is the kind of thing worthy of moral analysis. If someone gets a bad feeling when considering a moral issue, then, it is because the novel stimuli that person is currently experiencing match better with negative previous experiences than positive ones (Weijers 2013b). Furthermore, a *strong* negative moral intuition, i.e. repugnance, is the result of the current novel stimuli being experienced matching *much* better with (probably very) negative previous experiences than with positive ones.

Kekes points out that moral intuitions also importantly rely on the beliefs that make up part of the novel stimuli experienced by an individual (Kekes 1986; 1998). In other words, how the novel stimuli are framed or viewed by a person will affect their consequent moral intuitions. For example, whether someone finds the eating of recently deceased family members repugnant, will depend on the beliefs they have; in some cultures, people believe that eating their dead family members is the only way to properly respect them after they die (e.g., Conklin 2001). So, eating recently deceased family members can be framed as both respectful and disrespectful depending on the other background beliefs. The role of belief in intuition formation is important because it means that different framing of events, which can lead to different beliefs about them,

can dramatically alter our intuitions about them (Nelson, Oxley, & Clawson 1997; Sinnott-Armstrong 2008).

The probabilistic processing system that generates our moral intuitions relies partly on associations and heuristics about associations that are mainly socio-culturally learned. For example, we learn that defecating and eating don't go together and that none of eating, sex, or blaspheming go with sacred places because we have had, or heard about, many negative experiences resulting from those associations. Similarly, we learn that some things are morally bad and should only be associated with in a negative way (e.g., preventing or renouncing). For example, rape is common amongst non-human animals (Crawford & Galdikas 1986), but most humans learn that the only morally permissible associations to have with rape are negative, such as preventing or renouncing associations, because rapists and discussion of rape nearly always lead to condemnation and suffering.

Individuals can be associated with events in various ways. Some of those associations are deemed to be morally acceptable or even laudable, while other associations are deemed to be repugnant. This moral acceptability tends to depend on several factors, including: whether the event is seen positively or negatively, whether the person has a causal association with the event, whether the association is intentional, whether the association benefits or would be expected to benefit those disadvantaged by the event, what the person's underlying motivations for the association are, and whether the person benefited from the event. These factors contribute to an individual's association with an event being seen as positive (e.g., enabling or endorsing), neutral, or negative (e.g. preventing or denouncing). For instance, the theft of a handbag from an innocent person is a negative event (that is, undue harm has been done to an innocent person, and any positive outcomes from the event are completely overridden by the negative outcomes). In this case, a thief would have morally unacceptable enabling and endorsing associations with the event because they intentionally act to cause the theft with the expectation of profiting from it. However, an investigating police officer would have morally laudable preventing and denouncing associations with the event, given that they intentionally act to remedy the ills of the situation and attempt to prevent future thefts.

3.2 Misguided repugnance

Importantly for this paper, complex novel stimuli, such as complex new technologies, can be misunderstood. Such misunderstandings can lead to inappropriate framing, misguided associations, and false beliefs about the novel technologies, which in turn can lead to misguided repugnance about them. Kass notes that repugnance is not always wise, but he insists that *widespread* repugnance about a new technology effectively puts the justificatory burden on the defenders of the new technology (Kass 1998, p. 689). In this paper, the justificatory burden regarding the widespread repugnance about PMsoT is accepted. It is argued that the repugnance about PMsoT is likely to be misguided because the information about them was framed in such a way that the public failed to understand the ways in which PMsoT are negatively associated with terrorism, and respectful of human death, rather than being neutrally or positively associated with terrorism, and *disrespectful* of human death.

From a moral theory point of view, Kass and most of the detractors of PMsoT are espousing and implicitly following (respectively) some sort of intuitionist approach. That is to say that they believe that their intuitions (perhaps when widely shared) have weight in a moral argument (Sinnott-Armstrong 2005). It may even be the case that the likes of Senators Wyden and Dorgan believe that the strength of the repugnance they felt about PAM elevated their intuition from having some weight in a moral argument to being an unquestionable knockdown reason for why PMsoT are immoral. Indeed, Hanson (2007) has argued that the various politicians involved might all have acted so swiftly in cancelling PAM (they did not give the creators of PAM a chance to respond to the allegations) because, in the wake of the September 11, 2001 attacks, betting on terrorism was seen as a taboo, and that to stop to contemplate the pros and cons of funding a taboo activity would have been political suicide. Of course, throughout history we have witnessed many taboos becoming accepted as morally permissible activities at least partially because of the sustained use of rational arguments. The example of homosexuality seems pertinent as the recorded history of the West has documented homosexuality moving from morally acceptable commonplace to Taboo, and recently back to morally acceptable commonplace mainly on the basis of rational argument (Mondimore 1996; Wilson-Buford 2013). Therefore, taboo or not, using repugnance as a moral argument instead of a reason to investigate a moral issue seems lazy and out of place in academic debates (at least). Indeed, academics who use their intuitive repugnance as arguments, such as Kass (1998), seem to recognise this because they

usually attempt to justify their repugnance with reasons why the object of their repugnance is immoral.

The argumentative strategy used in this paper is to use rational argument to assess the strongest justifications for repugnance about PMsoT. Rather than assessing these justifications against any claimed objective moral criteria, however, the justifications will be assessed against the stated and implied moral principles of the critics of PMsoT. That is to say, the critics' own moral criteria will be used to assess their own moral claims. If the critics' moral claims are consistent with the moral principles that they endorse, then their repugnance will be considered legitimate. However, if the critics' moral claims are *not* consistent with the moral principles that they endorse, then their repugnance will be considered misguided.

For the purposes of this paper, then, legitimate repugnance and misguided repugnance will be defined as follows:

Legitimate repugnance: A person P experiences legitimate repugnance as an intuitive feeling of morally charged revulsion about thing T that, after careful consideration of the relevant facts and moral issues, can be justified using the relevant facts and P's moral framework without contradiction.

Misguided repugnance: A person P experiences misguided repugnance as an intuitive feeling of morally charged revulsion about thing T that, after careful consideration of the relevant facts and moral issues, would contradict the most reasonable moral judgment about T based on all of the facts and P's moral framework.

It is reasonable to assume that the critics are of the opinion that the reasons they think justify their repugnance about PMsoT are perfectly consistent with their moral frameworks. The goal of this paper is to provide detailed discussion of the relevant facts and moral principles to show that the repugnance that the critics feel about PMsoT is misguided because a reasonable moral judgment made with their moral framework would contradict their existing moral judgments on the matter. A strength of this paper is that there is no attempt to foist an alien moral theory onto the critics; their own moral frameworks are used to assess their judgments and justifications. If the repugnance critics feel about PMsoT can be shown to be misguided, then the horrific suffering and

death that terrorist attacks can cause should give ample reason for PMsoT to be tested for effectiveness.

4. The repugnance of PMsoT

The idea of PMsoT has caused strong negative intuitive reactions. PAM, the only planned PMoT, was described as “morally repugnant,” “morally reprehensible,” “morally wrong,” “just wrong,” “disgusting,” “grotesque,” “very sick,” and “offensive.”⁶ As is to be expected,⁷ the commentators expressing repugnance gave fewer substantive justifications for why PMsoT were morally unacceptable than some of the less emotional commentaries, which tended to focus on whether PMsoT could be effective (Hanson 2007; e.g., Richey 2005; Stiglitz 2003). Nevertheless, many of the comments from those expressing repugnance bemoaned the way that PMsoT would be associated with terrorism. For example, Senator Hillary Clinton commented that “...a market in death and destruction, [is] not in keeping with our values” (Biever & Carrington 2003, no page), and Senator Wyden described PAM as: “encouraging people to bet on and make money from atrocities and terrorist attacks.”⁸ Since negative associations with terrorism are morally praiseworthy, the nature of PMsoT’s associations with terrorism should be closely analysed to see if the repugnance about PMsoT is misguided.

In this section, two *prima facie* positive associations between PMsoT and terrorism—causing and endorsing—are argued to in fact be entirely appropriate negative associations. Then the ‘intentionally profiting from’ association between

⁶ “just wrong” comment by Senator Thomas Daschle in Congress (Congressional Record Vol. 149, No. 114, 29 July 2003: S10082-S10083). “morally repugnant”, “morally wrong,” and “grotesque” comments by Senator Ron Wyden at a press conference. See the transcript here: <http://www.iwar.org.uk/news-archive/tia/futuremap-program.htm>, accessed 25 March 2013. “disgusting” and “offensive” comments by Senator Byron Dorgan at another press conference (see the transcript here: <http://hanson.gmu.edu/PAM/govt/Senator-Wyden-Dorgan-pressconf-7-29-03.txt>, accessed on 18 March 2013. “very sick” comment by Senator Barbara Boxer (Courson & Turnham 2003, no page). “morally reprehensible” comment by the editors in “Pentagon drowns in its own “dead pool,”” *The Virginian Pilot*, 31 July, 2003: B10. See Meirowitz and Tucker (2004) for more detail on the reactions to PAM.

⁷ Recall that: “repugnance is the emotional expression of deep wisdom, beyond reason’s power fully to articulate it” (Kass 1998, p. 687).

⁸ See the transcript here: <http://www.iwar.org.uk/news-archive/tia/futuremap-program.htm>, accessed 25 March 2013.

PMsoT traders and terrorism is argued to be one of the cases in which intentionally profiting from human death is morally laudable because it is usually highly respectful of the relevant matters of life and death. An important exception to this general rule will also be discussed: when terrorists intentionally profit from their own attacks.

4.1 Causing terrorism

'Causing' is a repugnant association to have with terrorism, so if PMsoT contribute to human death in anyway, then repugnance about PMsoT would be legitimate. While criticising PAM, Senator Thomas Daschle claimed that: "Most traders try to influence their investments"⁹, and that PMsoT are "an incentive actually to commit acts of terrorism" (c.f. Schoen 2003, no page) Daschle's implication is that after buying shares in a prediction about a terrorist attack, some traders will carry out such an attack to reap the financial rewards.

But, this implication is implausible. Imagine that a trader in a PMoT invests the maximum value allowed by that market in the prediction that a terrorist attack will be carried out. First, regardless of how much the trader invests, their money will remain in the market, and cannot circuitously cause the terrorist attack to happen. In fact, betting a lot of money that a terrorist attack will occur might even have the effect of deterring terrorists from attacking (if the terrorists notice the price rise in the market and assume that news of their planned attack has spread past their own group). Furthermore, betting that a terrorist attack will occur cannot fund terrorists unless the terrorists short the stock (i.e. bet that there will not be an attack), don't commit an attack themselves, and hope that no other terrorists commit an attack. Ironically, this would effectively align the terrorists' interests with everyone else's (hoping that there are no terrorist attacks).¹⁰ Therefore, even if the attack occurs, the trader has no causal

⁹ Comments by Senator Thomas Daschle in Congress (Congressional Record Vol. 149, No. 114, 29 July 2003: S10082-S10083).

¹⁰ Note that regardless of the behaviour of individual traders, there are potential ways that terrorists could make money from PMsoT, but if the PMs are effective intelligence-gathering PMsoT, then all of the ways that terrorists could profit from the markets would provide useful information that would increase the chances of the attack being thwarted and the terrorists being captured. Terrorists buying shares in predictions about attacks that they already intended to carry out are discussed in the Subsection 4.3.

relationship to it—their investment has not increased the likelihood of the attack occurring, nor has it funded any organisation which would carry out such an attack.

Secondly, traders who would not otherwise have become terrorists are highly unlikely to commit acts of terrorism just because they invested in a PMoT. While financial motives obviously do drive many people to commit criminal acts, there are many other far less risky ways for money-hungry opportunists to get rich. Theft and fraud seem obvious examples. So, the claim that PMsoT are repugnant because they will encourage non-terrorists to become terrorists is too implausible to warrant further discussion. Therefore, neither PMsoT, nor the traders who bet on them are associated with terrorism in a causal way. So, if the repugnance about PMsoT is not to be misguided, then it had better be the result of some other immoral association between PMsoT and terrorism.

4.2 Endorsing terrorism by association

Endorsing is a repugnant association to have with terrorism. When a trader in a PMoT bets that a terrorist attack will occur, they align their financial interests with the destructive interests of terrorists. This is because, if the terrorists succeed in their plans for a destructive attack, then the traders who bet on an attack occurring will financially profit. Does this alignment of interests, or the manner in which PMsoT enable this alignment of interests, constitute an endorsement of terrorism?

On the one hand, betting that a terrorist attack will occur does not endorse or denounce terrorism. Indeed, a PMoT trader who bets that a terrorist attack will occur does not necessarily endorse the attack; the trader may think terrorism is always a horrific and unjustifiably excessive use of violence. On the other hand, however, even if betting on a terrorist attack is not endorsing of terrorism, the non-endorsing association of 'betting on' with 'terrorist attacks' does seem slightly disturbing. Indeed, this reaction is likely to have been encouraged by George W. Bush's pronouncements that terrorism is an evil force that "must be opposed", and that "you are with us or you are with the terrorists" (Bush 2002, no page). It might be the case that the constant anti-terrorist rhetoric Bush and Clinton used while they were in office (see Lazar and Lazar 2004) has had the effect of making people believe that the only morally permissible associations with terrorism are of the preventing or denouncing kind. I.e., both positive associations, such as endorsing, and neutral associations, perhaps including disinterested betting on,

might be perceived as repugnant given the framing of public debate about terrorism in black and white—with us or against us—terms. If ‘betting on’ is seen as a neutral association with terrorism, and if the only acceptable associations with terrorism are preventing or denouncing, then ‘neutrally’ betting that a terrorist attack will occur will still be seen as repugnant. And, perhaps encouraging traders to do something other than prevent or denounce terrorism is a valid reason to think that for-profit PMsoT are immoral and legitimately repugnant. But notice that effective intelligence-gathering PMsoT require traders to bet that terrorist attacks will occur (as well as betting against their occurrence), and that such trades would be useful in preventing terrorism. Therefore, intelligence-gathering PMsoT (which are intended to help prevent terrorism) elicit the neutrally associated betting in the service of the (clearly negatively associated) preventing and denouncing of terrorism.

But now reconsider the traders’ association with terrorism in PMsoT. While traders who bet that a terrorist attack will occur have potentially aligned their financial interests with the interests of terrorists, they have also taken steps that might help prevent the terrorist attack from occurring and possibly even lead to the capture of the terrorists. It’s hard to say exactly, but it seems likely that a small proportion of traders would also bet that a terrorist attack would occur because they expect an attack will be attempted, and they want to help prevent it. It seems, then, that the moral status of the actions of traders who align their financial interests with the interests of terrorists by betting that a terrorist attack will occur depends on both the extent to which the traders have the intention to help prevent terrorism and whether the prediction market is constructed in such a way that its prices might actually be able to help prevent a terrorist attack. While for-profit PMsoT are not expected to include many traders who are trading with the intention of helping to prevent terrorist attacks, explicitly intelligence-gathering PMsoT may well attract traders who have terrorism-preventing motivations for their trading. Similarly, while the prices in for-profit PMsoT are not expected to be helpful in preventing terrorism,¹¹ the prices in effective intelligence-gathering PMsoT would be helpful in preventing terrorism.

¹¹ For-profit PMsoT are likely to be part of more general PMs that only contain a few fairly general predictions about terrorist events. They are also unlikely to contain ‘full sets’ of specific terrorism-related events, such as different specific locations or timeframes for the attacks. For example, even if the price for the Intrade prediction that there will be a WMD attack (mentioned earlier) is rapidly increasing, security

In sum, it seems that repugnance about for-profit PMsoT might not be misguided (based on the moral framework of the critics) because for-profit PMsoT are associated with terrorism neutrally instead of preventing or denouncing it. Furthermore, for-profit PMsoT also encourage traders to associate themselves with terrorism in a neutral way (betting on), rather than in a negative way. Comparatively, effective intelligence-gathering PMsoT are associated with terrorism in a morally laudable preventing and renouncing way, and while they do encourage traders to relate to terrorism in a neutral way (betting on), they also enable traders to relate to terrorism in a preventing way, making them only slightly morally problematic in total and, all things considered, at least morally acceptable. Therefore, any repugnance about PMsoT that has been caused by the framing of these prediction markets' association with terrorism as being mainly or wholly a neutral betting one, is misguided because these PMs' main (and net) associations with terrorism are negative preventing and renouncing ones.

4.3 Profiting from human death

'Knowingly planning to profit from' is a prima facie repugnant association to have with death, so, regardless of whether they endorse or renounce terrorism, PMsoT might still be legitimately considered repugnant because they enable traders to knowingly profit from human death. Consider celebrity death pools, such as www.stiffs.com, in which people create lists of famous people that they expect to die in the next year, and stand to win real money if they are right. People who take part in celebrity death pools might not hope for any of the celebrities on their list to die, but they do intend to profit because they think those celebrities are likely to die. Similarly, PMsoT traders who bet that terrorist attacks will occur might not consciously endorse terrorism, but they can still profit from it. In this way, PMsoT and some of the actions of those who trade in PMsoT might be considered repugnant because 'knowingly planning to profit from' seems to be a repugnant association to have with 'human death', and likewise for enabling such an association.

and intelligence forces couldn't do anything other than go on 'high alert' and intensify their normal operations in response to this warning. Only PMs that have been specifically designed to help prevent terrorist attacks are likely to contain specific enough predictions and a broad enough coverage of terrorism-relevant events to provide useful information to prevent terrorist attacks.

However, profiting from human death isn't always immoral or repugnant, and can in fact be morally laudable depending on the relevant contextual factors, including the intentions behind, and effects of, the actions taken, and, perhaps most importantly, whether the actions are performed in a way that is respectful of the weighty matters of life and death involved. Therefore, while some cases of repugnance based on knowingly profiting from human death will be legitimate, others will be misguided. Consider the case of funeral directors. Funeral directors knowingly plan to profit from human death, but their profession is not repugnant. Indeed, skilled funeral directors do not cause death or seek to belittle matters of life and death; rather they aim to manage deaths in a way that is respectful of the dead people and their families by arranging for the culturally appropriate treatment of the body of, and service for, the deceased. Furthermore, by taking care of the more mundane and morbid aspects of dealing with the dead, funeral directors enable families of deceased relatives more time to grieve appropriately. Therefore, even though funeral directors profit from death, any repugnance felt about the profession would be misguided because funeral directors actually show high levels of respect to the weighty matters of life and death involved. That is to say that, in the case of funeral directors, their 'knowingly profiting from' association with human death cannot be the cause of legitimate repugnance because the intentions for, and effects of, funeral directors' activities is highly respectful of the relevant matters of life and death.

Consider also that couples who decide to get health or life insurance policies for themselves or their children are essentially betting that unfortunate and even tragic events will occur to (presumably innocent) people that they love (Pennock 2004). These policies might enable someone to knowingly profit considerably from the tragic death of their partner. Life insurance is in fact one of many ideas that started out being widely rejected for its repugnance until its practical benefits were recognised as being more important than its potential moral issues (Roth 2007). Indeed, these days, it might even be argued that it would be morally praiseworthy for families in certain circumstances to take out life insurance policies on particular family members because it could help ensure that the family avoid the dire possibility of compounding negative circumstances, which can occur if the main-income-earning family member dies. For families such as these, taking out a life insurance policy can be associated with human death in a 'knowingly profiting from' way. However, the action is highly respectful of the

relevant matters of life and death because it helps to prevent lives from being burdensomely filled with suffering, and grants the deceased's wishes that her or his family is supported in their absence. Therefore, the highly respectful intentions and effects of taking out a life insurance policy makes the initial repugnance about life insurance companies encouraging people to put themselves in a position in which they stand to knowingly profiting from human death seem to be misguided.

Given that knowingly planning to profit from human death is not always legitimately repugnant or immoral, and may even be morally praiseworthy, we cannot assume that knowingly planning to profit from terrorist attacks (or enabling such behaviour) is legitimately repugnant simply because it is a derivative case of knowingly planning to profit from human death. There are two quite different justifications for why enabling traders to knowingly plan to profit from human death is immoral. The first relates to traders who knowingly plan to profit from human death and also plan to cause the human death so that they can profit. The second justification for repugnance about the way PMsoT encourage traders to knowingly plan to profit from human death relates to traders who are not also planning to cause the human death so that they can profit (which should be the vast majority or perhaps even all PMsoT traders). Each justification will be discussed in turn.

Indeed, Senators Wyden and Dorgan (2003) worry that terrorist cells could fund their campaigns of terror by investing heavily in the occurrence of an attack they are planning. The most likely claimed justification for the repugnance of enabling traders to profit from the human death their terrorist attacks will cause is that evil-doers should not be rewarded for their evil deeds (Weijers 2013a; e.g., Stiglitz 2003). However, consideration of a relevant example reveals that the moral principle referred to here should best be understood as 'evil-doers should not be rewarded for their evil deeds, except when doing so has the actual and intended effect of preventing a tragic event from occurring'. According to Hanson, paying people, including bad people, to tell us about bad things is intrinsic to intelligence-gathering (c.f. Shachtman, 2003). Consider the bribery of an informant who had helped commit past acts of terrorism and plan future attacks. The government would essentially be paying the informant in order to prevent the tragic deaths that the informant has helped plan to bring about. Also consider that the informant might not have any useful information if they had not taken a role in planning future attacks. Clearly, this example is an instance of the government

paying a bad person because they have done a bad thing (planned future terrorist attacks), and they think that the planned tragic event can be prevented. Paying this kind of person is likely a last resort for intelligence agencies, something they would only do if the information could not be acquired in other ways.

As discussed earlier, if PMsoT are effective, then they will elicit information about potential terrorist attacks that could not be gathered in other ways (or in as timely a manner), and that such information could be used to prevent terrorist attacks and capture terrorists. So, it seems that PMsoT's creating the possibility that terrorists could profit from their planned attacks fits the exception clause of the moral principle that bad people should not be rewarded for doing bad things. Recall that the only way for terrorists to make money from their attacks via a PM is to buy shares in the occurrence of the kind of attack they are planning to commit. It was previously argued that such betting would be unlikely as it is not prudential. Nevertheless, it is possible that it would occur. If terrorists did make such bets, then it is true that they would stand to profit from their planned attack, the enabling of which seems repugnant. But by enabling this potentially small profiting, PMsoT also increase the chances that the terrorists in question will be captured, and their attack thwarted, in which case they do not get paid.¹² So, assuming that the PMsoT and the intelligence agencies other actions are coordinated effectively, actually paying terrorists for their attacks is extremely unlikely.

Furthermore, PMsoT only reward good information (correct predictions), whereas informants might provide bad information, take the money, and go into hiding. As a result, PMsoT seems a safer bet than some morally acceptable instances of paying informants, and also seems much less likely to reward bad people for doing bad things. So, assuming that the critics of PMsoT endorse the moral principle, evil-doers should not be rewarded for their evil deeds, except when doing so has the actual and intended effect of preventing a tragic event from occurring, and they view paying informants as being covered by this exception clause, the critics should also view PMsoT as being covered by this exception clause. Therefore, critics who justify their repugnance about PMsoT based on PMsoT's potential to pay bad people for doing bad things are likely mistaken about the specifics of their own moral framework. And, any critics who view

¹² The terrorists not getting paid is most obvious if the PMoT in question fully refunds all positions in predictions about terrorist attacks if an attack is thwarted (as discussed earlier).

PMsoT as repugnant because they believe evil-doers should not be rewarded for their evil deeds, except when doing so has the actual and intended effect of preventing a tragic event from occurring are likely experiencing mistaken repugnance because PMsoT have the actual and intended effect of preventing a tragic events from occurring.

As for traders who do not knowingly plan to profit from terrorist attacks that they will commit, the most plausible justification for the repugnance of their actions is that they fail to appropriately respect the weighty matters of life and death involved. Indeed, Hanson (2006, p. 291) has argued that the main reason that critics of PAM find PMsoT repugnant is that purposefully making money from the terrorist acts of others is immoral because “none of us should intend to benefit when some of them hurt some of us”. Therefore, whether PMsoT appropriately respect the matters of life and death relevant to terrorist attacks will decide whether the repugnance can be considered misguided on the critics’ moral framework.

As mentioned above, intelligence-gathering PMsoT have the intention and effect of preventing the tragic destruction and human deaths that terrorist attacks can cause. This ‘preventing’ association with terrorism seems to be the most respectful association possible with the relevant matters of life and death. So, although PMsoT encourage traders to put themselves in a position in which they could knowingly profit from human death, this association with death is analogous to the one between life insurance companies and human death because the association is in the context of intending to respect, and actually respecting, the relevant matters of life and death. Most important here is that PMsoT enable traders to profit financially from human death, but intend to, and are very likely to actually, have the effect of enabling innocent civilians to profit in terms of lives saved. Furthermore, preventing potential future deaths from terrorist attacks is surely something that people whose lives have been ineluctably affected by terrorism would judge as being highly respectful of the relevant matters of life and death.

But what of the actions of the traders themselves? When individual traders bet that a terrorist attack will happen, they have put themselves in a position such that they could knowingly profit from terrorist-caused human death (if there is a successful terrorist attack). Are these individual actions immoral and thereby a legitimate cause of repugnance about PMsoT? Again, an important consideration will be whether the

intention and effect of such trading behaviour is respectful of the weighty matters of life and death involved.

As mentioned above, trading in PMsoT, including betting on terrorist attacks occurring, will have the effect of preventing terrorism. Since the depth of a prediction market (the amount of trades offered in it) is one of the most important criteria for its accuracy (Ho & Chen 2007), the more trades the better. Therefore, the effect of traders' betting on terrorist attacks occurring is greater accuracy of the PMsoT and an increased chance of preventing terrorist attacks. So, the *effect* of traders putting themselves in a position in which they can knowingly profit from terrorist attacks is clearly morally praiseworthy because it respects the relevant matters of life and death by preventing terrorism.

However, it is not clear exactly what the intentions of traders on PMsoT are. Nevertheless, they are likely to include: preventing terrorist attacks, gaining financial reward, and pursuing an interest in prediction markets or terrorism. Intending to pursue an interest in prediction markets or terrorism by trading on PMsoT seems not to affect the morality of the association of 'knowingly profiting from' between a trader and terrorism (at least without further details, which are likely to only apply to an extreme minority of cases).

In contrast, intending to prevent terrorism has the effect of making the association of 'knowingly profiting from' between a trader and terrorism a morally laudable one. A well-intentioned trader has to bet on a terrorist attack occurring if their information about such an attack occurring is going to send a signal through the market. But, if the trader is so well-intentioned, it might be asked, why don't they simply alert the appropriate authorities, rather than sending this signal through the market? There are many reasons why a trader would prefer to use the market, including: the trader is of a race or ethnicity considered suspicious by the authorities and fears undue suspicion and reprisal from the authorities, the trader lives in a foreign country and does not know how to contact the correct authorities, and the trader believes that their information will fall on deaf ears if they attempt to disseminate through non-market channels. Indeed, it is the traders' willingness to put their money on the line that makes signals sent through the market seem more worthy of attention than messages sent directly to the authorities (which have to be considered alongside hoaxes and messages from people suffering from paranoid delusions). Finally, consider that an intelligence

operative tasked to predict terrorist attacks might get a pay increase if they are correct (or might get demoted if they are incorrect). Such an operative could also put themselves in a position in which they stand to gain from terrorist-caused human death. The money stood to be gained and lost could be much greater for this operative than for a trader in PMsoT. Is this stronger profit motive likely to register with the intelligence operative, or be outshone by the intention to prevent terrorist attacks? It seems unlikely that the operative would consider profit as a major motive, so why would it be any different for a trader in PMsoT (who has less to lose or gain financially)?

The intention that does seem to make the association of 'knowingly profiting from' between a trader and terrorism immoral, and thereby a potentially legitimate source of repugnance about PMsoT, is the intention to gain financial reward. If asked to justify why this intention seems repugnant, people would likely claim that it is repugnant because it is disrespectful of matters of life and death. However, the intention to gain financial reward seems like it would not be a particularly important intention for traders in PMsoT. As the results in several for-profit prediction markets show, only a small amount of the traders make anything remotely close to a good hourly rate by betting on prediction markets. As a consequence, most traders (who have low quality information) tend to lose money on PMs in the long run, and could make more money doing regular work. Therefore, it's unlikely that profit is a major incentive for most (low-quality-information-providing) traders to trade in PMsoT, and if profit is their motive, then they soon exit the market after losing their initial investment. Furthermore, those who have made a decent amount of money on prediction markets are most likely those with very high quality information about a limited set of predictions, and the trades of these traders on those limited sets of predictions are likely to make the PMsoT considerably more accurate. Moreover, the few traders with high quality information are likely to realise the importance of their bets for sending an accurate signal from the market to security and intelligence agencies. So, like the intelligence operative tasked with predicting terrorism discussed above, the main candidates for having strong financial incentives to trade are also likely to have strong preventing-terrorism intentions.

In sum, traders' intentions are more likely to be about preventing terrorist-caused human death than profiting from it, and the other potential intentions do not seem to clearly respect or disrespect the matters of life and death involved. Therefore

both the effect, and net intentions, of individual traders' putting themselves in a position in which they can knowingly profit from terrorism are, all things considered, morally laudable because they respect matters of life and death by intending to prevent, and actually preventing, terrorism. As a result, any repugnance that has been caused by PMsoT encouraging traders to knowingly profit from terrorist-caused human death (and that trading itself) is likely to be misguided because PMsoT's encouraging of such trades (and those trades themselves) has the effect, and all things considered intention, to prevent terrorist-caused deaths, which is highly respectful of the relevant matters of life and death. Again, however, repugnance about for-profit PMsoT is unlikely to be misguided because for-profit PMsoT do not have the intention, and will not have the effect, of preventing terrorist-caused human death and thereby respecting the relevant matters of life and death.

5. Conclusion

In this paper it was assumed that carefully constructed intelligence-gathering PMsoT would be effective—i.e. they would elicit useful information that the extant intelligence-gathering methods might not (or elicit the same information in a timelier manner). Based on this assumption, possible justifications for feelings of repugnance (morally charged revulsion) about PMsoT were assessed to see if they are likely to be misguided.

Repugnance about for-profit PMsoT was found to be legitimate because for-profit PMsoT are not associated with terrorism in a negative (preventing or denouncing) way and encourage traders to knowingly profit from terrorist-caused human death in a way that does not adequately respect the relevant matters of life and death. In contrast, intelligence-gathering PMsoT were argued to be associated with terrorism in a preventing and renouncing way, and to enable traders to relate to terrorism in a preventing way. It was also argued that PMsoT's encouraging traders to bet on terrorist attacks (and traders' corresponding actions) has the effect, and all things considered intention, of preventing terrorist-caused deaths, which is highly respectful of the relevant matters of life and death. It was concluded, therefore, that any repugnance about how PMsoT were associated with terrorism, including whether they respected the relevant matters of life and death, is likely to be misguided. Furthermore, since it was argued that these potential sources of repugnance are likely to be the main

sources, then the misguidedness of repugnance about these associations means that most of the repugnance about PMsoT is likely to be misguided.

These results mean that, unless effective intelligence-gathering PMsoT can be argued to be legitimately repugnant for some other reason, governments should reconsider trialling PMsoT to better gauge their efficacy. After all, if there is a morally acceptable technology that could decrease the incidence of terrorism, then the horrific devastation of terrorist attacks provides a strong reason to implement tests of the new technology.

The discussion in this paper also highlights the importance of proactively framing public discourse about new technologies. Had PAM been framed as a serious *anti-terrorism* technology that will help with the War on Terror, instead of a terrorism betting game in which people can bet *for* terrorist attacks occurring, then its trial may have gone ahead. Indeed, if PAM's trial had gone well, a fully-fledged government-backed intelligence-gathering PMsoT might have been set up in time to prevent recent terrorist attacks such as the Boston Marathon bombing.¹³

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