Spoiler or Stabilizer?

Assessing the Role of Private Military and Security Companies in Armed Conflicts

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To my parents,

Aeicha and Sarwar Hadjer,

and my brother,

Tayeb Hadjer

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List of Abbreviations

AFRC	Armed Forces Revolutionary Council
APPF	Afghan Public Protection Force
AR	Abnormal Returns
BRD	Battle-related Deaths
CAR	Cumulative Abnormal Returns
CBO	Congressional Budget Office
CPA	Coalition Provisional Authority
CSTC-A	Combined Security Transition Command-Afghanistan
CWC	Commission on Wartime Contracting
DEFIN	Defence and Aerospace Index
DOD	US Department of Defence
EMH	Efficient Market Hypothesis
EU	European Union
FCO	UK Foreign and Commonwealth Office
FTSE	Financial Time Stock Exchange
GAO	Government Accountability Office
GDP	Gross Domestic Product
GSG	Gurkha Security Guards
ICoC	International Code of Conduct for Private Security Providers
IHL	International Humanitarian Law
ISAF	International Security Assistance Force
ISOA	International Stability Operations Association
JNA	Yugoslav People's Army
MPRI	Military Professional Resources Incorporated
NATO	North Atlantic Treaty Organization
NBM	Negative binomial model
NIE	New Institutional Economics
NR	Normal returns
PAT	Principal-Agent Theory
PM	Poisson regression model
PMSC	Private Military and Security Company
PMSF	Private Militär- und Sicherheitsfirmen
PRIO	Peace Research Institute Oslo
Q.E.D	Quod erat demonstrandum
RCI	Rational Choice Institutionalism
RUF	Revolutionary United Front
S&P	Standard and Poor's
SIGAR	Special Inspector General for Assistance Force
UK	United Kingdom
UN	United Nations
US	United States of America
US EHII	University of Texas Estimated Household Income Inequality
WITS	Worldwide Incidents Tracking Systems

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Abstract

Private Military and Security Companies (PMSCs) have become a major global player within the international security structure and have gained intensive media and academic attention – particularly since their involvement in international interventions such as in Afghanistan in 2001 and in Iraq in 2003, where they served intermittently as the second largest occupying power after the United States. Given the legal grey area in which PMSCs operate and their incisive impact on issues such as the legitimate use of force and security as a public good, the increased use of PMSCs has been the subject of much academic and public controversy.

Previous research on PMSCs has largely focused on contextual factors that have facilitated the emergence and rise of the private military and security industry, on the consequences of using PMSCs on issues such as state sovereignty and authority, democratic mechanisms, security, human rights, and on the question how to establish effective accountability, monitoring and regulatory mechanisms. Studies investigating factors that are conducive to a spoiling or stabilizing role of PMSCs in conflict are rare. This is particularly astonishing given the increased reliance of states as well as non-state actors on the support of PMSCs when operating in conflict zones. However, in order to benefit from the advantages and minimize the risks associated with the use of PMSCs, it is of utmost importance to understand the mechanisms driving the behaviour of PMSCs and to identify parameters that actually can be influenced to induce a desired performance of PMSCs.

Therefore, this thesis tries to fill this niche by analyzing contractual arrangements between states and PMSCs. A formal principal-agent model is developed with which the exact mechanisms driving the behaviour of PMSCs as well as decisive contractual factors that can be constituted by states to induce a desired performance of PMSCs are scrutinized. It is argued that given the existing agency problems and the particular environment in which states and PMSCs interact, traditional ways of assessing performance and providing incentives through explicit contracting is hardly feasible. Rather, there exists a mutual implicit understanding between states and PMSCs whereby the state incentivizes PMSCs with the prospect of a bonus in case of repeated collaboration – if and when the PMSC has performed well in the previous collaboration. However, due to the implicit nature of the agreement, the state must be able to credibly promise to compensate the PMSC for a good performance. The relation between a credibly promised bonus and the performance of PMSCs is examined in two empirical studies.

First, it is examined whether there is a measurable difference in the conflict intensity of civil wars in which the state was able to credibly commit to a bonus and those in which the principal could not

promise a bonus. In due consideration of intervening variables, a high effort level of involved PMSCs should negatively affect conflict intensity and *vice versa*. A cross-sectional analysis of worldwide civil wars in which PMSCs operated shows that in conflicts in which the state could credibly promise a bonus, the presence of PMSCs is significantly associated with lower levels of conflict intensity compared to conflicts in which the state could not promise a bonus.

Second, using an event study it is examined whether investors' expectations about future profits of PMSCs decrease in view of an anticipated decrease in PMSCs' performance. The results of the event study indicate that a low effort level of PMSCs (more precisely investors' perception of such) decreases investors' expectations about PMSCs' future profits. However, the findings need to be interpreted with caution as they are not robust across different model specifications.

Zusammenfassung

In den vergangenen Jahren haben sich private Militär- und Sicherheitsfirmen (PMSF) zu einem bedeutenden Akteur in der internationalen Sicherheitsarchitektur entwickelt und große mediale sowie akademische Aufmerksamkeit erregt. Die zunehmende Bedeutung dieser Akteure wird jedoch aufgrund der rechtlichen Grauzone, in der sie operieren, sowie der Bedrohung, die sie für das staatliche Gewaltmonopol und für die Bereitstellung von Sicherheit als ein öffentliches Gut darstellen, äußerst kritisch diskutiert.

Die bisherige wissenschaftliche Beschäftigung mit diesem Phänomen konzentriert sich insbesondere auf die Frage nach den notwendigen rechtlichen und regulatorischen Rahmenbedingungen für die Aktivitäten dieser Firmen, auf die Untersuchung politisch-ökonomischer Faktoren, die die Entstehung und den Aufstieg der privaten Militär- und Sicherheitsindustrie begünstigten, sowie auf die Erforschung von Konsequenzen, die sich aus einer verstärkten Nachfrage nach PMSF für beispielsweise die Souveränität und das Gewaltmonopol von Staaten, für demokratische Entscheidungsmechanismen, für die Legalität und Legitimität von Gewaltausübung, für menschliche Sicherheit und dem Konflikt, in dem sie operieren, ergeben. Die meisten Studien sind deskriptive Fallstudien, die es schwierig machen, die tatsächliche Rolle von PMSF in einem Konflikt zu bestimmen oder generelle Faktoren zu identifizieren, mit denen man die Performanz dieser Firmen beurteilen könnte.

Es gibt bisher wenige Studien, die gezielt Faktoren untersuchen, die das Verhalten von PMSF beeinflussen und damit dazu beitragen, ob PMSF eine stabilisierende Rolle in einem Konflikt einnehmen, oder ob sie gar zu einer Verschärfung dessen beitragen oder zumindest nicht im besten Interesse der beteiligten Akteure agieren. Angesichts der zunehmenden Nachfrage nach PMSF durch staatliche aber auch nicht-staatliche Akteure und ihrer wachsenden Rolle in Krisengebieten ist diese Forschungslücke jedoch besonders überraschend.

Vor diesem Hintergrund untersucht die vorliegende Dissertation welche Faktoren das Verhalten von PMSF maßgeblich beherrschen und identifiziert Parameter, die der Staat beeinflussen kann, um die von ihm erwünschte Performanz von PMSF herbeizuführen. Dabei wird insbesondere folgende Fragestellung erforscht: Welche Anreizstrukturen können Staaten für PMSF schaffen, um eine höchstmögliche Leistungserbringung dieser Firmen zu generieren? Diese Frage ist der Ausgangspunkt der vorliegenden Arbeit.

Um diese Frage theoretisch und empirisch zu beantworten wird die Beziehung zwischen Staaten und PMSF als ein klassisches Prinzipal-Agenten-Verhältnis aufgefasst, aus dem die Mechanismen, die

das Verhalten beider Akteure beeinflussen sowie die vertraglichen Rahmenbedingungen, die ein Staat festsetzen kann, um die erwünschte Performanz zu erzeugen, abgeleitet werden. Dabei argumentiert die vorliegende Arbeit, dass in Anbetracht der ohnehin bestehenden Agency-Probleme, die durch das Konfliktumfeld in dem Staaten und PMSF agieren zusätzlich verschärft werden, die Schaffung von Anreizstrukturen durch klassische Entlohnungsschemata im Rahmen einer expliziten Vertragsvereinbarung nur sehr schwer realisierbar sind. Es wird daher angenommen, dass Staaten die notwendigen Anreize implizit schaffen, nämlich durch eine implizite Vereinbarung zwischen Staat und PMSF wonach der Staat eine gute Leistung einer PMSF mit einem Bonus im Rahmen einer erneuten Zusammenarbeit belohnt. Da dieses implizite Versprechen auf einen Bonus nicht vor einer dritten Instanz eingeklagt werden kann, muss der Staat in der Lage sein, ein glaubwürdiges Versprechen zu machen, um die PMSF dahingehend zu motivieren die bestmögliche Leistung zu erbringen. Der Zusammenhang zwischen der Fähigkeit eines Staates einen Bonus glaubwürdig in Aussicht zu stellen und der Performanz von PMSF wird in zwei empirischen Studien untersucht.

Die erste Studie untersucht, ob sich ein messbarer Unterschied in der Konfliktintensität von Bürgerkriegen mit Beteiligung von PMSF feststellen lässt, in denen der Staat glaubwürdig einen Bonus in Aussicht stellen konnte und solchen Konflikten, in denen der Staat kein glaubwürdiges Versprechen machen konnte. Dabei wird angenommen, dass – unter Berücksichtigung intervenierender Variablen, die auch einen Einfluss auf die Konfliktintensität von Bürgerkriegen ausüben - eine hohe Performanz von PMSF sich negativ auf die Konfliktintensität auswirken sollte und vice versa. Die Ergebnisse der Studie bestätigen den vermuteten Zusammenhang: Die Konfliktintensität korreliert negativ mit der Glaubwürdigkeit des in Aussicht gestellten Bonus.

Im zweiten empirischen Teil wird mit Hilfe einer Ereignisstudie untersucht, ob sich die Erwartungen von Investoren börsennotierter PMSF über deren zukünftige Gewinne angesichts einer schlechten Performanz dieser Firmen verringern. Die Ergebnisse der Ereignisstudie deuten an, dass eine minderwertige Leistung von PMSF (bzw. die Einschätzung der Investoren darüber) sich negativ auf Investitionsentscheidungen der potentiellen Anteilseigner auswirkt.

Die theoretischen und empirischen Ergebnisse der vorliegenden Arbeit tragen zu einem besseren Verständnis der Mechanismen, die das Verhalten von PMSF beeinflussen, bei und helfen damit Faktoren zu identifizieren, die dazu beitragen, ob PMSF eine stabilisierende Rolle in einem Konflikt einnehmen, oder ob sie gar zu einer Verschärfung dessen beitragen.

1 Introduction: Changing Patterns of Security Provision

1.1 The Puzzle, the Argument and the Contribution

"The United States will not be able to conduct large or sustained contingency operations without heavy contractor support" (CWC, 2011:13). This was one of the conclusions of the final report of the Commission on Wartime Contracting, a legislative body which was established by the US Congress to study US wartime contracting in Afghanistan and Iraq in 2008. This quote illustrates the new reality of modern warfare: A considerable amount of previously inherent state functions is outsourced to private companies and states become more reliant on these companies in current and future military operations.

In this context, private military and security companies (henceforth PMSCs) have become an increasingly crucial player. Like no other actor, they illustrate the fundamental change classic warfare has faced. The concept of classic warfare, which centres on the nation state as the exclusive possessor of the monopoly on the legitimate use of force, has been challenged - particularly in the course of the end of the Cold War (Bailes et al., 2007). The process of globalization and the influence of neo-liberal economic models, which are based on the idea that comparative advantage and competition maximize effectiveness and efficiency, triggered the privatization of inherent state functions - among them core security functions (Abrahamsen and Williams, 2007). Furthermore, leading industrial states have not been willing anymore to intervene in armed conflicts which are peripheral to their direct strategic interests (Mandel, 2002; Singer, 2003; Ortiz, 2010). This decreasing willingness has been accompanied by an increased number of internal armed conflicts in regions of weak or failed statehood (Gleditsch et al., 2002). As a further consequence of the end of the Cold War and the removal of imminent danger, many states downsized their militaries, thereby drowning the market with low priced weapons and well trained but unemployed servicemen (Mandel, 2002). These parallel occurring developments had two complementary effects. On the one hand, the security vacuum in regions of fragile statehood created a strong and urgent demand for private military and security services. On the other hand, a global market of discretionary private military and security services began to satisfy this demand (Singer, 2003). In this context, PMSCs have established themselves as a major global player.

Previous studies on PMSCs have largely focused on politico-economic factors that have facilitated the emergence and growth of the private military and security industry (Shearer, 1998; Zarate, 1998; Singer, 2003; Kinsey, 2006; Rosén, 2008; Branović, 2011; Buchan, 2011). Another large strand of the literature has explored the consequences of the increased use of PMSCs on issues such as authority,

democracy, sovereignty of states, the legitimate use of force, security as a public good, and human rights and human security (Avant, 2005; Leander, 2005b; Abrahamsen and Williams, 2010; Krahmann, 2010). Given the significant impact of PMSCs on traditional understandings of statehood and security provision, the scholarly debate has to a great extent focused on normative questions. Besides, parts of the discussion suffer from polarization - by either condemning or praising the private military and security industry. Advocates of using PMSCs emphasize the strong demand for privatized military and security provision and the industry's role in filling the security gap (Shearer, 1998; Brooks, 2000). Critics, on the other hand, consider the strong reliance on PMSCs a threat for state authority and the legitimate use of force and fear the blurring of responsibilities, the weakening of democratic mechanisms and the legal grey area that surrounds PMSCs' activities (Cilliers and Mason, 1999; Musah and Fayemi, 2000). Both sides, though, are clear about the irreversibility of PMSCs' presence in the current international security structure. Hence, a third, more pragmatically-oriented, strand of the literature has focused on how to establish effective regulatory, monitoring, accountability, and prosecution mechanisms in order to minimize the risks associated with the use of PMSCs (Chesterman and Lehnardt, 2007; Cockayne et al., 2009; Francioni and Ronzitti, 2011).

However, studies investigating contextual factors that are conducive to the performance of PMSCs are rare. This is particularly astonishing regarding the increased reliance and use of PMSCs not only by states (whether strong or weak) but also by trans-national corporations or non-governmental organizations (Singer, 2001). To a large extent, this is driven by the difficulty of finding sufficient empirical evidence. However, understanding the mechanisms that drive PMSCs' behaviour and identifying parameters which states can influence in order to induce a desired performance of PMSCs helps us to minimize the risks and benefit from the advantages associated with the use of PMSCs. The starting point of this dissertation is therefore the question which contextual factors account for a stabilizing or spoiling role of PMSCs in conflict zones. Focusing on factors that actually can be influenced by governments, I ask the question how a state can optimally motivate PMSCs to exercise high effort in order to induce a performance that is in the best interest of all parties concerned. The analysis and answer to this research question unfolds in two steps:

In the first part of the dissertation, I develop a formal principal-agent model in order to scrutinize the exact mechanisms driving the behaviour of PMSCs and to identify decisive contractual factors that can be constituted by states to induce a desired performance of PMSCs. The basic assumptions of principal-agent theory, namely that principal and agent have diverging interests and that there exists information asymmetries, reflect the problems and pitfalls inherent in the relation between states and PMSCs. I will argue that given existent agency problems and the environment in which the interaction between states and PMSCs takes place traditional ways of assessing performance and providing incentives through explicit contracting, is hardly feasible. Rather, there exists a mutual

implicit understanding between states and PMSCs whereby the state incentivizes PMSCs with the prospect of re-hiring and a higher rent in case of a repeated collaboration – if and when the PMSC has performed well in the previous collaboration. In the second part of the dissertation, I test my argument and the implications of the formal model in two empirical studies in which I statistically examine the performance of PMSCs in different conflict settings.

The research focus and methodological approach of this dissertation allows contributing to existing research both theoretically and methodologically. This is one of the first studies to analyze the implications of using PMSCs in conflict zones with the help of a formal model and quantitative methods. Thereby, this dissertation contributes to the theory building as well as methodological enlargement of this field of research. Furthermore, the results of this dissertation add to the research on contextual factors that are conducive to the performance of PMSCs – a branch of research of highly practical relevance. More precisely, this study contributes to an advanced understanding of the economic and political mechanisms driving the behaviour of both states and PMSCs, the agency problems inherent in the relationship between states and PMSCs, the impact of PMSCs on the conflict they operate in, as well as, the parameters the state is capable of influencing in order to induce a better performance of PMSCs. Thereby, the theoretical and empirical findings of this dissertation offer insights which are highly relevant not only for researchers, policy-makers and principals of PMSCs but also for those actors who are directly affected by PMSCs' activities.

1.2 The Private Military and Security Industry

PMSCs – a New Phenomenon?

Despite the common perception of PMSCs as a new actor in the international and regional security architecture, the presence of mercenaries, private militias and private military and security actors does not constitute a new phenomenon of national or international security policy. In fact, the provision of security by private actors is based on a long-lasting tradition, which was gradually replaced in the course of the peace of Westphalia in 1684 and the rise of modern nation states in Europe after the French Revolution in 1789 (Thomson, 1994:21ff; Tilly, 1990:67ff). Ever since, the modern nation state claims the monopoly of power, the legitimate use of force, as well as, the right to declare wars and raise armies. In this context, the modern nation state is defined as "a human community that (successfully) claims the monopoly of the legitimate use of physical force within a given territory" (Weber and Gerth, 1991:78). Nevertheless, private actors have remained a component of the military and security sector throughout. A popular example is the British East India Company which commanded a standing army of 200.000 men during the 17th and 18th century (see Singer, 2003:19ff and Roy, 2012).

What distinguishes the contemporary private military and security industry from past forms are its professional corporate structure and its remarkable rise since the 1990s (see Figure 1). Influenced by the process of globalization and the concept of privatization, which rests upon the idea that comparative advantage and competition maximize effectiveness and efficiency, leading industrial states have been outsourcing core functions such as education, health and security functions (Singer, 2003:66ff). Besides, the end of the Cold War resulted in a security vacuum in the developing world and revealed a number of internal armed conflicts, which threaten local, regional and global stability. Failed or collapsing states, which are not able to preserve their monopoly over the use of force or to guarantee physical security for their citizens, have created an increasing demand for private military and security provision (Mandel, 2002:60). The demand from both leading industrial as well as weak states is being accommodated by the private military and security industry. Accordingly, the number of private companies offering military and security services has enormously increased, particularly since the end of the Cold War (see Figure 1).

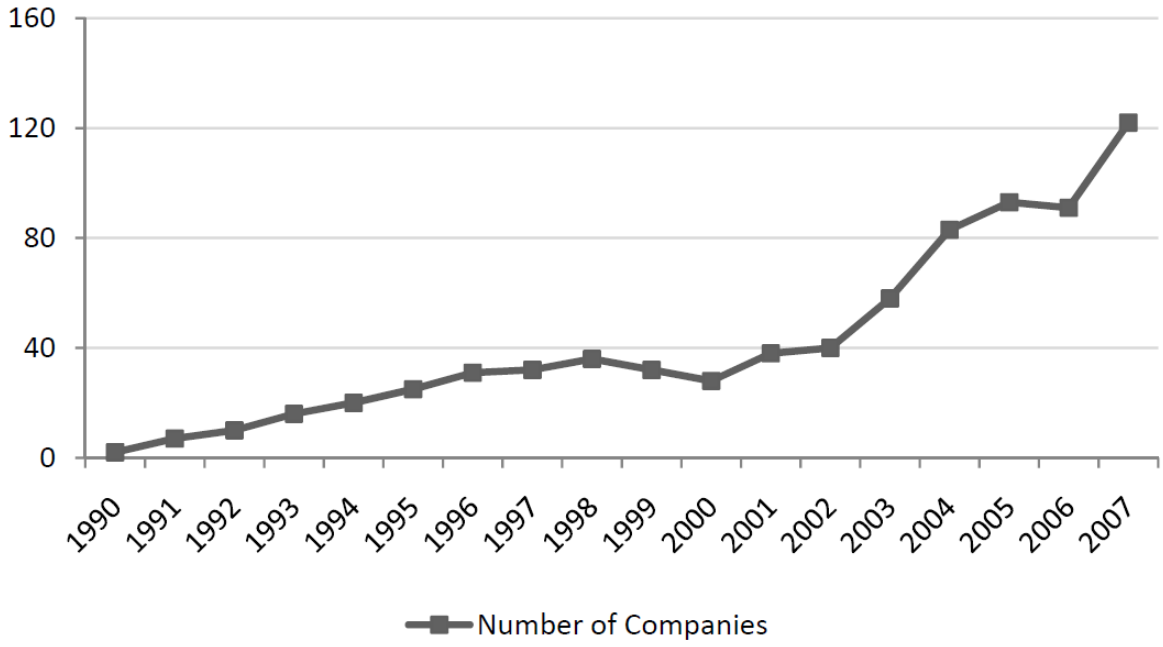


Figure 1: Rise of PMSCs since 1990[1]

The steadily growth of the private military and security industry has lead to an increased media and scholarly interest in PMSCs. There has been, though, little agreement on what PMSCs actually are and what distinguishes them from other private military and security actors. Depending on the respective agenda or normative approach, authors refer with different terms to PMSCs. Some studies use a historical approach and differentiate PMSCs from mercenaries and yet others use the notion "contractor" – a term which is especially established in the press (Isenberg, 2004; Chesterman and

[1] Source: Branovic (2011:28). The dataset, from which this figure was created, starts coding in 1990 and therefore does not comprise PMSCs before 1990s.

Lehnardt, 2007; Glanz, 2009; Carmola, 2010; Nordland, 2012). In the academic literature it is common to differentiate between private military companies (Shearer, 1998) and private security companies (Schreier and Caparini, 2005). According to these definitions, both types of companies provide their services to public and private actors. However, whereas private military companies provide offensive services, private security companies provide defensive services. In this context, the classifications of Singer (2003) and Kinsey (2006) have been highly influential.

Singer proposes a "Tip-of-the-Spear-Typology" arguing that "the best way to structure the industry is by the range of services and level of force that a firm is able to offer" (Singer, 2003:91). Singer (2003) organises the companies along their closeness to the frontline, i.e. to the battlefield (see Figure 2). He distinguishes between military support firms (companies providing non-lethal aid and assistance), military consultant firms (companies providing advisory and training) and military provider firms (companies implementing and commanding operations). Taking the public/private dimension into account, Kinsey (2006:9ff) organises PMSCs by the object they secure (private/public) and the means they employ to secure that object (lethal/non-lethal) (see Figure 2). On the horizontal axis, the array of objects that can be secured ranges from private property, such as commercial buildings and oil refineries, to the defence of states. On the vertical axis, the variety of means that can be employed to secure a specific object is displayed, ranging from unarmed security provision to armed fighting.

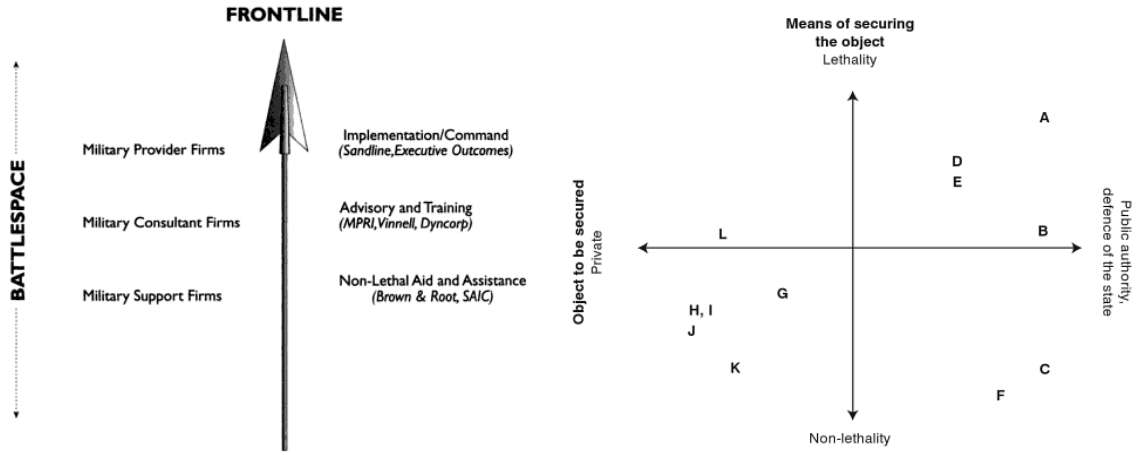


Figure 2: PMSC Typologies[2]

However, both Singer (2003) and Kinsey (2006) agree on the limits and pitfalls of an explicit differentiation between private military and private security companies. Companies operating in the private military and security industry often offer a wide range of services including both military and security services. This causes a blurring of lines between presumably exclusively military and solely security services. On these grounds, using a category broad as possible appears most appropriate.

[2] Source: Singer (2003:93) and Kinsey (2006:10)

Hence, in this dissertation, I define PMSCs as commercial and profit-oriented companies, which offer military and security services to private as well as public clients.

Which Services do PMSCs offer and to Whom?

PMSCs offer a wide range of military and security services to a diverse client base (Singer, 2001; Østensen, 2011). The services offered by PMSCs include combat operations, military assistance, intelligence, operational and logistics support, static security of individuals and property, advice and training of security forces, de-mining and weapons destruction, humanitarian aid, research and analysis, and even facility and infrastructure building (Perlo-Freeman and Sköns, 2008:6; Branovic, 2011:26).

The clients of PMSCs are as diverse as the services they offer. International organizations, like the United Nations (UN), as well as trans-national companies, like British Petroleum, humanitarian non-governmental organizations, and even rebel groups contract PMSCs to provide military and security services (Singer, 2003:183; Holmqvist, 2005:7; Mathieu and Dearden, 2007; Stoddard et al., 2008).[3] The Peace Operations Institute, a research institute of the International Stability Operations Association (ISOA – a lobbying organization of the private military and security industry) quantifies the variance as follows: "Governmental entities account for 87 percent of companies' operations […]. After government, the type of client most contracted with is international organizations, with whom 74 percent of companies contract, followed by non-governmental organizations (70 percent). Less than half of companies (43 percent) contract with private individuals" (Messner and Gracielli, 2007:20). Their regions of operation are likewise wide-ranging. According to the Peace Operations Institute, PMSCs are presently engaged in 144 countries with Iraq and Afghanistan being the largest venues of operation closely followed by Sudan, the Democratic Republic of Congo and Bosnia due to ongoing international missions (Messner and Gracielli, 2007:21). Interestingly, Nigeria is ranked tenth even though there is no international mission or greater conflict. Nigeria's placement is likely the result of the presence of the oil industry in the Niger Delta. This requires a large number of security providers. Furthermore, PMSCs do not only operate worldwide, they have also headquarters all over the world. Figure 3 shows the number of headquarters per country of PMSCs that have signed the International Code of Conduct for Private Security Service Providers (ICoC).[4] As can be seen from Figure 3 the US and UK are home to most of these PMSCs.

[3] PMSCs were hired by rebel groups in Zaire (1996-98), Angola (1998), Rwanda (1994), and in Sierra Leone (1998), see Akcinaroglu and Radziszewski (2012).

[4] The ICoC is an initiative that aims to clarify international rules of conduct and to improve oversight and accountability.

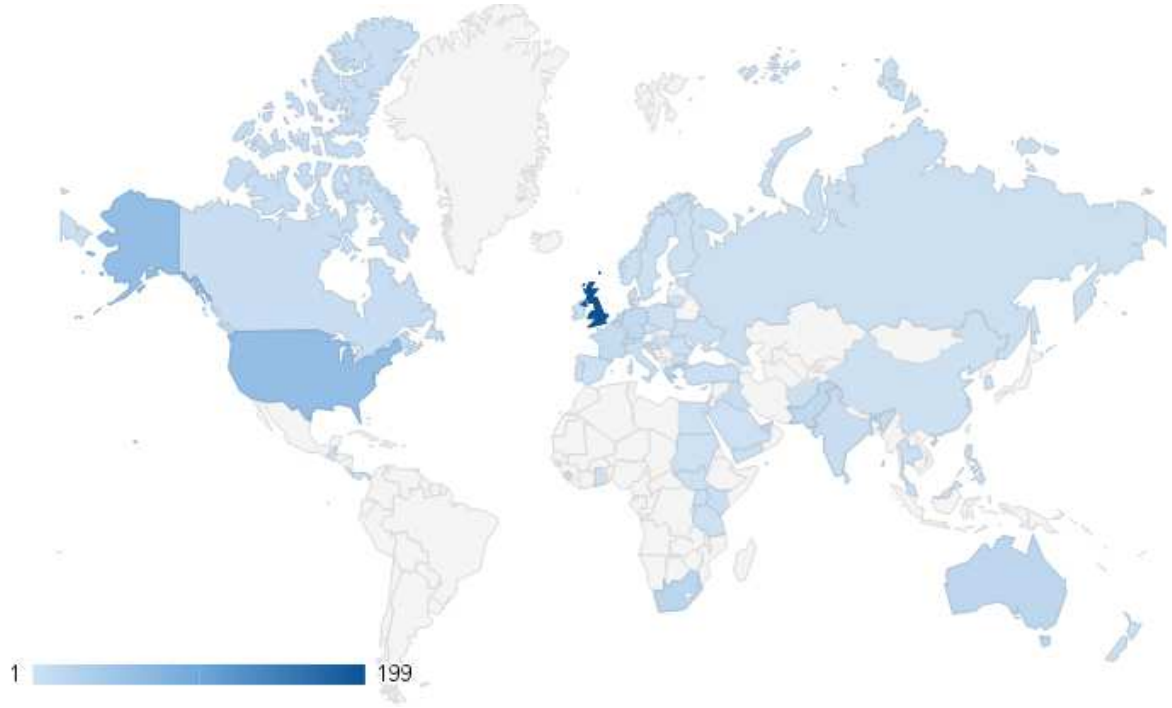


Figure 3: Number of ICoC Signatory Company Headquarters per Country 2013[5]

PMSCs during the 1990s

Especially during the 1990s, PMSCs hit the headlines with their combat operations in several African conflicts, where they had been able to shift the conflict in favour of their clients (Shearer, 1998). The South-African PMSCs Executive Outcomes and Sandline International, for example, interfered successfully in the intra-state conflicts in Sierra Leone and Angola (Howe, 1998; Shearer, 1998; O'Brien, 2000; Musah, 2002). In 1995, the government of Sierra Leone contracted PMSCs to fight against the rebel group Revolutionary United Front (RUF). Initially, the Sierra Leonean government contracted the British company Gurkha Security Guards (GSG) to provide security for the mining company Sierra Rutile and to train the public forces of Sierra Leone (Dokubo, 2000:56). However, shortly after GSG's arrival in Sierra Leone, the RUF and disloyal elements within the army lured them into an ambush where they lost their commander. As a result, GSG reneged on the contract and left Sierra Leone (Howe, 1998:326). Thereafter, in March 1995, Executive Outcome was contracted to fight the RUF and to restore internal security in Sierra Leone.[6] Before operating in Sierra Leone, Executive Outcomes was providing assistance in counter-crime and counter-narcotics activities in Colombia and security services for the Angolan oil company Sonangol in the early 1990s. On the basis of the strength of their military, equipment, tactical, and strategic superiority, Executive Outcomes managed to recapture all major mining regions, to repel the RUF rebels, and to facilitate a cease-fire

[5] Source: Private Security Monitor – University of Denver (Avant, 2013)

[6] Because Sierra Leone was not able to pay the full amount of $35 million, it granted Executive Outcomes future mining revenues (Shearer, 1998:51ff).

which ended in a peace settlement in 1996 (Howe, 1998; Francis, 1999; Dokubo, 2000).[7] In May 1997, the Sierra Leonean government was again overthrown by a coup d'état in which the military junta aligned itself with the RUF (Francis, 1999:327). On this account another major PMSC became active in Sierra Leone: Sandline International. Sandline International supplied weapons, equipment and expertise to Sierra Leonean government forces and helped in this way the government to extend their power. However, the RUF and its junta allies could not be ultimately defeated (Cleaver, 2000:143).

In the 1990s, a further famous area of operation for PMSCs was the Yugoslav War. In 1994, the US-located PMSC, Military Professional Resources Incorporated (MPRI) was contracted by the Republic of Croatia to train the Croatian military and transform it into a modern and professional force (Ortiz, 2007).[8] During the war, the Croatian army had suffered several defeats by the Yugoslav People's Army (JNA). MPRI supported the Croatian army and Defence Ministry only with training in leadership skills and education of military and civilian personnel because the UN Security Council arms embargo of 1991 prohibited weapons transfer, military planning, intelligence services, and strategy or tactics support to any party of the Yugoslav war (Cilliers and Douglas, 1999:111). The improvement in the Croatian army, however, was spectacular. Shortly after the beginning of MPRI's activities, the Croatian army launched an operation against the Serb-held Krajina region of Croatia and made the JNA and its Serbian allies retreat. As Singer (2003:126) states: "In a shocking fashion, the Croat army revealed that it had transformed from a ragtag militia into a highly professional fighting force." This operation was the turning point in the Yugoslav war. As the war continued, the Croats managed to regain their territory and to occupy parts of Bosnia, making the Serbs agree to a cease fire, which ended up in the Dayton Agreement in 1995. In the light of the improvements of the Croatian army's capabilities, the Bosnian government is said to only have signed the agreement on condition that they also would get support from MPRI (Singer, 2003:126ff). Many observers have drawn attention to the paradox how an outmoded army was able to improve and make use of sophisticated war techniques in such a short time (Shearer, 1998:59). As Singer (2003:127) argues: "Even if specific assistance on the offensive was not given, it is extremely possible that MPRI training exercises given to their Croat clients, such as war gaming, were tailored to such a contingency." To date the extent to which MPRI was involved in the Croatian operation has been a controversial and much disputed subject. MPRI, anyhow, got broad public and scientific attention and secured new contracts (Smith, 2002:110).

[7] For a detailed description of Executive Outcomes' operation Sierra Leone, see: Singer (2003), Richards (2005), Howe (1998), Cleary (1999), Francis (1999).

[8] It was the Pentagon, however, who referred the Croatians to MPRI (Singer, 2003:124).

PMSCs after 9/11

Direct combat operations are the exception rather than the rule today. In recent years, PMSCs have been performing mostly logistics support, static security of individuals and property, advice and training of security forces, or de-mining and weapons destruction rather than combat operations (Branovic, 2011:27). They are involved in multi-national (humanitarian) interventions, in peace-keeping operations, by order of trans-national companies, or in international military operations, such as in Afghanistan and Iraq (Singer, 2003).

The recent wars in Afghanistan (2001) and Iraq (2003) initiated a new phase of private military and security provision and increased remarkably the use of PMSCs by democratic countries. According to the US Government Accountability Office (GAO), the US Department of Defence employed 100,000 private military and security contractor personnel in Iraq and about 107,000 in Afghanistan at the end of the first quarter of fiscal year 2010 (Solis, 2010:3).[9] Furthermore, the US Department of Defence hired thousands of contractors in Kuwait and elsewhere to support their operations in Iraq and Afghanistan. By comparison, only about 9,200 contractor personnel supported the military operations in the second Gulf War 1991 (Solis, 2010). The operations of PMSCs in Afghanistan and Iraq suggest how strong the dependence on the private military and security industry in future military operations will be.[10]

Moreover, PMSCs are not only constantly gaining more significance in terms of their considerable contribution to contemporary conflict resolution but have also become a major economic player. It is difficult to estimate the economic value of the private military and security industry due to the lack of reliable data and the secretive nature of the industry. There are, however, some sources of information. In 2004, for example, the Centre for Public Integrity's "Windfalls of War" project announced that more than 150 US PMSCs have earned almost US $48.7 billion for fulfilling contracts in Afghanistan and in Iraq (cited in Schreier and Caparini, 2005:2). Other estimates suggest that the annual revenue of the private military and security industry has increased from US $55.6 billion in 1990 to US $200 billion in 2002 and is expected to increase by another 30 to 85 percent within the next years (Holmqvist, 2005:17; Singer, 2001:199). Additionally, according to the Peace Operations Institute, the average gross revenue of PMSCs increased by 86 percent over five years, from US $137 million in 2002 to US $256 million in 2006 (Messner and Gracielli, 2007:17).[11] In 2007, the New York Times reported that US $4 billion per annum are spent on PMSCs (Broder and Rohde, 2007).[12] The

[9] In Iraq, approximately 72,000 are third country or Iraqi nationals. In Afghanistan, approximately 81,000 are Afghan nationals.

[10] I elaborate on the role of PMSCs in Afghanistan and Iraq in more detail in Chapter 6.

[11] According to the US Commission on Wartime Contracting, PMSCs in Iraq and Afghanistan received more than US $206 billion in 2011 (CWC, 2011).

[12] Please note that this data only refers to the US State Department. Other departments, for example the US Department of Defence, are not included.

majority of the money went to companies like Blackwater USA (now Academi) and DynCorp International. Up to US $2.2 billion have been paid to DynCorp International for police training and drug eradication in Iraq, Afghanistan and Latin America (*inter alia*).[13] In 2008, the US Congressional Budget Office (CBO) studied the use of contractors in Iraq to support US activities.[14] The CBO estimated that from 2003 through 2007, US agencies awarded US $85 billion in contracts for work performed in Iraq (Frisk and Trunkey, 2008:1). Moreover, the "defense support service" markets in the United Kingdom (UK), Germany and Australia have been estimated to be around US $11 billion per year (Perlo-Freeman and Sköns, 2008:8). And the Small Arms Survey estimated the worldwide security market to be worth about US $100 to 165 billion per year, annually growing about 7 to 8 per cent in 2011 (Florquin, 2011:103).

The private military and security industry is politically, military and financially highly emergent. Contemporary military interventions and peace-keeping operations have become unfeasible without the support of PMSCs. Despite of the industry's significantly increasing role, substantial insights into the industry are scarce. Hence, there is an urgent need for systematic scientific research in order to shed light on an industry the international community is heavily reliant on.

1.3 Outline of the Dissertation

In consideration of the increasing reliance of states, as well as, non-state actors on the services of PMSCs, the question of how to induce a desired performance of PMSCs becomes highly relevant. Hence, this dissertation addresses this question in a conjunction of theoretical and empirical approaches.

The remaining of the dissertation unfolds in two steps. Part I of the dissertation outlines the theoretical framework and Part II addresses the theoretical findings in two empirical studies.

CHAPTER 2 reviews and discusses the general literature on PMSCs. In this chapter, I introduce the different branches of scholarly attention towards PMSCs and the most influential studies to date. Furthermore, I systemize and discuss the controversial scholarly debate on the perils and promises of hiring PMSCs. After that, I present existing theoretical approaches to the study of PMSCs. In the last section, I discuss the conceptual and methodological weaknesses and gaps in the literature and place this study in the context of previous research on PMSCs. Thereby, I point out the added value of this study to the existing literature and introduce my theoretical framework.

[13] Blackwater was said to have received US $593 million in revenues from US federal contracts in 2006. Triple Canopy, an armed security provider, was said to have had contracts worth US $170 million in 2007. Aegis Defence Services was said to have revenues of US $113 million in 2005. For more information, see: US Congress (2007).

[14] These calculations consider also contractors in Iraq, Bahrain, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Turkey, and the United Arab Emirates as support for the US Iraq mission.

CHAPTER 3 discusses the historical and theoretical origins of principal-agent theory and introduces its fundamental assumptions and concepts. The purpose of this chapter is to provide the conceptual basis for the formal principal-agent model presented in the subsequent chapter and to discuss the applicability of principal-agent models for examining PMSCs.

CHAPTER 4 analyzes with the help of a formal-principal agent model, the relationship between a state and a PMSC. The model provides the theoretical foundation for the empirical chapters in which the model's implications are empirically examined. Building on the literature review in the preceding chapters, I discuss the diverging interests of states and PMSCs, as well as, potential agency problems. Thereafter, I examine formally why states hire PMSCs in the first place and how they can optimally incentivize them to exercise high effort in fulfilling their tasks. Thereby, I analyze a state's optimal choice whether to perform a military or security task itself, hire a PMSC and optimally design the contract, or completely abstain from performing the task. One of the main implications of the formal model is that the equilibrium effort level of PMSCs is determined by their variable costs and the expected bonus, more precisely, the state's credible commitment to later compensate a PMSC for a good performance. In other words, the higher the chance of a bonus, the higher will be the effort level of a PMSC; and the higher the variable costs a PMSC faces, the lower its effort level will be. These results are the subject of the subsequent empirical chapters.

CHAPTER 5 examines the implication of the formal model regarding the influence of a credibly promised contingent compensation on the effort level of PMSCs. Using a cross-sectional and a panel analysis, I empirically investigate whether there is a measurable difference in the conflict intensity of civil wars in which PMSCs operated compared to those in which PMSCs were not involved and whether there is a difference in the conflict intensity between those conflicts in which the state was able to credibly commit to a bonus and those in which the principal could not promise a bonus. The results of the cross-sectional analysis show that the presence of PMSCs in civil wars is significantly associated with increasing conflict intensity. Furthermore, the empirical results support the implication of the formal models regarding the impact of a bonus on the effort level of PMSCs and show that conflicts in which the state was able to credibly commit to a bonus exhibit lower levels of conflict intensity. The results of the panel analysis, however, are mixed. They neither support the expectation that PMSCs contribute to a worsening of conflict intensity, nor do they provide evidence for the assumption that a bonus increases the effort level of PMSCs. Rather, these results indicate that the presence of PMSCs is associated with lower levels of conflict intensity.

CHAPTER 6 examines the implication of the formal model regarding the influence of high variable costs on the effort level and with that on the profit of PMSCs. Using an event study, I explore how investors of publicly traded PMSCs react to increasing variable costs in the form of a deteriorating

security situation in countries which the companies operate in. At first sight, the results support the assumption that investors tend to invest less in PMSCs' stocks after insecurity events. However, a detailed look into the individual events reveals that these results are not robust. In other words, the results of the event study can neither support nor refuse the assumption that a deteriorating security situation decreases investor's expectations about future profits if PMSCs.

In the last chapter, I summarize my argument and my theoretical and empirical approach. Furthermore, I highlight the contribution of this study for researching the private military and security industry and discuss the policy implications that follow from my findings. Lastly, I discuss avenues for future research.

Part I Theoretical Framework

2 Linking Empirical Findings and Theoretical Debate: A Literature Review

What do we know about PMSCs and the political, ethical, practical, and regulatory implications of using these companies in crisis and war regions? Research on PMSCs has been primarily concerned to answer these questions. Particularly since the 1990s, scholarly attention towards the privatization of security and, thus, the body of academic publications on that topic has started to grow. Today, a large group of academics from various disciplines, such as political science, law and economics, are investigating the growing role of PMSCs within the international security arena (Shearer, 1998; Musah and Fayemi, 2000; Mandel, 2002; Singer, 2003; Avant, 2005; Holmqvist, 2005; Kinsey, 2005; Schreier and Caparini, 2005; Kinsey, 2006; Chesterman and Lehnardt, 2007). The scholarly debate is highly controversial and covers a broad range of topics. A large part of the literature explicitly or implicitly discusses the perils and promises of using these companies in crisis and war regions.

The remainder of the chapter is organized as follows: I begin with briefly sketching the development phases of the literature on PMSCs and portray some of the most influential pieces. Then, I systemize and discuss the controversial scholarly debate on the perils and promises of hiring PMSCs and present the point of view of both the proponents and opponents. Then, I present existing theoretical approaches to the study of PMSCs. In the last section, I discuss the conceptual and methodological weaknesses and gaps in the literature and place this study in the context of previous research on PMSCs. Thereby, I point out this dissertation's added value to the existing literature, introduce my theoretical framework and discuss its applicability for examining PMSCs.

2.1 General Overview of PMSC Literature

In the early 1990s, the phenomenon of (re-)privatization of security attracted researchers' and journalists' attention alike. The phenomenon itself was not new, but it showed up in a by then unknown magnitude. The operations of companies like Executive Outcomes and Sandline International in African civil wars presented a commercialized military and security industry that seemed fundamentally different from past experiences. Early studies on PMSCs have therefore primarily focused on historical and descriptive analyses of the private military and security industry and aimed at giving an overview of its global activities and the actors involved, thereby unfolding its

political and economic networks as well as disclosing potential consequences (Biersteker and Hall, 2002; Mandel, 2002; Singer, 2003; Avant, 2005; Kinsey, 2006; Scahill, 2007).

Table 1 shows a listing of the most influential studies on PMSCs to date as determined by Google Scholar Citations. It can be seen from Table 1 that two studies have contributed immensely to the research as well as our understanding of the private military and security industry. The first one is "Corporate Warriors" by Singer (2003). In this book, Singer (2003) provides the first comprehensive analysis of the industry. He traces the industry's beginnings to its present shape and offers a definitional framework for further analysis. Singer (2003) also covers organizational and operational issues and provides deeper insight into the industry as a whole as well as into specific companies. The second book is Avant's "The Market for Force: The Consequences of Privatizing Security" (2005) in which she, on the one hand, describes the origins and the current state of the industry and, on the other hand, discusses how the privatization of security might affect the legitimate use of force and violence. Whereas many studies analyze the private military and security industry from a more practice-oriented perspective (see for example Shearer, 1998), Avant (2005) utilizes a theoretical framework building on the so-called "New Institutionalism". In doing so, she calls attention to the destabilizing effect of privatized security provision on the collective monopoly of the state over the control of force.

The majority of studies investigating the private military and security industry, however, focus on regional case studies and conduct in-depth analyses of specific companies. The involvements of PMSCs in local African conflicts, in the former Yugoslavia and in the recent Iraq War are most prominent (Howe, 1998; Cilliers and Mason, 1999; Francis, 1999; Mills and Stremlau, 1999; Cleaver, 2000; Dokubo, 2000; Büttner, 2003; Singer, 2003; Avant, 2005; Abrahamsen and Williams, 2007; Gumedze, 2008; Hansen, 2008; Abrahamsen and Williams, 2009; Gumedze, 2011). In this context, the ground-breaking book "Mercenaries. An African Security Dilemma", edited by Musah and Fayemi (2000), provides an excellent overview and analysis of PMSCs' activities in African conflicts. The authors cover the involvement of PMSCs in African conflicts during the periods 1950-1989 and 1990-1998 and examine a total of 80 PMSCs. The editors, though, hold a clear position on the deployment of PMSCs in African conflicts: "This book is meant as potent ammunition to all forces advocating the empowerment of sub-regional bodies as guarantors of local stability within the context of long-term peace-building strategies […] Our encounter with mercenarism on the continents convinces us that the trade is a menace and no effort should be spared in exposing it as such" (Musah and Fayemi, 2000:263).

Table 1: Influential Studies on PMSCs

Study	Focus	Region	Conclusion/Findings	Journal	GSC	Ø
Singer 2004	Rise of the private military and security industry; its organization and operations; implications	General	Private military and security industry has entered global politics and plays an important role; existing policies and understading are not capable of grasping its magnitude	*Book*	927	103
Avant 2005	Impact of private security on the control of force	Africa, Balkan, US, UK	Privatization of security changes role of states and undermines collective monopoly over the use of force	*Book*	438	54,8
Rodney and Biersteker 2003	Nature of private authority and authorative dimension of private, non-state, non-market-based actors	General	PMSCs excercise illicit authority	*Miscellany*	513	51,3
Scahill 2007	Origins, growth and activities of Blackwater Worldwide	Company	Critique of PMSCs' impunity, close contacts to government officials and use of PMSCs in general	*Book*	270	45
Volkov 2002	Use of organized crime in the emerging Russian economic market after the end of the Cold War	Russia	State-formation in Russia was preceded by the consolidation of violent entrepeneurs	*Book*	374	34
Thomson 1996	Emergence of national-state system; historical processes of elimination of non-state transnational violence	General	Control over transnational violence necessary for consolidation of nation state's sovereign status	*Book*	505	29,7
Singer 2004	Applicability of international laws and definitions to PMSC; national attempts at legal regulation	General	Lack of political will to enforce regulation; PMFs likely to stay in grey area for the near future	*Columbia Journal of Transnational Law*	219	24,3
Shearer 1998	Emergence of private military and security industry and its limitations and capabilities; private military interventions in civil conflicts	Africa, Balkan	Discrimination between PMSCs and mercenaries necessary to understand the strategic scope and implication of PMSCs' activities	*Book*	270	18
Singer 2001	Overview of private military industry; provision of theoretical structure; industry's impact on the overall risks and dynamics of warfare	General	Standard contracting policies and vetting and monitoring systems for PMFs past due, reexamination of role of the state in the military sphere, broadening of civil-military theory	*International Security*	205	17,1
Howe 2001	Military professionalism in African states; military strategies used to address African security threats	Africa	Africa has not developed an institutionalized regional security response mechanism; development of indigenous military professionalism necessary	*Book*	159	13,3
Duffield 1998	Emancipation from traditional concept of nation-state in favour of the idea of post-modern conflict; transformation of traditional modes of government in the course of gloablisation	Africa, East Europe	Emergence of variuos national and international (non-state) actors and networks weakens rule of law and tradtional responsibilities; creates demand for private protection	*Civil Wars*	192	12,8
Schmitt 2005	Civilian employees' and private contractors' involvement in conflict; legal aspects of civilian's participation in hostilities	Iraq	Increased reliance on civilians creates confusing and dangerous environment for armed forces and civilian population; rules of action for civilians in conflicts indispensable	*Chicago Journal of International Law*	102	12,8
Verkuil 2007	Outsourcing of military and national security functions; challenges created by outsourcing	US	Outcourscing can undermine capacity effectiveness and moral of government officials	*Book*	73	12,2
Minow 2005	Performance of private contractors; potential jeopardies to military mission; implications of using PMSCs for democracies	General	Use of PMSCs erodes control of force; rise of PMSCs foreshadows decline of nation-state and rule of law	*Boston College Law Review*	97	12,1
Schooner 2005	Public procurement; contractor misconduct	Iraq, US	Increased outsourcing and workforce reduction in the US resulted in oversight, transparency and contracting failures	*Standford Law & Policy Review*	97	12,1
Zarate 1998	History of mercenarism and emergence of PMSCs; international law aspects	Africa, Balkan	International law on the use of mercernaries does not apply to PMSCs; licensing procedures and regulations for PMSCs past due	*Stanford Journal of International Law*	176	11,7
Kinsey 2006	Emergence of PMSCs with special focus on British PMSCs; examination of controversies and debates surrounding PMSCs	Afrika, UK	Primary responsibility of governments is to control and regulate the increasing impact of PMSCs on international security	*Book*	80	11,4
Abrahamsen and Williams 2009	Public-private partnerships; role of PMSCs in global security governance	Africa	Shifts in governance structures resulted in PMSCs' activitives; security de-linked from nation-state and occurs in and new security networks	*International Political Sociology*	45	11,3
Chesterman and Lehnhardt 2007	Assessment of private military and security industry and its activities; civil-military relations; lessons learned; regulatory and institutional norms; economic aspects	General	Private military and security industry industry must be regulated by a governance regime which establishes norms and institutions to oversee activities and prosecute misconduct	*Miscellany*	66	11
Musah and Fayemi 1999	African experience with mercenarism	Africa	Mercenaries motivated by profit; pose a threat to regional security	*Miscellany*	146	10,4

Notes: table shows total number and average of Google Scholar Citations
average is calculated as: total number of citation divided by the years since publication

The scholarly debate about PMSCs intensified in the post 9/11 era due to the massive use of PMSCs in the recent wars in Afghanistan (2001) and Iraq (2003). Ever since, a considerable amount of literature has been published on the activities of PMSCs in Afghanistan and Iraq (Isenberg, 2004; Simons, 2004; Bjork and Jones, 2005; Avant, 2006; Kinsey, 2006; Carafano, 2008; Isenberg, 2009;

Kinsey, 2009). In view of the recent Iraq War, Scahill (2007) highlights the activities of the world's probably most famous PMSC: Blackwater Worldwide.[15] His major study provides the most comprehensive documentation of the origin, development and activities of Blackwater Worldwide, and exposes the company's connections to politics and the military-industrial sector. This book, however, is one in a row of very normative and polarized publications on the private military and security industry. It is exemplary for a bulk of the literature on PMSCs which is very judgemental and normative, either condemning or praising the military and security industry (Brooks, 2000; Musah and Fayemi, 2000; Cilliers and Mason, 1999). As Kinsey (2006:viii) puts it: "Much of what has been written on PMCs either marginalises their impact on international peace and security, while pointing to the dangers posed by outsourcing military skills to companies that frequently work in a legal vacuum, or sees those individuals who work for them as white knights prepared to undertake peacekeeping missions that the international community would rather forget". The issue of private military and security provision and its consequences particularly with regard to human security and state authority has been a topic of heated discussion among scholars and is far from over. Hence, in the following section, I discuss this academic debate particularly with regard to potential risks and benefits when deploying them to crisis and war regions.

2.2 The Academic Debate on the Risks and Benefits of Using PMSCs

Having introduced the beginnings and waves of scholarly attention as well as the most influential works on PMSCs, I discuss in this section the theorized and empirically evidenced risks and benefits of using PMSCs. The academic literature on PMSCs is strongly concerned with the implicit risks and imponderabilities of contracting PMSCs and, thus, has generated a considerable body of literature to date. The arguments for and against the use of PMSCs range between normative assertions and verifiable statements. Figure 4 illustrates that all arguments are interconnected and address crucial ethical, legal, political, and operative questions regarding the increased reliance on PMSCs in dealing with regional and international security crises. In the following, I discuss the controversial academic debate and present the arguments of both the proponents and critics.

Are PMSCs Legitimate Actors?

Those who harbour reservations against using PMSCs consider profit as the main motivation for providing military and security services as illegitimate. Some authors criticise that, on the one hand, it is insecurity that provides PMSCs with business opportunities and that, on the other hand, these very companies are being hired to overcome insecurity (Francis, 1999; Dokubo, 2000). Critics worry that PMSCs' quest for profits might influence their incentives in such a way that they may not resolve

[15] In this context, the following publications are also of interest: Ender (2009), Simons (2009) and Fainaru (2008).

conflicts but even incite more conflicts in order to gain subsequent contracts. According to them, PMSCs cannot be accepted as legitimate actors because it cannot be guaranteed that they are not interested in inciting more conflicts in order to reap higher profits and that their quest for profit does not undermine their ethical standards (Francis, 1999; Rosky, 2004; Scahill, 2007). These authors fear that the quest for more profit might lead to an extension of conflict duration, an increase of conflict intensity, or an increase in the overall number of conflicts (Dukobo, 2000:62; Pavel, 2010:331).

In this context, PMSCs are often portrayed as wartime profiteers, mercenaries or profit-driven (Hughes, 2007; Armstrong, 2008). This portrayal is embodied by labels such as "dogs of war" (Muthien and Taylor, 2002; Chesterman, 2008; Isenberg, 2008) "coalition of the billing" (Miller, 2007; Scahill, 2007) "guns for hire" (Percy, 2003; Franke and Von Boemcken, 2011), or "mercenaries" (Chesterman and Lehnardt, 2007; Percy, 2007; Fainaru, 2008), which are used in the media and in academic publications alike. Another key concern in this context is the fear that (due to their profit-driven motivation) PMSCs might be hired by so-called "illegitimate" clients such as rebels, insurgents, warlords, drug cartels, and terrorist organizations. Opponents worry that PMSCs might exacerbate conflicts by supporting opposite groups in a conflict or that they might help "illegitimate" actors to overthrow a "legitimate" government (Musah, 2002; Leander, 2005b). That this concern is not a pure invention shows the following example: In 2004, Simon Mann (at that time one of the managers of Sandline International) and his collaborators were imprisoned in Zimbabwe for attempting to overthrow the government of Equatorial Guinea (BBC, 2004; Mathieu and Dearden, 2007; Krahmann, 2013). The support of coups against a legitimate government indeed threatens established states and raises serious sovereignty problems for the countries concerned.

A further controversial issue in this context is the granting of mining contracts to PMSCs. Due to financial straits, some clients are not able to pay for the services of PMSCs. Instead, some states have reimbursed PMSCs with concessions to extract natural resources such as diamonds, gold, oil, and timber. Executive Outcomes, for instance, was compensated by the government of Sierra Leone for its service with both cash and diamond mining concessions (Francis, 1999:331; Richards, 2005:394; Cleaver, 2000:140).[16] Critics argue that this kind of compensation cuts back a country's control of its assets, damages on the long-run the national wealth, and hinders the fair distribution of the profits to citizens (Francis, 1999; Richards, 2005). Francis (1999:331) even claims that this form of economic exploitation "represents a return to exploitative neocolonialism" by "corporate mercenarism". On the other hand, a situation in which the government has no access to the country's natural resources at all or in which the government or rebel groups misuse them is not much better.

[16] Executive Outcomes is rumoured to have had close personal links to companies operating the mines in those areas which it had recaptured from the rebels during its deployment in Sierra Leone (McIntyre and Weiss, 2007:71).

However, several studies show that conflict intensification, resource exploitation and illegal weapons trade are closely interrelated (Musah, 2002; McIntyre and Weiss, 2007). Musah (2002), for example, highlights the strong links between PMSCs, foreign mining companies and weapons trade in Africa: During the operation of Executive Outcomes in Sierra Leone, the company Branch Energy (Executive Outcome's mining wing) carried out the mining in Sierra Leone. When Executive Outcomes was forced out of Sierra Leone in 1997, LifeGuard Systems (Executive Outcome's field brigade) continued the protection of Branch Energy's mining possessions. Furthermore, LifeGuard Systems reportedly supplied the Armed Forces Revolutionary Council (AFRC), who allied itself with the rebel group Revolutionary United Front (RUF), with weapons. In return, Branch Energy was able to continue its mining operations after the AFRC seized power by a coup d'état against the government of Sierra Leone (Musah, 2002:925).[17] Moreover, in the so-called "Arms to Africa" affair, Sandline International was accused of shipping weapons to Sierra Leone by order of the exiled President Tejan Kabbah - against the UN Security Council embargo in 1998 (Mathieu and Dearden, 2007). With regard to the relationship between PMSCs, arms traders and mining companies Musah (2002:928) reasons that these "alliances […] are primarily profit-driven marriages of convenience that impact negatively on conflict dynamics and human security."[18]

Can PMSCs Be Held Accountable?

Given the increased use of PMSCs in crisis and war regions and along with that the occurrence of human rights violations, war crimes and crimes against humanity, concerns about accountability, legal responsibility and transparency became particularly fundamental. There is a large volume of published studies describing and criticizing the co called "legal vacuum" in which PMSCs operate (Spearin, 2003; Singer, 2004; Stinnet, 2005; Kinsey, 2006; Leander, 2010; Francioni and Ronzitti 2011). The questions (1) who actually is accountable - the PMSC, the individual employee of a PMSC, or the contracting entity - and, furthermore, (2) which court - international or national - is responsible for prosecuting misconduct, have become central issues not only for researchers, lawyers and policy-makers but also – and more pressing – for those affected by PMSCs' activities.

At the international level, the status of PMSCs falls into a grey area. Some authors even claim that applicable international law is either non-existent or outdated (Singer, 2004; Kinsey, 2006). A prominent case in this context is the abuse of prisoners by US military officers and PMSCs employees in the Abu Ghraib detention facility in Iraq in 2004. While the regular US military officers involved in the abuse were prosecuted and sentenced to a prison sentence, the employees of the PMSCs (CACI International and L-3 Communications Holdings, Inc.) faced no penalty (Musgrove, 2009). In this

[17] According to Musah (2002:925), Executive Outcomes warned the President of Sierra Leone, Tejan Kabbah, "that he would be overthrown within 100 days of their exit."

[18] For more information on the involvement of PMSCs and their influence on the conflict in Sierra Leone, see: Florquin and Berman, 2005.

context, the first question that needs to be clarified so that international law can take effect is whether PMSC employees can be considered (1) combatants (persons who directly participate in hostilities) and/or (2) mercenaries (persons who are not members of the armed forces but participate in combat for personal gain). Anyhow, it is easy for PMSCs to avoid meeting the full criteria of the definition of combatants and mercenaries the way it was stated in Article 47 of the Geneva Convention (1949) because they operate as legally registered companies. Hence, international law regulations on mercenary activities do not apply to PMSCs yet. A new international agreement on the activities of PMSCs is past due. However, because of disunity within the international community about issues such as what specifies a military and security service provider and how to regulate the industry, it will take long until PMSCs can be both hold accountable as well as granted their rights (Kinsey, 2006:291).

The debate about prosecution of PMSCs has generated an active and growing body of literature (Cassese, 1980; Chesterman and Lehnardt, 2007; Lehnardt, 2008). Many authors have analyzed the legal and policy status of PMSCs under the International Humanitarian Law (IHL) (Jackson, 2002; Faite, 2004; Holmqvist, 2005; Kinsey, 2005; Kontos, 2005; Gillard, 2006; Kinsey, 2006; Gaston, 2008; Hoppe, 2008; De Nevers, 2009; Chesterman, 2011; Francioni and Ronzitti, 2011). Lehnardt (2008), for example, addresses the topic by exploring previous cases where PMSCs employees had participated in war crimes and crimes against humanity. She discusses both legal regimes to increase regulation and oversight of PMSCs as well as problems of implementation and jurisdiction. Lehnardt shows that the enforcement of international criminal law against PMSCs' employees is not considered a priority by governments.

At the national level, the establishment of a consistent regulatory framework faces three challenges. Firstly, PMSCs are able to easily circumvent national legislation and escape from prosecution by taking up a new corporate structure, a new name, or by relocating themselves elsewhere. Blackwater International, for instance, whose employees killed Iraqi civilians in 2007, changed its name several times, becoming Xe Services in 2009 and Academi in 2011 (BBC, 2011). PMSCs can, furthermore, subcontract or undertake their activities through subsidiaries registered elsewhere (Roston, 2009; Ryngaert, 2008:1038). Del Prado (2008) and Stanger (2012) report that PMSCs in Afghanistan subcontract with former warlords who appear as commercial security providers.

Secondly, PMSCs often operate in weak states that have neither the legislative framework nor the necessary enforcement mechanisms and means to effectively prosecute PMSCs. Sometimes, these states even agree to immunity agreements, as happened in Iraq, where PMSCs had immunity from

local courts until 2009 (Hoppe and Quirico, 2011:384). However, in crisis and conflict regions it is generally difficult to exercise effective monitoring and oversight.

The last major problem is that many states fail to create regulation mechanisms. In case of US regulation, for instance, Singer (2004:537) points out that "under the Neutrality Act, U.S. law prohibits only the recruitment of mercenaries within the United States but not the sale of military services. In turn, the Uniform Code of Military Justice only covers transgressions committed by members of the U.S. military, but not any civilians accompanying the force overseas." The US case exemplarily reveals the complicated and inconsistent regulations at the domestic level, which result in PMSCs' unaccountability.

Cockayne et al. (2009) give an excellent overview of the regulatory problem and existent regulatory initiatives. The authors provide an outstanding discussion of how to improve effective regulation and accountability mechanisms. According to them, there have been deficient efforts at the national and the international level as well as within the industry itself and intergovernmental organizations to regulate the private military and security industry (see also Krahmann, 2005 and De Nevers, 2009). State efforts to regulate the industry often fail due to their inadequate substantive and geographic reach and their lack of effective enforcement mechanisms (Cockayne et al., 2009). In recent years, there have been at least at the international level two mentionable initiatives to regulate PMSCs: the "Montreux Document" from 2008 and the "Draft of a Possible Convention on Private Military and Security Companies" of the UN Human Rights Council from 2010. Whereas the "Montreux Document" proved to be too soft and too vague, the impact of the UN Draft has yet to be seen.

Do PMSCs Pose a Hazard to Human Rights?

In consideration of the above discussed problems, one of the most significant issues in the literature is that PMSCs work both in conflictive environments which can be fertile grounds for human rights violations as well as in judicial grey areas in which punishment for these violations is not warranted. Francis (1999:332), for example, expresses his concerns in the following way: "A high price paid for this ephemeral security is the incalculable loss of civilian lives. […] Mercenaries loot, plunder and sometime kill indiscriminately, leaving in their wake chaos, death and destruction […]." Critics argue that PMSCs' activities in grey zones without transparency, accountability and regulation mechanisms might prepare the ground for human rights violations perpetrated by PMSCs (Del Prado, 2008; White, 2011). In this context, Lenzerini and Francioni (2011:79) state: "[…] the inherent nature of such operations entails a certain potential for human rights breaches, of both an occasional and a systemic nature. This potential danger is increased in light of the fact that PMSCs are often in possession of and make use of highly sophisticated military and security technology and operational

systems, which sometimes cannot be taken under control by the authorities of the territorial state in which they operate." There have been many reported human rights violations conducted by PMSCs personnel. The shootings in Nisour Square in Baghdad in September 2007, which resulted in the killing of 17 Iraqi civilians by employees of the company Blackwater International, received probably the most media and academic attention. Other well-known incidents are sex trafficking and arms trade in the Balkans by employees of the US-company DynCorp International; torture and inhumane interrogations of prisoners in the Abu Ghraib detention facility in Iraq by employees of CACI International and Titan (subsidiary of L-3 Communications); indiscriminate shooting of cars which approach convoys protected by PMSCs in Iraq; killing and beating of local miners in Angola, and the usage of fuel air explosives by Executive Outcomes in Angola and Sierra Leone (Singer 2001, Singer, 2004:525; Grofe, 2007:243; Chesterman, 2011).

However, advocates argue that compared against regular forces PMSCs personnel do not have more motivation for abusing civilians (Taulbee, 1998:159; Coker, 1999; Lynch and Walsh, 2000,). On the contrary, because they are very professional and ideologically or ethnically not affected by the conflict, they are less prone to unethical behaviour and human rights violations. Furthermore, market-driven companies tend to differentiate themselves from other companies and compete over future contracts. Therefore, they have strong incentives to behave legitimately and are interested in enhancing their reputation (Avant, 2005:221; Kinsey, 2006). A recent study by Akcinaroglu and Radziszewski (2012) finds support for this assumption: Investigated the impact of PMSCs on the duration of a conflict, the authors find that as the level of competition increases, PMSCs are more likely to perform optimally.[19] They reason that accountability, monitoring and competition determine the effort level of PMSCs. With regard to the Colombian conflict, however, Vauters and Smith (2006:176) find an escalating influence of PMSCs' activities on the level of violence. They identify the (1) frequent contact between as well as the rise in number of armed conflict parties, (2) conflict of interests between PMSC and the principal, (3) a blurring of lines between military and civilian actors, (4) impunity, and (5) PMSCs' inability to understand the complexities and the dynamics of the conflict as the main reasons for an increased risk of more fatalities and more security risks in general. Besides, a 1999 report of the UN Commission on Human Rights even pointed out that "mercenaries" believe their comparative advantage and greater efficiency rests upon their independency from legal prosecution (Ballesteros, 1999:28). Likewise, Singer (2001:214) concludes that inherent market dynamics might lead to situations in which PMSCs violate human rights for the sake of business interests.

[19] Performing optimally means to deliver optimal services and support and to bring an end to violence in internal armed conflicts; underperformance in this context means staying longer in conflicts in order to maximize profits (Akcinaroglu and Radziszewski, 2012).

Figure 4: The Risks and Benefits of Using PMSCs

Are PMSCs More Effective and Efficient than Armed Forces and UN Troops?

The promise of more efficiency and effectiveness of military and security services through privatization is one of the main driving forces behind the increased use of PMSCs. According to neo-liberal concepts, efficiency will be achieved because (1) the principal will choose an agent that fits its objectives best and (2) competition among the agents will ensure an optimal price and, hence, reduce defence spending (Taibl, 1997). Even though private contractors sometimes earn more than public forces personnel, it is argued that the state still saves costs such as retirement, medical and training costs (Isenberg, 2004).[20] This, in theory, plausible outsourcing concept involves, however, some pitfalls as Ortiz (2010a:37) points out: "In practice, however, efficiency is not always achievable. Non-economic factors can affect the process of selecting the best firms to contract out; and the more sensitive the public service to be outsourced is, the more such factors can affect the decision to hire a particular firm." Initial experiences with security outsourcing, especially in contingency operations such as in Afghanistan and Iraq, confirm Ortiz's argument and indicate that the laws of free market might not always work the way one would have liked them to: A high amount of the contracts awarded by the US Department of Defence in Afghanistan and Iraq in the last years were cost-plus, no-bid, or sole source contracts (Hedahl, 2009:23; Waxman, 2007:2).[21] A cost-plus

[20] As a side effect, the high salaries of PMSCs cause that regular soldiers and special forces increasingly prefer to work for PMSCs rather than for state armies (Isenberg, 2004:8).

[21] In consideration of these cost saving arguments, the question arises whether national forces have to be cost-efficient in the first place, or whether it is in fact military effectiveness that is most important.

contract, for instance, gives companies no incentives to keep the costs low because it passes the additional costs to the principal.

A related question in this context is the attentive fulfilment of contracts. The contracting of PMSCs appears to be widely accepted as the extension of government policy. However, Schreier and Caparini (2005:51) assess that "there will always be tensions between the security goals of clients and the companies' desire for profit maximization." Furthermore, political and military requirements often conflict with economic incentives of PMSCs. As Carbonnier (2006:408) points out: "Cost cutting, for instance, may cause a firm to neglect to train its personnel to respect the principle of proportionality in the use of force and to show restraint in the exercise of violence." Moreover, given that PMSCs' main objective is to attain a maximum return on investment, questions of quality control and reliability arise. Singer (2001:203) illustrates the dilemma inherent when hiring PMSCs in the following way: "[…] the public good and a private company's good often conflict. A firm may claim that it will act only in its client's best interests, but this may not always be true.[…] In addition, concerns that arise in any normal contracting environment—for example, incomplete information and monitoring, loss of control, and the difficulties of aligning incentives— are further complicated when the business takes place within the military environment." Singer (2001) argues that there is in general less oversight and control over fulfilment of contracts by PMSCs. There have been several occurrences when PMSCs broke agreements or cancelled contracts. The Gurkha Security Guards, for example, who were contracted to support the government of Sierra Leone, abruptly dropped out of the contract after losing their commander in a rebel ambush in 1994 (Singer, 2001:206).

A further strand of the literature discusses the question whether PMSCs are more efficient compared to UN peacekeeping forces (Bures, 2005; Pavel, 2010; Wittels, 2010). Advocates of outsourcing key functions of UN peacekeeping missions to PMSCs argue that private contractors are better organized, better trained, more flexible, and cost-efficient. They, furthermore, possess modern military equipment, have a clear chain of command and are easier to mobilize than UN peacekeeping forces (Howe, 1998; Shearer, 1998; Cleary, 1999; Bures, 2005; Avant, 2006). Executive Outcomes, for instance, claimed it would have been able to mobilize armed troops within two weeks during the genocide in Rwanda in 1994. It declared to be able to establish safe areas at around $600,000 per day. For comparison, the UN mission after the genocide cost $3 million per day (O'Hanlon and Singer, 2003:92). Howe (1998:315) points out, that not only Executive Outcomes' personnel and capability in terms of military skills and equipment were instrumental in the conflicts in Angola in 1993 and Sierra Leone in 1995, but also their ability to improve local military capabilities through training and intelligence services.

In contrast, in his case study of PMSCs' involvement in Sierra Leone, Francis (1999:329) argues that the impact of Executive Outcomes in the armed conflict in Sierra Leone is exaggerated because deployments of PMSCs are not able to tackle fundamental political and socio-economic problems that led to the armed conflict in the first place. Furthermore, long-lasting peace depends on several post-war conditions such as demobilization programs and political settlements – none of which private contractors are able to fulfil as the repeated outbreak of combat in Angola and Sierra Leone after the operation of Executive Outcomes highlighted (Shearer, 1998; Brayton, 2002). However, it may be even possible that PMSCs support opposing sides in a conflict without either one of them knowing. This can have effects on both the duration of a conflict and the intensification of a conflict.[22]

In order to examine differences in military effectiveness and economic efficiency between PMSCs and UN peacekeeping forces, Lawyer (2005) studied four major African civil wars.[23] He finds that PMSCs use fewer personnel and, hence, cost less than UN peacekeeping forces. On closer inspection, though, Lawyer (2005) uncovers that PMSCs cost more per individual unit.[24] The author shows that both UN peacekeeping forces as well as PMSCs were able to put a cease-fire successfully in order. The UN, however, experiences the double number of broken cease-fires than the PMSC involved.

Arguments in favour of a privatization of UN peacekeeping missions are mostly based on the successful operations of Executive Outcomes in Angola and Sierra Leone in the 1990s. According to Spearin (2011), however, the private military and security industry would not be able to respond effectively, quickly and robustly to an UN request these days. He points out that the current condition of the private military and security industry differs fundamentally compared to the circumstances in the early 1990s: today's industry is (amongst other things) characterized by a more heterogenic personnel pool and a new regulatory framework that have altered the industry's capability and effectiveness.[25]

Another important aspect is the operative cooperation between regular forces and PMSCs, which apparently faces practical challenges. According to Isenberg (2004), there have been authority confusions between the US military and private contractors during the recent Iraq War. Isenberg (2004:22) reports that PMSCs were not required to keep the US military informed about their operations, locations, or actions. This has led to alarming situations in which private contractors were involved in fire fights of which the US military learned at best afterwards. Moreover, private

[22] Francis (1999:330), for instance, states that the involvement of PMSCs exacerbated the conflict in Angola in 1993.
[23] Lawyer (2005) examined Sierra Leone and Angola as examples for conflict cessation with PMSCs (both Executive Outcomes deployments) and Somalia and Liberia as examples for conflict cessation with UN peacekeeping forces.
[24] It should be noted, though, that UN costs comprise also costs for humanitarian aid.
[25] For example, because of cost-cutting considerations PMSCs tend to hire a more international workforce. This, however, causes communication problems due to the employees' different backgrounds, language skills and work experience.

contractors are either not tied to particular assignments on the battlefield or turn out not as professional as assumed. Singer (2004:8) describes an incident during the recent Iraq War in which companies refused to fulfil their contract obligations: "During the deployment delays in the summer of 2003, the upsurge of violence in April 2004, and the mass of contractor kidnappings of July 2004, U.S. forces in Iraq faced a wave of firms delaying, suspending, or ending operations because they found it too dangerous." Schreier and Caparini (2005:45) reason that an adequate assessment regarding actual risks and costs are necessary before deciding on whether to hire PMSCs. However, it should be kept in mind that an "unprofessional" performance is not necessarily confined to PMSCs.[26] Furthermore, the improvement of the operative cooperation between armed forces and PMSCs is to a large extent subject to trial and error processes. With regard to counterinsurgency operations in Iraq, Petersohn (2011), for example, argues that the performance and the cooperation between PMSCs and US armed forces improved during the course of the war.

Can PMSCs Fill the Security Vacuum?

The lack of resources, the fear of burdens, responsibilities and unforeseeable political consequences as well as the military downsizing especially after the end of the Cold War triggered the reluctance of many governments to intervene in humanitarian crises (Shearer, 1998). Against this background, one of the most powerful arguments in favour of PMSCs is the alleged ability of the private military and security industry to fill the security vacuum which evolved from the increasing unwillingness of the international community to intervene in crisis-ridden regions, which do not directly affect their economical or political interests. Furthermore, humanitarian catastrophes such as the Rwandan genocide in 1994 made it apparent that the organizational framework of the UN is unwilling or maybe incapable of the short-term funding, staffing, effective training, and oversight of peacekeeping missions (Pavel, 2010:322).[27]

Given the failures of the international community in general and the United Nations in particular, voices were being raised to hire PMSCs for carrying out humanitarian interventions, when the international community is not in the position to do so.[28] Probably the most famous test case where a PMSC filled the security gap left by the international community is the armed conflict between the government of Sierra Leone and the rebel group Revolutionary United Front (RUF) in 1995. In this conflict, neither the US, the UK nor the UN was willing to intervene due to their military operations in the Balkans, which already overstretched their capabilities. Instead, Executive Outcomes was hired by the government of Sierra Leone. Executive Outcomes defeated the RUF and improved the stability

[26] Pavel (2010:330) adverts to the US Operation in Somalia in 1993 where the US abandoned the Malaysian and Pakistani UN forces after 18 US soldiers were killed and enormous domestic public and electoral pressures befell the US government.
[27] For an overview of the obstacles and benefits of delegating UN peacekeeping missions to PMSCs, see Bures (2005).
[28] PMSCs themselves have offered their services to the UN several times, but those offers were declined by the UN (O'Hanlon and Singer, 2004:92; Pavel, 2010:322).

so much that the country could hold elections for the first time after a decade of armed conflict (O'Hanlon and Singer, 2003:92).

Some authors argue that PMSCs can – under certain circumstances such as strong regulation and accountability mechanisms - be of assistance for the international community in dealing with humanitarian catastrophes and peacekeeping missions (see Shearer, 1998; Jackson, 2002; Mandel, 2002; Smith, 2002; Singer, 2003; O'Hanlon and Singer, 2004; Bures, 2005; Mayer, 2009; Pavel 2010). The sphere of action for PMSCs is according to their proponents not restricted to emergency humanitarian catastrophes but ranges over more long-term tasks such as strengthening weak governments, helping humanitarian organizations, working in conflict zones, and assisting overstretched public forces (Spearin, 2001; Whyte, 2003).[29] Even the UK government has already considered the opportunity to hire PMSCs as a complement to existing agents (FCO, 2002:4). By using PMSCs as "force multipliers", i.e. as a complementary tool to reduce the military overstretch of own troops, states can allow their regular forces to concentrate on so-called "core functions". Furthermore, they can reduce costs of an otherwise expanded standing army (O'Brien, 2000; FCO, 2002; Cancian, 2008). According to the final report "Privatized Military Operations Industry" by the Industrial College of the Armed Forces (US National Defence University) "the use of the private sector has allowed the US government to downsize its military since 1991 from 2.1 million to 1.4 million while greatly expanding its national commitments and influence abroad" (NDU, 2008:16).

Do PMSCs Threaten State Authority?

Controversial debate continues about the use of PMSCs by Western governments in order to achieve their foreign policy objectives while circumventing the necessary domestic support for the involvement of national forces in foreign conflicts (Brayton, 2002; Whyte, 2003; Stanger, 2009). Whereas advocates (Smith, 2002:116) argue that PMSCs can be used as a tool to advance national strategic interests without deploying own forces, critics (Francis, 1999:333; O'Brien, 2000; Avant and De Nevers, 2011) worry about the loss of democratic control and the erosion of state authority. By using PMSCs to foster national foreign policy agendas, governments can skirt international norms such as non-interference clauses or sanctions as well as avoid domestic public control, budgetary constraints and the approval of the legislative branch. Moreover, they can deny any direct military involvement in controversial military operations, reduce fatalities and avoid political as well as public opposition (Schooner, 2008:88).[30] In doing so, governments can substantially reduce political costs involved with overseas troop deployments.[31] Perry (2012), for example, reports that the US

[29] For an overview of the services offered by PMSCs to humanitarian organizations, see Spearin (2001).
[30] For instance, the US Congress does not have to be informed about contracts under $50 million (Vauters and Smith, 2006:177). For examples of how governments use PMSCs as proxies, see Binder (2007:309) and Francis (1999:334).
[31] For example, the true number of troop fatalities can be decreased and the true number of war victims can be covered up.

government used PMSCs for covert operations in Afghanistan and Iraq. However, due to the classified nature of the subject, it is difficult to find clear empirical evidence.

Avant (2005), Holmqvist (2005) and Krahmann (2008) argue that the increased use of PMSCs by states threatens the traditional concept of the state as the only authority with absolute and legitimate control over the use of force. It is, however, striking that many of the countries that hire PMSCs are not able (anymore) to exercise their monopoly over the use of force (e.g. deployments of PMSCs in Sierra Leone, Angola, Iraq, and Afghanistan). In case of so-called strong states, privatization does not necessarily undermine the state's monopoly over the use of force, but, as mentioned earlier, may serve as a tool to further foreign policy objectives through PMSCs as proxies (Binder, 2007:309). Furthermore, the delegation of security services to private actors in these states has to be assessed in the context of a broader transformation of traditional governance structures and does not necessarily hint at an erosion of state authority.

The question in case of weak states is not whether PMSCs contribute to an erosion of state authority in those states, but rather whether PMSCs facilitate or interfere with the creation of such (Abrahamsen and Williams, 2009). Avant (2006), Leander (2005b) and Musah (2002) argue that the deployment of PMSC to regions of weak statehood can undermine the consolidation of public security structures and enhance institutional malformation in the long-run. According to them, that is because resources from public security organizations are being drained to private security providers and, thus, a de-legitimization process of public security actors becomes more likely, making the need for private services again necessary. Furthermore, regular soldiers are forced to engage in commercial employments or may even side with rebel groups or other competitors to the government and, hence, increase the insecurity and dysfunction of these states (Leander, 2005b; Sherman and DiDomenico, 2009).

Moreover, an increased hiring of private security providers instead of strengthening public security forces, builds those actors up as rivals to government and provincial institutions. Ayub et al. (2009:40-42) describe the impact on the public security architecture in Afghanistan in the following way: "Up to 20,000 Afghan "private security contractors" have submitted registration applications for permission to carry weapons; many of these companies are run by former militia commanders who might otherwise be disarmed. […] In addition, U.S. forces have begun training Afghan tribal militias as part of the counter-insurgency effort. […] dispelling the authority of an already tenuous central government through legitimizing people or groups that may already pose threats through a haphazard process in the name of community defense is unwise. […] Empowering more sources of violence, over which the United States and its allies will have little control, may result in some short-term gains, but is not a recipe for stability. It creates another farcical cycle."

Do PMSCs Influence Security Perceptions?

The last major issue that has dominated the literature in the last years concerns the process of commodification of security. Krahmann (2008) discusses how the concept of security as a public good vanishes in favour of the idea of security as a private good, which is being sold and bought in an open market. This shift has crucial implications for the classical understanding of the state as the main security provider as well as for the provision of the good security (Abrahamsen and Williams, 2007). The so-called commodification of security affects not only the availability of security and its price but also the capacity to define what poses a security threat and what not. Leander (2005a:615) characterizes the commodification of security as "Swiss cheese" security coverage, arguing that privatized security provision creates islands of security instead of nationwide security provision. In this context, there is increasing concern about the growing power of PMSCs in shaping the understanding, interpretation and discourses of security concerns (Leander, 2005a; Leander and Van Munster, 2007; Berndtsson, 2011; Krahmann, 2011). Leander (2005a:805), for instance, argues that PMSCs possess especially through their consultancy, logistics and intelligence services an "epistemic power" which enables them to affect perceptions of security and insecurity. They increasingly provide the necessary information on potential security concerns for policy-makers and military officials. This significant role permits them to produce their own security concepts and to foster military action.[32] Similarly, Krahmann (2011) points out that PMSCs were conducive to the replacement of the concept of security with the concept of risk. According to Krahmann (2011:371), this new concept of risk has "permitted private firms to identify a growing range of […] dangers which cannot be eliminated but require continuous risk management."

PMSCs' close contacts to government officials allows not only for a governmental control of PMSCs but also for an influence of PMSCs over public and official stakeholders to the point of influencing formal decision-making over the use of force (Leander, 2005b:808).[33] According to Isenberg (2004:8), PMSCs have spent around $32 million on lobbying and another $12 million on political campaign donations in the US. DynCorp International, for instance, has spent $500,000 of which 72 percent were spent for the Republican Party. However, the actual political and economical consequences of such an exertion of influence are incalculable yet.

In this context, a novel feature of the recent literature examines PMSCs' identities, their self-perception and their efforts in influencing social perceptions (Schneiker, 2007; Schaub and Franke, 2009; Cutler, 2010; Berndtsson, 2011; Franke and Von Boemcken, 2011; Higate, 2012; Joachim and

[32] Uncritical reliance on PMSCs' intelligence information can lead to incorrect decisions which may have disastrous consequences for civilians. For cases illustrating these hazards, see Leander (2005(b):814).

[33] The close contact between government stakeholders and PMSCs may have important consequences regarding contract bargaining, payment and accountability. For more information, see Leander (2005(b):809) and for the connection between PMSCs involved in the resent Iraq War and representatives of the Bush administration, see Isenberg (2004:39).

Schneiker, 2012; Krahmann, 2012). Using a survey methodology, Schaub and Franke (2009) compare the attitudes of US military officers to those of PMSCs employees. They find that PMSCs employees see themselves as, and want to be regarded, as military professionals. In a similar study, Franke and Von Boemcken (2011) examine the motivations and values of 200 PMSCs employees. The authors find that PMSCs employees are not driven by monetary incentives but by "the opportunity to face and meet new challenges and to help others" (Franke and Van Boemcken, 2011:737). They also conclude that PMSCs employees want to be considered military professionals who provide necessary armed security services in contingency operations.

Authors investigating the question whether PMSCs try to influence social perception find that in order to polish their images and present themselves as legitimate actors, PMSCs tend to present themselves as the "new humanitarians". In doing so, they emphasize their support of humanitarian organizations in crisis and war regions (Joachim and Schneiker, 2012) and stress their professionalisms and security expertise (Berndtsson, 2011; Higate, 2012).

Besides, advocates (Brooks, 2000) of using PMSCs are concerned with stressing the differences between PMSCs and mercenaries (see Leander, 2005:608). This serves the purpose to indicate that "not using legitimate private firms will probably lead to a resurgence of uncontrollable individual freelance mercenaries who will flock to satisfy the profitable demand for military expertise, but who have far less regard for the legitimacy of their clients" (Brooks, 2000:129). This position partly has been taken on by states: The UK House of Commons (Foreign Affairs Committee), for instance, pointed out that in the light of the impossibility to abolish mercenarism, it would be wiser to work with them within a governing framework than being not able to control their activities (FCO, 2002; Whyte, 2003).

2.3 Previous Theoretical Approaches

Having presented and discussed the concerns and arguments of both the proponents and critics of using PMSCs, I introduce in the following section theoretical approaches to the study of PMSCs.

Even though there are various theoretical approaches to the study of the private military and security industry, a common overarching theoretical framework has been lacking to date. One of these theoretical approaches highlights the role of neo-liberal governmentality in catalyzing the rise of PMSCs as so-called "security experts". Neo-liberal governmentality, coined by Foucault (see Bröckling, 2011; 2010), addresses the decentralization of government responsibilities and delegation of core functions to social agents. Against this background Abrahamsen and Williams (2010) and Leander and Munster (2007) argue that PMSCs benefit enormously from an increased practice of neo-liberal governmentality and that they have a share in the reinforcement of it.

Another theoretical approach is the construction of risk by PMSCs. This approach is based on the concept of the risk society, coined by Beck (1992). The term describes a society which is predominantly concerned with the identification and mitigation of risks. According to Beck (1992), the creation of wealth in the course of industrialization, modernization, globalization, and technological development created a society in which the scarcity problem is solved. The abolishment of the scarcity problem, however, created itself new risks as side-effects which need to be taken care of; examples of such are climate change, nuclear disasters, or global terrorism. These new risks are hallmarked by their global, uncontrollable and incalculable consequences and the society's preoccupation with the quantification and prevention of those. Because these risks are in essence incalculable, diffuse and lastly irremovable, they allow for social construction and the emergence of self-constituted "experts" who define the risks (Roorda, 2012). This in turn creates business opportunities and a market for those actors who make the construction and reduction of these risks their business. At this point, the literature on the construction of risk by PMSCs joins. According to Leander (2005b), PMSCs not only implement contemporary security policy but also possess the power to shape it. This is due to their close contacts to key actors whose interests and preferences these companies bias. Krahmann (2011:371) even argues that PMSCs use the discourse of risk for their own ends and contribute "to the rise of a culture of fear in which the demand for security can never be satisfied and guarantees continuous profits."

In her seminal study, Avant (2005) utilizes the theory of new institutionalism to analyze how the privatization of security changes a state's control of force. New institutionalism is an umbrella term for different analytical approaches in the social sciences for the study of institutions and institutional mechanisms and their impact on individual behaviour, the society, economy, and politics (Peters, 2005). The most prominent ones are the historical, economic and sociological approaches, which evolved all independently from each other (Hall and Taylor, 1996). All approaches share a general understanding of "institutions" as a relatively stable formal or informal structural feature of society or polity which affects individual behaviour (Peters, 2005:18-19). They differ from each other in their origins, their exact conceptualization of institutions, their belief in how institutions evolve, change, operate, and in their answer on how individuals and institutions interact (Peters, 2005).

Historical institutionalism is primarily characterized by the idea of path dependency, namely the belief that social and political decisions are particularly affected by decisions and institutions made in the past (Steinmo et al., 1992).[34] The economic approach, the so-called new institutional economics (referred to as rational choice institutionalism in political science literature) treats individual behaviour as a rational and strategic interaction according to an exogenously given preference

[34] The concept and basic idea of Historical institutionalism is highly simplified at this point. For a detailed description see Peters (2005) and Hall and Taylor (1996).

function (Coase, 1937; Williamson, 1975; North, 1990; Coase, 1998). Institutions in this context influence individuals' strategic behaviour by providing them with information about other individuals' actions. By contrast, sociological institutionalism (grounded in the research area of organizational theory) is concerned with how institutions and cultural beliefs affect individuals' behaviour (Powell and DiMaggio, 1991; Meyer and Scott, 1992). While acknowledging the rationality of individual behaviour, sociological institutionalism perceives the latter as influenced additionally by cultural beliefs (Hall and Taylor, 1996; Peters, 2005). Schneider and Aspinwall (2001:2) organize the three approaches along the following spectrum: "These are two ends of the same spectrum, which varies according to the extent to which institutions are internalised by agents and therefore the extent to which agents are capable of acting independently of them." Avant (2005) centres her analysis on economic and sociological approaches. Combining economic and sociological arguments, she reasons that privatized security destabilizes the state's collective monopoly over the control of force.

Another strand of the theoretical literature on PMSCs, which is closely related to the theory of new institutionalism, analyzes the relationship between states and PMSCs through the lenses of principal-agent theory. Principal-agent theory (PAT) itself is a theoretical approach associated with new institutional economics. It offers an analytical tool with which the mechanisms of state and PMSC relationship can be disclosed. Given the controversial academic debate on the promises and perils of private military and security services provision, an approach which helps to focus on the essentials – namely the delegation of a task to an agent and its associated consequences – seems highly appropriate. The basic ideas of PAT are that principal and agent have diverging interests and that there exist information and preference asymmetries. Previous literature on PMSCs has adapted PAT as an analytical tool to analyze the implications of using PMSCs. Cockayne (2007), for instance, applies PAT to the regulation of PMSCs and offers insights for potential risks and opportunities when contracting private actors for security services, especially against the background of legitimacy, authority and rule of law. He reasons that security, particularly with regard to weak states, risks becoming a product of power and cash rather than a legal right. Dickinson (2007) discusses possible accountability mechanisms and focuses on the question how to design and improve contracts in such a way that they ensure efficient monitoring, oversight and enforcement mechanisms. She particularly calls on non-governmental organizations to strive towards alternative accountability instruments such as international accreditation regimes and to mobilize political pressure. Stöber (2007) analyzes the delegation of security to private actors by conducting a case study of the Iraq War of 2003. He uses a principal-agent approach in order to examine potential contractual hazards and the possibilities of the principal to enforce the agent's compliance to the negotiated contract. Stöber (2007:134) concludes that the principal must improve monitoring and control mechanisms, draw up

more explicit contracts and build-up long-term relationships with PMSCs. Building on this strand of the literature, I also utilize the analytical framework of the principal-agent theory to examine the mechanisms of PMSC-state relations and the implications of outsourcing core military and security functions to private companies. To use Feaver's (2003:113) words: "The monopoly on the legitimate use of force is what distinguishes governments from other institutions. Understanding how this monopoly is delegated and controlled is therefore central to the enterprise of political science."

2.4 Conclusion: A Positivist Approach to the Study of PMSCs

Doing research on the private military and security industry and assessing the impact of PMSCs' activities in crisis and war regions is difficult because of the scarcity of and difficulty to gather empirical evidence as well as the secrecy of the industry in general (Schreier and Caparini, 2005:9). Nonetheless, research so far has contributed enormously to a better understanding of the origins of the industry as well as its impact and provided in-depth knowledge of individual companies and conflicts PMSCs operated in.

However, the literature review showed that much of the research on PMSCs is concerned with identifying contextual factors for the evolution of the private military and security industry (Shearer, 1998; Zarate, 1998; Singer, 2003; Kinsey, 2006; Rosén, 2008; Branović, 2011; Buchan, 2011). A further large strand of the literature has explored the impact of PMSCs on issues such as authority, democracy, sovereignty of states, the legitimate use of force, security as a public good, and human rights (Avant, 2005; Leander, 2005b; Abrahamsen and Williams, 2010; Krahmann, 2010). Furthermore, a third, more pragmatically-oriented, strand of the literature has focused on how to establish effective monitoring, accountability and prosecution mechanisms in order to minimize the risks associated with the use of PMSCs (Chesterman and Lehnardt, 2007; Cockayne et al., 2009; Francioni and Ronzitti, 2011). Given the significant impact of PMSCs on traditional understandings of statehood and security, the scholarly debate has largely focused on normative questions. Additionally, parts of the discussion suffer from polarization - by either condemning or praising the private military and security industry: Advocates (Shearer, 1998; Brooks, 2000) of using PMSCs emphasize the strong demand for privatized military and security provision and the industry's role in filling the security gap. Critics (Cilliers and Mason, 1999; Musah and Fayemi, 2000), though, consider the strong reliance on PMSCs a threat for state authority and the legitimate use of force and fear the blurring of responsibilities, the weakening of democratic mechanisms and the legal grey area that surrounds PMSCs' activities. What misses out, though, are more attempts to answer which contextual factors are conducive to a desired performance of PMSCs and which account for a stabilizing or spoiling role of PMSCs in conflict zones. To a large extent, this is certainly driven by the difficulty of finding sufficient empirical evidence. Furthermore, macro-level variables such as the

improvement of the security situation or the progress of peace in the area of operation are influenced by too many factors such that the precise impact of a PMSCs' performance on them seems impossible to identify.

Nevertheless, the literature offers some direction: For example, studies on the activities of PMSCs in African conflicts, in Colombia and in Afghanistan show that a rise in the number of armed groups through the additional involvement of PMSCs constitutes a destabilizing factor for the respective conflicts in the first place (Vauters and Smith, 2006; McIntyre and Weiss, 2007; Ayub et al., 2009). Furthermore, collaborations between PMSCs and criminal networks might be facilitated by the conditions of the conflict environment itself and lead to an exacerbation or prolonging of conflicts (Musah, 2002). Besides, studies indicate that legal and regulatory mechanisms may have a crucial impact on the performances of PMSCs, particularly in terms of ethical behaviour, respect for human rights and unsatisfactory task fulfilment (Singer, 2004; Francioni and Ronzitti, 2011). Analyzing African civil wars, Akcinaroglu and Radziszewski (2012) find that competition between PMSCs is a positive decisive factor for their performance. On the other hand, Ortiz (2010a) argues that during the process of awarding a contract, competition is not always guaranteed. He shows, furthermore, that PMSCs are often awarded contracts which do not offer sufficient incentives for the provision of a good performance.[35]

These studies suggest that the principals (in this case: states) of PMSCs could considerably affect factors which are conducive to the performance of PMSCs.[36] Therefore, when moving away from a purely normative perspective addressing issues like state authority or security as public good and the question why PMSCs should or should not be hired in principle, more practical aspects remain to be analyzed. For example, issues like contractual hazards, difficulties at the operational level and enforceable monitoring, accountability and prosecution mechanisms have to be understood. In other words, from the point of view that activities of PMSCs are a matter of fact of contemporary military and security missions, the identification of contextual factors which account for a stabilizing or spoiling role of PMSCs in conflict zones becomes crucial. It is of utmost importance to ask the

[35] With regard to US wartime contracting, companies are often awarded cost-plus contracts. A cost-plus contract passes the agent's costs to the principal. The agent's profit is unaffected from its costs since it is a percentage of them. These contracts are, however, a mixed blessing: On the one hand they have the advantage that companies might rather agree to a risky contract and the government obtains support quickly. On the other hand, however, companies have no incentives in keeping costs low (in fact they have an incentive to keep them high) and, hence, extensive oversight is necessary – which in turn is almost impossible to provide in contingency operations (Carafano, 2008:76, Grasso, 2008). At the same time, it is also difficult to predict a contract's full operating costs (in terms of time and resources) and profit margins in contingency operations. I will discuss this issue in detail in the subsequent chapter.

[36] However, the literature also shows that the capability of exerting an influence strongly varies between strong and weak states. Strong and weak states generally have different motivations for hiring PMSCs (efficient government vs. inefficient security forces), different approaches to finance their services, different means to induce an optimal performance, and different feasibilities for control, regulation and prosecution. Besides, the impact of PMSCs' activities on state authority poses fundamentally different challenges for strong and weak states (Avant, 2005).

questions how to optimally motivate PMSCs to exercise high effort and how to identify factors that actually can be influenced by governments.

In order to answer these questions, I develop a theoretical framework, with which some practical questions related to deploying PMSCs to crisis and war regions can be tackled. Applying a principal-agent relationship in which the state (the principal) hires a PMSC (the agent) to fulfil certain tasks, I am able to execute a precise and value-free analysis of the risks and benefits of hiring PMSCs. Furthermore, identifying the exact mechanisms driving the behaviour of PMSCs in a given arrangement, I am able to identify decisive contractual factors that can be constituted by states in order to induce a desired performance by PMSCs.

However, in contrast to the existing literature using principal-agent approaches to examine state and PMSCs relations, this study focuses on designing optimal incentives schemes and the question how to motivate PMSCs to exercise high effort rather than on optimizing monitoring and oversight mechanisms (see Dickinson, 2007 and Stöber, 2007). Moreover, in contrast to previous principal-agent approaches, this dissertation entails a formal theoretical model. This is associated with certain advantages: Precision in thinking as well as clarity of argument is guaranteed. In other words, compared to purely verbal approaches, a formal model delivers precise concepts and logical validity – in particular because invalid arguments, missing or not clearly stated assumptions, and ambiguous concepts and definitions are exposed more easily. Furthermore, empirically testable predictions can be derived out of a formal model. Hence, it is possible to make a noteworthy contribution to the knowledge as well as theory building in this field of research (Fiorina, 1975).

In the following chapters, I present the historical and theoretical origins of PAT, its concepts and basic assumptions, and then apply the model to a setting in which a state delegates a military and security task to a PMSC.

3 Principal-Agent Theory

In this chapter, I discuss the historical and theoretical origins of PAT and introduce its fundamental assumptions and concepts. The aim of this chapter is to provide the conceptual basis for the formal model presented in the subsequent chapter.

3.1 Historical and Theoretical Origins

Principal-agent theory is an economic concept rooted in the so-called new institutional economics (NIE) coined by Williamson (1975). NIE encompasses a variety of different methods (formal, non-formal, empirical, experimental), topics (economic, sociological, legal, political) and assumptions (methodological individualism, rational choice, bounded rationality) (Joskow, 2008:5ff). NIE emerged from a critique of the simplification of complex issues by neo-classical theories, which only focus on price mechanisms and production efficiency to explain economic relations (Coase, 1937; Williamson, 1985; North, 1990). NIE does not aim at replacing neo-classical theories; in fact it builds on particular neo-classical fundamentals such as the rational choice model and the assumptions of scarcity and competition. NIE rather aims at improving neo-classical theories through the inclusion of a more realistic view of the world. The fundamental difference to neo-classical theories is the recognition of information asymmetries, diverging interests between interacting economic agents, and imperfect rationality along with the introduction of the concept of transaction costs. According to Coase (1937; 1960), transaction costs constitute all costs which arise from the interaction between market participants in a market economy, such as information, communication and coordination costs. Building on Coase (1960), Simon (2004; 2009) and John (1984), Williamson (1975; 1985) identifies two assumptions which are essential to the idea of transaction costs: bounded rationality (i.e. the idea that the rationality of individuals is limited by the information they possess and their cognitive capabilities) and opportunism (i.e. individuals' leaning towards self-serving and deceptive behaviour). New Institutionalists argue that in a complex, uncertain and risky environment, bounded rationality and opportunism necessarily breed transaction costs. According to NIE, institutions have the task to countervail uncertainty and to reduce risks by creating a social structure that enables control and coordination (Ménard, 1995). Institutions in this context are "the rules of the game in society or, more formally, are the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic" (North, 1990:3).

North (1990) distinguishes between formal (constitutions, laws, rules) and informal (customs, traditions, codes of conduct) rules. New Institutionalists seek to investigate how institutions affect

economic outcomes, why they exist, how they are established, and why some vanish and others are of permanent duration (Klein, 2000). Williamson (2000) introduces an analytical framework in which he organizes institutions along four interrelated levels: The first level, the "institutional embeddedness level", comprises informal institutions (customs, traditions, norm, religion) and constitutes the basic institutional foundation of a society. The second level, the "institutional environment", covers formal rules of the game (constitutions, political system, property rights). The third level, the "governance level", includes the play of the game, i.e. the institutions coordinating economic activities such as contracts. Finally, the last level, the "resource allocation and employment level", encompasses the daily operations of an economy as defined by the foregoing institutional framework. Institutional changes at the first level take place most slowly whereas the speed escalates the more one moves to the lower levels (likewise does the research perspective alter from the macro- to the micro-level). Based on these analytical levels, NIE has produced four seminal theories and strands of literature that deal with the optimal arrangement of formal rules and their effective application: property rights theory, transaction costs theory, public choice theory and principal-agent theory.

Parallel to the academic debate in the economics literature, a growing body of political science literature evolved, which applied rational choice analysis, game theoretical models and principal-agent models to political institutions. The so-called rational choice institutionalism (RCI) has been widely influenced by NIE (Hall and Taylor, 1996:11; Lane and Ersson, 2000:35; Peters, 2005:49). RCI seeks to design political institutions which constrain human behaviour (Hall and Taylor, 1996). According to RCI, human behaviour is characterized by individual utility maximization and strategic calculation which consequentially result in dysfunctional behaviour such as rent-seeking and shirking. Hence, the task of political institutions is to channel and constrain human behaviour in order to produce socially useful outcomes (Peters, 2005:48ff). This outcome can be achieved if individuals believe that adherent behaviour to given (political) institutions will make them better of than non-adherence. Thus, Hall and Taylor (1996:8) conclude that "the more an institution contributes to the resolution of collective action dilemmas or the more gains from exchange it makes possible, the more robust it will be."

RCI literature originally stems from early studies of the American legislative process and the influential role of the US Congress with regard to legislators' behaviour in the 1970s. A second wave came with works by March and Olsen (1984; 1989) who criticized the overemphasis of individualism in rational choice approaches and drew the attention to the role of institutions in the 1980s (Riker, 1980; Epstein and O'Halloran, 1994). Later on, Rational Choice Institutionalists have also focused on diverse topics such as the intensity of ethnic conflicts, democratic transitions, international regimes or coalition behaviour (Laver and Shepsle, 1990; Marks, 1992; Hall and Taylor, 1996; Weingast,

1998). Since the 1990s, a major area of research has become the institutional framework of the European Union (EU), particularly with regard to the relationships between institutional actors, actors' agenda-setting-power and appropriate modelling techniques to analyze these relationships and their implications (Tsebelis, 1994; Jupille and Caporaso, 1999; Dowding, 2000; Schneider and Aspinwall, 2001). The two most prominent modelling techniques in RCI literature have become game-theoretic-models and principal-agent models (Peters, 2005:55ff). The application of principal-agent models, however, exceeds the subfield of RCI and is a widely used theoretical instrument in political science research across the borders of different subfields such as comparative politics and international relations. Miller (2005) and Shapiro (2005) give a broad overview of the literature and show that principal-agent models are adopted in political science in order to examine the delegation of power and authority in its various facets: relationships between elective institutions and administrative agencies, government regulation, state policy implementation, political corruption, international organizations, civil-military relations, and the EU (Mitnick, 1975; McCubbins and Schwartz, 1984; Banks and Weingast, 1992; Avant, 1994; Pollack, 1997).

In the following section, I present and discuss the basic theoretical assumptions of principal-agent theory and reveal the additional analytical value that this theory offers for the study of PMSCs. In the subsequent chapter, I design a formal principal-agent model to formally analyze the interaction between states and PMSCs.

3.2 Fundamental Concepts of Principal Agent Theory

Division of labour and cooperation between two parties facilitate specialisation, reduce costs, increase efficiency, and, thus, make the delegation of tasks beneficial for the parties involved. Every relationship in which the payoff of one party depends on the actions of another party constitutes a principal-agent relationship.[37] This relationship is based either on an explicit or implicit contract.[38] The principal designs the contract and offers it to the agent. The agent then decides on whether to accept or refuse the contract and – upon acceptance – enters an (economic) relationship with the principal.[39] The contract specifies the payment the agent receives for different outcomes (Macho-Stadler and Pérez-Catrillo, 2001:4). An explicit contract is based on variables which can be verified by a third party, i.e. a court. In case of no arbitrating body, the agent (and the principal) would have no incentives to optimally fulfil the agreements specified in an explicit contract (Macho-Stadler and Pérez-Catrillo, 2001:6). An implicit contract, on the other hand, is based on non-verifiable variables.

[37] As is the custom in principal-agent literature, I refer to the principal as "she" and to the agent as "he".
[38] I will elaborate on the difference between an explicit and an implicit contract in more detail below.
[39] The relationship between principal and agent is generally referred to as a "Stackelberg game". In a Stackelberg game one party to a contract offers a contract (which maximizes his utility) to the second party to the contract (a so-called "take-it-or-leave-it-offer"). The second party can either accept or refuse the contract. He will accept the contract if he can expect a higher utility compared to potential outside options (Salanié, 2005:5).

Hence, it is self enforcing in the sense that it constitutes an equilibrium of the underlying game. A contract is then accepted by the agent if the utility he obtains from the offered contract is greater than his utility from his alternatives (referred to as the agent's reservation utility) – for example if he would abstain or get a better offer elsewhere (Macho-Stadler and Pérez-Catrillo, 2001:4).

When the agent accepts the contract, he has to carry out the contracted tasks. Furthermore, he chooses the effort level with which he exercises the task. Obviously, the agent's effort and the resulting outcome are directly related: More effort is generally associated with (expecting) a higher output. Thus, it follows that principal and agent have conflicting interests because "a cost for one is revenue for the other: the wage paid is revenue for the agent and a cost for the principal, while the effort of the agent favours the principal but is costly for the agent" (Macho-Stadler and Pérez-Catrillo, 2001:5). Whereas the principal's ultimate objective is to induce the agent's highest effort level and at the same time keep her costs (the agent's compensation) low, the agent – absent incentives - will employ the lowest possible effort level. Hence, the relation between both is a strategic interaction in which both parties aim to maximize their respective utility levels. If principal and agent had the same objectives, a contract would become needless. In this case, information asymmetries between principal and agent would also constitute no hazard for the principal, because both parties would share all relevant information (Macho-Stadler and Pérez-Catrillo, 2001:46). In the real world, however, the principal is confronted with diverging objectives between herself and the agent. In addition, the latter often possesses private information. The agent thus constitutes the informed party, whereas the principal constitutes the uninformed party (Salanié, 2005:5). This information asymmetry is associated with certain risks for the principal. It is therefore absolutely necessary to identify the correct type of information asymmetry and then to design the optimal contract (Macho-Stadler and Pérez-Catrillo, 2001:8).

3.2.1 The Agent's Private Information

The agent's private information crystallises in two different ways: (1) the agent's actions cannot be observed by the principal (hidden action) and (2) the principal either cannot fully evaluate the agent's characteristics (hidden characteristics) or the agent receives additional information the principal doesn't know about (hidden information) (Laffont and Martimort, 2002:12). As Table 2 shows, these information asymmetries can exist either ex ante or ex post. From this, different information problems arise for the principal: adverse selection and moral hazard (Laffont and Martimort, 2002:14).[40]

[40] In the real word, however, the principal is often faced with elements of both moral hazard and adverse selection.

Table 2: Moral Hazard and Adverse Selection

	Moral Hazard	Adverse Selection
	(Hidden Action and Hidden Information)	(Hidden Characteristics)
Private Information		
ex ante	Principal and agent have same information	Agent has private information
ex post	Agent has private information	Principal and agent have same information
Agent's Action	Not observable for principal and/or non-verifiable by an arbitrating body	Observable but effort level unrateable for principal

3.2.1.1 Adverse Selection

Adverse selection describes a situation in which the agent possesses private information before the contract has been signed (see Table 2). This information is about characteristics of the agent, for example his type, skills, or qualifications. In this situation, the principal faces the risk of adverse selection, namely the risk of choosing the wrong type of agent (Jost, 2001:29). However, assuming that different types of agent would chose different types of contracts, the principal could offer diverse contracts to one agent. Depending on which contract the agent chooses, the principal would find out about the agent's type (referred to as *screening*). Besides, the agent in question could also let the principal know what type he is before a contract is signed (referred to as *signalling*) (Jost, 2001:29).

3.2.1.2 Moral Hazard

Moral hazard describes a situation in which (1) the principal cannot verify or perfectly control the agent's action or effort (hidden action) and/or a situation in which (2) the agent receives private information after the contract has been signed (hidden information) (Ross, 1973; Holmström, 1979; Mirrless, 1999(1975)). As indicated earlier, private information can arise in different time periods (see Table 2). In case of moral hazard, the agent receives private information after the contract has been signed and before he decides on his effort level (Macho-Stadler and Pérez-Catrillo, 2001:9). Because the agent's effort or action is not observable or - even if it is observable - not verifiable, it cannot be included in the terms of the contract. However, it is possible that the outcome (the result of the agent's action/effort) is observable and verifiable and then it can be included in the contract.

The principal-agent framework mirrors very well the problems and pitfalls inherent in the relationship between states and PMSCs and provides an excellent analytical tool to examine their diverging motivations and lines of action. Let me illustrate this with an example: Imagine a state that has intervened in another country. The country in which the intervention takes place (i.e. the host state) is weak and crisis-ridden. Hence, the intervening state assumes certain military and security tasks some of which it delegates to a PMSC. These kinds of tasks could be, for example, the provision of security for individuals or buildings or the training of the host state's security forces. Imagine that the state decides to delegate the training of the security forces to a PMSC. Then, the state is

confronted with the problem of adverse selection because it cannot definitively tell whether the PMSC in question possesses the necessary qualifications. Furthermore, after the state has hired a PMSC, it is confronted with the problem of moral hazard: The state cannot fully control and verify the action of the PMSC, i.e. how much effort the PMSC exercises to train the security forces. Moreover, the PMSC has an information advantage because it knows more about the qualification level of the security forces once it has started to train them. It can tell how much effort is necessary (in terms of time, personnel, or equipment) to achieve the best possible outcome. The state on the contrary does not possess this information. However, the effort level the PMSC chooses for training the host state's security forces has a direct impact on the desired outcome of the intervening state as well as of the host state. The better the security forces are trained the higher the utility of both. However, more effort involves more costs for the PMSC and, thus, it has strong incentives to shirk.

In Afghanistan, for example, DynCorp International was contracted by the US to train street level police officers in 2004 (Skinner, 2008; Friesendorf, 2011). In the beginning of the international intervention in Afghanistan, Germany was chosen to establish the Afghan National Police. However, the establishment of the Afghan police made very slow progress due to the German approach to first train senior level officers instead of street level police officers and additional domestic restrictions which prohibited the deployment of German trainers outside of Kabul. In order to train police officers more quickly and enhance the visibility of the Afghan police in rural areas, the US contracted DynCorp International to train street level police officers in eight week courses. However, the training carried out by DynCorp International and the experience level of its employees was strongly criticised by observers (Thruelsen, 2010). As Skinner (2008:229) puts it: "In contrast to the Germans, the contractors employ staff with very little experience and there have been reports of aggressive behaviour towards Afghan officials." The Afghan example illustrates very well the difficulty of the state to choose the right type of PMSC (in terms of qualifications) as well as to control and monitor the actions of the private company. Moreover, neither the US and Germany nor the Afghan officials could tell whether DynCorp International in fact exercised the highest possible effort level to train the candidates because at that time DynCorp was more familiar with the qualifications (for example in terms of literacy or morale) of the candidates.

3.2.2 The Optimal Contract

After identifying the correct information asymmetry, the principal has to design the optimal contract. In doing so, the principal faces two questions: Will the agent accept the contract? And if he accepts it, will he exercise high effort in fulfilling his tasks? As mentioned above, in order to make the agent accept the contract, the principal has to cover the agent's reservation utility (referred to as the contract's participation condition).

Because effort is costly for the agent and the principal is the uninformed party, who cannot observe or verify the agent's actual effort, the agent would choose the lowest possible effort level if compensation consisted only of a fixed wage. Therefore, the principal needs to design a payment scheme that gives the agent sufficient incentives to exercise high effort. Because effort cannot be observed, this payment scheme can only be contingent on the resulting outcome, which is an imperfect measure of the agent's effort.[41] In doing so, she can balance her and the agent's interests (referred to as the contract's incentive compatibility condition). This type of contract, however, involves risks for the agent: He runs the risk of getting punished for an outcome he is not solely responsible for. For example, exogenous factors (referred to as the state of nature) could affect the outcome.[42] At this point it is important whether the agent is risk-neutral or risk-averse. If he is risk-averse, he will accept the contract if he gets a rent for accepting the risk. The principal, thus, has to design a contract with which she can minimize the trade-off between risk-sharing and offering efficient incentives. Obviously, in case of a risk-neutral agent, this trade-off is absent. However, in cases in which the agent is risk-neutral but wealth-constrained, the principal faces the problem of limited liability. This means that the payment of the agent cannot fall below a specified minimum, or in other words, the principal is constrained in punishing the agent for an unsatisfactory outcome (Jost, 2001:21). Then, incentives which generate high effort require a rent going to the agent as well.

Relational Contracts

The conflict environment in which the interaction between states and PMSCs takes place inevitably exacerbates the existing agency problems and makes explicit contracting particularly tricky: The ability of the state to optimally control and monitor the PMSC is particularly constrained in conflict regions. Furthermore, traditional ways of assessing the performance of PMSCs and providing incentives through an explicit contract is also hardly feasible in conflict regions. The state does not have the ability or it is too costly for it to cover all potential contingencies and specify all actions which are necessary in order to achieve a certain outcome ex ante – particularly in a way which is also verifiable before a court ex post. Under these circumstances it is extremely difficult to motivate PMSCs to exercise high effort with an explicit contract. In the principal-agent and contract-theory literature contracts which are concluded in these kinds of settings are referred to as incomplete contracts (Grossman and Hart, 1986; Hart, 1988; Nöldeke and Schmidt, 1995; Hart and Moore, 1999; Bolton and Dewatripont, 2005:487ff). Actually, given the impossibility to cover all conceivable contingencies in a real world setting, explicit contracts usually are incomplete. However, incomplete

[41] Under this incentive scheme, the agent receives generally a higher payment if output was high and vice versa.

[42] For example, the success of a company will to a large degree depend on how the employees do their jobs. However, external factors like the state of the economy, the performance of competitors, or natural disasters have an impact on the company as well.

contracting in a conflict environment makes control, monitoring and giving incentives particularly precarious.

An alternative to an explicit but incomplete contract is a relational contract (also referred to as implicit contract). A relational contract is a non-contractual, implicit agreement between principal and agent which is sustained by the value of future collaborations (Bull, 1987; MacLeod and Malcomson, 1989; Levin, 2003). It cannot be enforced by a court but has to be self-enforcing which means that it must be optimal for both contracting parties to stick to the contract in every contingency. However, parties will only stick to the contract if there is repeated interaction and the value of a continued cooperation is higher than any outside option. Usually, both explicit and relational contracts are utilized complimentary by the principal to induce a desired performance level. Since it is very likely that states and PMSCs (at least potentially) interact repeatedly, a relational contract qualifies as a very appropriate contractual commitment for both. Thus, I examine the principal-agent relationship between states and PMSCs with the help of the theory of relational contracts.

3.3 Conclusion

Using Arrow's (1968:538) words, "by definition the agent has been selected for his specialized knowledge and the principal can never hope to completely check the agent's performance." Diverging interests and information asymmetries are at the core of principal-agent relations (Laffont and Martimort, 2002:12). The principal designs a (explicit or implicit) contract in which – after having identified the correct information asymmetry between her and the agent – she balances their diverging objectives in order to maximize her profits. Hence, in an optimal contract principal and agent share the risks of a negative outcome. However, compared to a situation of symmetric information, this constitutes additional costs for the principal which Williamson (1975) referred to as "transaction costs" (Laffont and Martimort, 2002:14) and the principal agent literature refers to as agency costs (Jost, 2001:23).

In this chapter, I have demonstrated that PAT offers a valuable analytical tool for examining the options and constraints of a state for controlling a PMSC and motivating it to exercise high effort in fulfilling its assigned tasks. Likewise, this instrument permits to explicitly identify the PMSC's objectives, interests and line of action. Therefore, it constitutes a suited theoretical framework and analytical instrument for examining state-PMSC relationships. In the next chapter, I translate PAT to the relationship between a state and a PMSC and derive the logic of my argument within a formal model. However, even though I have discussed both agency problems adverse selection and moral

hazard, I address in the following the problem of moral hazard because I am interested in how states can optimally incentivize PMSCs to exercise high effort once they have already hired a PMSC.

4 A Moral Hazard Model of State and PMSC Interaction[43]

4.1 Overview

The aim of this chapter is to develop a formal principal-agent model in order to scrutinize the exact mechanisms driving the behaviour of PMSCs and to identify decisive contractual factors that can be constituted by states in order to induce a desired performance of PMSCs. Given the increasing reliance of state as well as non-state actors on the support of the private military and security industry when operating in conflict zones, the question how to ensure an optimal performance of PMSCs becomes most pressing – not only for those hiring PMSCs but in particular also for those affected by PMSCs' activities.

Therefore, this chapter analyzes the complex relationship between a state and a PMSC who potentially enter a contractual relationship. It discusses the diverging interests of all involved parties as well as potential agency problems, and examines why states hire PMSCs in the first place and how they can optimally incentivize them to exercise high effort in fulfilling their tasks. In doing so, a theoretical moral hazard model is developed that analyzes a state's optimal choice whether to perform a military or security task itself, hire a PMSC and optimally design the contract, or completely abstain from performing the task.

The model developed here is based on the principal-agent moral hazard literature building on Holmström (1979) and Grossman and Hart (1983), which was initially developed to better understand employment relationships when an employee's effort is unobservable. Furthermore, the model developed relates to different extensions of the original approach, which analyze enforcement problems that restrict payments to optimally base pay on performance. Innes (1990), for example, assumes that an agent might be protected by limited liability, implying that his compensation must not fall below a certain level. In this case, it is necessary to give the agent a rent, making it optimal for the principal to reduce incentives and consequently implemented effort. While all these models focus on explicit contracts that reward the agent based on verifiable performance measures, there has been an increased interest in so-called relational contracts as a way to mitigate the moral hazard problem if output or effort can be observed but not verified to an outside party (Bull, 1987; MacLeod and Malcomson, 1989; Levin, 2003; 2009). Within the context of relational contracts, incentives must

[43] This chapter is based on a collaborative article with Matthias Fahn (University of Würzburg). In this chapter, I use therefore the pronoun "we" when explaining the procedure.
My contribution includes the formulation of the research problem, the conceptual design of state-PMSC interaction and, the formulation of the inherent agency problems. Matthias Fahn formalized and computed the model. All further steps (i.e. writing of the article) were done collaboratively, However, I have re-written the article for my dissertation.

be induced informally and both principal and agent must be interested in sticking to the terms of the contract in every contingency (Levin, 2003). However, cooperation can only be sustained within a dynamic game in which the principal rewards the agent's high effort by re-hiring him and forwarding positive rents in future projects (see Section 3.2.2). In this way, relational contracts help the principal to address the agent's incentive problem in contexts of moral hazard and unverifiable performance measures by offering him informal incentives and, thus, preventing him from shirking. We believe that this aspect is also relevant for the relationship between states and PMSCs because explicit contracting, perfect monitoring as well as performance verification by a court are very difficult to realize within the context of PMSCs' operations in conflict zones. However, with the help of relational contracts, states can implicitly base compensation on the outcome of a past performance, for example, in terms of joint future projects and in this way incentivize PMSCs to exercise high effort in fulfilling their tasks. Therefore, we examine in the following the moral hazard problem between states and PMSCs with the help of the theory of relational contracts.

The remainder of the chapter proceeds as follows: Section 4.2 introduces the basic assumptions of our model. It presents the intuition behind the model and its formal structure. Section 4.3 introduces the static version of our model and analyzes the player's optimal actions. In Section 4.4, we extend our original static model and present its dynamic version. In Section 4.5, we pursue the question how the delegation of military and security tasks in the context of international military operations affects the host state, i.e. the country in which the intervention takes place. Finally, Section 4.6 discusses the results and clarifies how the model's implications are translated into empirical analysis.

4.2 The Model

4.2.1 Intuition

The model considers the following situation: A state has the option to delegate a military or security task to an agent, in this case a PMSC. The delegation can take place against the background of various scenarios; for example it might be that the state is dealing with oppositional groups inside its territory as it was the case with the missions of Executive Outcomes and Sandline International in Angola and Sierra Leone in the early 1990s; or it might be that the state aims at improving its military and security structure like it was the case with the support of the Croatian Army by MPRI during the Yugoslavian wars in the late 1990s; or it might be that the state plans to or has already intervened in another country like it has happened during the recent wars in Iraq and Afghanistan, in which the intervening countries hired various PMSCs to fulfil certain military and security tasks (see Singer, 2003). However, in the light of any potential scenario the state has three options: It can carry out the

task itself, delegate it to a PMSC, or abstain from performing it at all. Therefore, the core question is: Why and how would the state choose to delegate the task? Based on the literature review in Chapter 2, we identify three crucial advantages for states when delegating military and security tasks to PMSCs:

(1) *Reducing financial costs*: States can reduce financial costs such as retirement, medical and training costs because PMSCs are paid only when needed. Furthermore, in cases where countries are involved in interventions or operations that are too extensive for their available force structure new costs, such as recruiting of new military and civilian personnel, accrue. States can circumvent these costs by hiring specialized PMSCs.

(2) *Enhancing military effectiveness*: States can enhance their military effectiveness because PMSCs are often specialized and posses modern military equipment and skills. In addition, hiring PMSCs enables the armed forces to free own resources and to concentrate on core functions. Moreover, internationally backed interventions involve often various states with different political systems. It can, therefore, take a long time to get the compliancy of every single member for deploying the necessary personnel. PMSCs, in contrast, are easy to mobilize. Thus, when hiring PMSCs states can act without delay.

(3) *Reducing political costs*: States can reduce political costs which arise in the course of a military operation. They can, for instance, secretly foster their foreign policy agenda, skirt international sanctions, avoid the approval of the legislative branch, and deny any direct involvement in controversial operations. Furthermore, in case of domestic calls for troop reducing or withdrawal from overseas operations, states can cloud the actual total number of troops. Moreover, states can decrease fatalities within their regular troops. For example, from the beginning of the military operations in Afghanistan (2001) and Iraq (2003), the US counted a total of 6,131 military fatalities. This is accompanied by a total of 2,429 contractor fatalities, which largely remained unpublicized (CWC, 2011:31). Figure 5 shows the development of US military casualities and contractor fatalities in Afghanistan and Iraq from the beginning of the intervention until 2012. It can clearly be seen that the number of wounded contractors has increased steadily in Afghanistan since 2010 and has even overtaken the number of wounded US military personnel in 2012. Apparently, this development accompanies the gradual withdrawal of the international forces from Afghanistan, which commenced in 2011. Regarding the development of the total numbers of US forces and contractor causalities in Iraq, the figure illustrates very well that since 2010 – parallel to the withdrawal of US forces from Iraq which started in 2009 - only contractors were wounded in Iraq. Apparently, states are particularly concerned with reducing political risks which might arise from high fatalities (Schreier and Caparini, 2005:81).

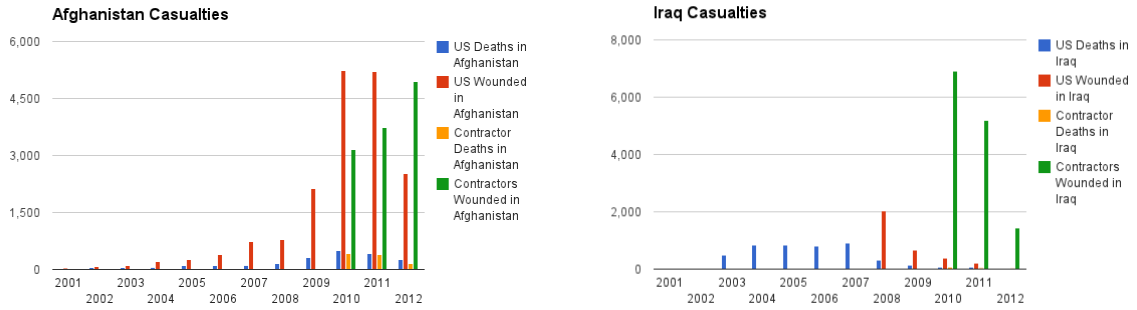


Figure 5: Afghanistan and Iraq War Casualities[44]

Shaw (2002) argues that the major political costs of war are (indirect) civilian fatalities and the deaths of own soldiers. According to him, one important aspect of wars these days is to keep the risks associated with political costs away from one's own military. Shaw (2002) refers as an example to recent military interventions (the Yugoslav War in the 1990s and the Afghanistan War in 2001) where local allies on the ground took a great share of battle casualties. He argues, furthermore, that states are more willing to accept indirect and less visible casualties, i.e. such casualties for which the own, direct responsibility can be dwarfed. This reduced willingness of states to accept own civilian and military casualties is motivated by the attempt to minimize the war risk and, thereby, the associated political costs which could lead to their own deselection as a result of shifting public opinion. Apparently, some casualties count more with regard to political costs than others. In other words, civilian casualties and deaths of regular soldiers count apparently more than casualties of PMSCs. The state seems to bear greater responsibility in case of wrong decisions which lead to high civilian casualties and military fatalities, whereas it can push the responsibility for deaths or even misconduct of PMSCs' employees away.

The reduced willingness of states to accept the (negative) consequences of warfare is in a way related to a general risk aversion as discussed in the context of the theory of the risk society in Chapter 2. Following this argumentation, any military intervention is a risk-averting action to control potential risks (see Heng, 2006). If the whole purpose of the intervention is risk mitigation, then it makes even more sense for the state to hire PMSCs in order to minimize its own direct risks. For example, the increased dependence on technology, such as drones in order to avoid own fatalities, seems to support this assumption. However, the increased dependency on highly sophisticated technology clears the way even more for PMSCs which possess the necessary knowledge and skills to run sophisticated weapons (Roorda, 2012). Hence, hiring PMSCs allows states both to minimize their own risks as well as to spread their responsibility (see Schreier and Caparini, 2005). At this point the

[44] Source: Private Security Monitor – University of Denver (Avant, 2013)

interests of the state meet with the interests of PMSCs: PMSCs benefit from the business opportunities which evolve from an increased outsourcing of security and military functions and the state can dispose partly of its responsibility and the risks it faces.

However, going back to our model, we subsume the first two aspects (reducing financial costs and enhancing military effectiveness) under the assumption that - in case of exercising high effort - the variable costs the PMSC faces when exerting effort are lower than those of the state. The last aspect (reducing political costs) is captured by the assumption that negative outcomes are more harmful to the state if the latter has been active itself. Performing the task itself allows for a better monitoring and control of activities, whereas hiring a PMSC is associated with lower operating costs and a less critical public towards failures. Delegating the task is, however, also associated with the usual agency problems: Contrary to the state, the PMSC has no intrinsic interest in achieving the outcome preferred by the principal. Furthermore, it is not possible or too costly to fully monitor the PMSC's effort when carrying out the task. Instead, the state can only observe whether it was completed successfully or not. Whereas success is positively affected by the PMSC's effort, some uncertainty always prevails, and failure can even occur if the task has been carried out with all possible care. Finally, giving the PMSC appropriate incentives is further restricted by the extent to which compensation can be based on the realized outcome. Past experience has shown that contracts between states and PMSCs are left vague, leaving out potential contingencies and related consequences (Stöber, 2007). Even though it seems desirable to relate PMSCs' compensation to a realized performance measure, it appears very difficult to do so because verification and enforcement is always limited in the context of contingency operations (Dickinson, 2007). However, rewarding the PMSC based on performance is certainly not impossible because a state is likely to have more tasks and missions in the future, for which it potentially needs PMSCs. Hence, performance based compensation can indirectly and implicitly be part of the agreement between state and PMSCs, namely as the expectation of being re-hired for future tasks and forwarded a rent. Indeed, there is evidence that these considerations play a role because PMSCs are often not chosen based on a competitive bidding process (Berrios, 2006; Dickinson, 2007; Ortiz, 2010a). Therefore, we assume in the model that discretionary payments based on whether the task was completed successfully are possible but bounded. On the one hand, they cannot be negative, implying limited liability on the PMSCs' side.[45] Hence, the only way to punish the PMSC for doing a bad job is not hiring it for future tasks. On the other hand, these payments cannot be arbitrarily large but are restricted by the value future collaborations have for the state. If this value is too low, the state only has limited incentives to honour promises and maintain mutual trust.

[45] Limited liability means that the agent has no wealth and cannot be punished. The principal must give an ex ante rent to the agent, which is costly for her (see Laffont and Martimort, 2002:149).

4.2.2 Formal Structure

A country, subsequently denoted as “principal”, faces the choice to (1) exercise a military or security task itself, (2) completely abstain from performing it, or (3) hire a PMSC, subsequently denoted as “agent”, to carry it out (see Figure 6). 'Military and security services' refer in this context to any type of military and security services offered by PMSCs. Each of the three options causes the realization of different outcomes. This model focuses on one specific task; however, the process will be identical among all of them, as long as there are no interdependencies. We assume that only one agent is available. In Section 4.4, we further take into account that the agent can be hired repeatedly.

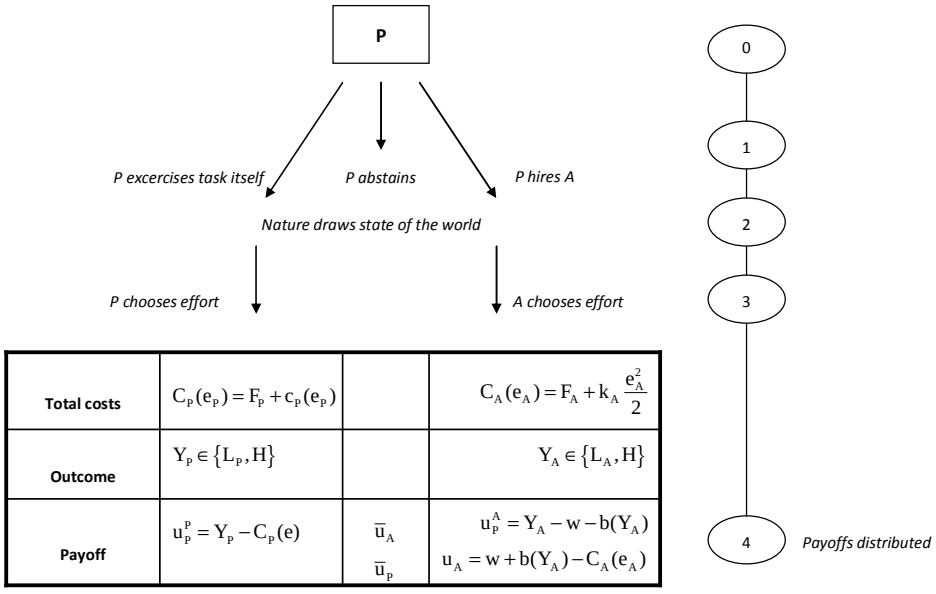
If the principal conducts the task herself, she faces fixed $F_P \geq 0$ costs. After starting, she decides on the resources she plans to spend, for example how many people to deploy for the task, their quality, the amount of training they receive, and the intended time period. All aspects that can determine the success of the mission are subsumed in a one-dimensional variable, effort e_P, which can take any value between zero and one, i.e., $e_P \in [0,1]$ and is directly chosen by the principal. However, effort is costly, and a higher level is associated with higher costs. Formally, effort costs are $c_P(e_P)$, with $c_P(e_P) = \mathrm{k}_P \frac{e_P^2}{2}, k_P > 0$. Total costs for the principal, if she conducts the task herself and plans to choose effort e_P, thus amount to $C_P(e_P) = F_P + c_P(e_P)$.

The task can either be a success for the principal or not. This manifests in whether the initial purpose is met, but also in what happened during the period, for example the number of own soldiers that have died or other incidents that can have an impact on the domestic public opinion or the principal’s international reputation. Formally, this is captured by the resulting outcome $Y_P \in \{L_P, H\}$, with $L_P \leq 0 < H$. The subscript in L_P captures the fact that a failure can be assessed differently by the principal, depending on whether she herself or the agent was active. Conditional on performing the task, the probability of a success, i.e. of $Y = H$, is determined by the principal's effort, with $\mathrm{Prob}(Y = H \mid e_P) = e_P$.

If the agent is hired instead, he also faces fixed starting costs, F_A, and can choose effort e_A, which is associated with variable effort costs $c_A(e_A) = k_A \frac{e_A^2}{2}$. Thus, total costs - borne by the hired agent – are $C_A(e_A) = F_A + k_A \frac{e_A^2}{2}$. The outcome Y_A can either be L_A or H with $L_A \leq 0 < H$. The offer made by the principal consists of an ex ante payment w, as well as some discretionary compensation b, in the following referred to as bonus. However, in this setting, it does not refer to direct monetary payments but to the possibility of being rehired by the principal in the future. In the

static benchmark model we assume that the principal can credibly commit to any value of b. However, in Section 4.4 we endogenize the maximum enforceable value of b if the agent can be hired repeatedly. Then, paying the bonus must be actually optimal for the principal ex post.

Furthermore, the agent's effort is not observable to the principal, but output - as well as the decision to perform the task triggering the fixed starting costs - is. The bonus can, therefore, only depend on the outcome, i.e., we have $b(Y_A)$. This implies that the principal can directly choose effort if she decides to enter herself but is not able to do so when the agent is hired and faces a moral hazard problem. Then, she has the option to give the right incentives by an appropriate choice of $b(Y_A)$.



Total costs	$C_P(e_P) = F_P + c_P(e_P)$		$C_A(e_A) = F_A + k_A \frac{e_A^2}{2}$
Outcome	$Y_P \in \{L_P, H\}$		$Y_A \in \{L_A, H\}$
Payoff	$u_P^P = Y_P - C_P(e)$	$\bar{u}_A$ $\bar{u}_P$	$u_P^A = Y_A - w - b(Y_A)$ $u_A = w + b(Y_A) - C_A(e_A)$

Figure 6: Game Setup

4.2.2.1 Players' Preferences

The principal would like to maximize her utility from the accomplishment of a military or security task, whereas the agent would like to exercise as little effort as possible. In particular, the players' preferences are defined as follows: If the principal conducts the task herself, her utility is $u_P^P = Y_P - C_P(e)$.[46] If the agent is hired, the principal's payoff is $u_P^A = Y_A - w - b(Y_A)$. If the principal neither conducts the specific task herself nor hires the agent, her utility equals $\overline{u}_P$. We impose no assumption on the size of $\overline{u}_P$. For some tasks, however, it might seem sensible to set $\overline{u}_P \geq L_P$. For example, combat operations with high civilian fatalities might make the principal worse off ex post compared to having abstained from the beginning. For other tasks, for example like the training of the host country's security forces in the context of a military intervention, any action is better than abstaining. In this case, we would have $\overline{u}_P < L_P$.

The agent's preferences are not affected by the outcome Y, but only depend on the payments he receives from the principal, as well as the costs he has to bear. Thus, we have $u_A = w + b(Y_A) - C_A(e_A)$ if the agent is hired. If not, his payoff is $\overline{u}_A$, where we make the normalization $\overline{u}_A = 0$.

Furthermore, the host state's welfare is affected by the task, although it cannot influence the principal's decisions. We discuss this issue in detail in Section 4.5.

4.2.2.2 Assumptions

Based on the literature review in Chapter 2, we identify in the following our assumptions on the parameters that have a direct impact on the principal's preferred choice of action and then describe and analyze the interaction between state and PMSC as reflected in our model.

First of all, the agent's variable costs are lower than the principal's, i.e., we make

Assumption 1: $k_P \geq k_A$.

We subsume under variable costs expenses such as hiring costs, training costs, pension, health care, and widow obligations.[47] It seems sensible that PMSCs can avoid various costs the state would have to bear. Moreover, past experiences with PMSCs show that they hire mostly locals or third-country nationals, who are even less costly (CWC, 2011:226). We impose no assumption on the relationship between F_A and F_P. Of course, similar arguments as with variable costs could be used to claim that

[46] Note that the principal's preferences are generally described by the preferences of its government.
[47] According to the Commission on Wartime Contracting the incremental operating cost to deploy a military member is estimated to be about $10,000 per year (CWC, 2011:225).

$F_P \geq F_A$. However, it should be noted that states already possess an infrastructure, for example for the training of soldiers, which can be used for another task at small additional costs.

Next we impose:

Assumption 2: $L_P \leq L_A$.

This assumption implies that negative outcomes are more harmful if the principal has been active herself. As we have already discussed in Section 4.2.1, we argue that the reputational loss for the principal - when she does not succeed in a military operation, or when civilians or soldiers are killed or involved in criminal activities, or simply the fact that the principal is involved in controversial military operations which are not supported by the public - should be larger than when PMSCs had been responsible. Hence, when hiring PMSCs states can avoid various political costs which they would have to bear otherwise.

The next assumption is purely technical, and serves to avoid corner solutions (i.e., to make sure that $e<1$):

Assumption 3: $(H - L_A) < k_A$.

Note that Assumption 3 - together with Assumption 1 - also implies $(H - L_P) < k_P$.

We could not find evidence that PMSCs officially receive contingent compensation based on some (verifiable) measure of success. However, we believe that the component of a contingent compensation is not absent at all but implicitly enters the contract between principal and agent. Countries hiring PMSCs might also envisage other missions, and a good experience with one agent can increase the latter's prospect of being hired again. Therefore, we add the contingent payment b, which reflects this possibility, into our model.[48] Our benchmark setup is a short-cut of this potential repeated interaction. However, the principal will not be able to credibly promise an arbitrarily high payment because future missions are limited. Hence, commitment to base payments on Y_A is possible, but this commitment is limited. We analyze this aspect in detail in Section 4.4. For now, we impose no bound on b. Moreover, payments are supposed to be non-negative. This reflects the implicit assumption that agents are rewarded for a good outcome by being hired in future missions. In case of a bad outcome, however, the punishment that can be imposed on them cannot be more severe than not being hired for future tasks or receiving a lower rent in future task.

Hence, we impose:

[48] We assume that just forwarding payments based on subjective criteria might not be possible, because this might be regarded as corruption by the public.

Assumption 4: $w, b \geq 0$.

Consequently, we have a game of moral hazard with limited liability if the agent is hired, see Innes (1990) for a general characterization. Our model differs in a sense that the principal can also be active herself, but that this is associated with different costs and outcome parameters.

4.3 Actor's Interaction – Static Game

In the following sections, we analyze the optimal actions when the principal decides to perform the task herself, and then derive the optimal contract if the agent is hired and finally compare both options.

4.3.1 Optimal Effort Choice of Principal

If the principal does not hire the agent but has to decide whether to carry out the task herself or not to perform it at all, her optimal action is described by

Proposition 1*: If the principal decides not to hire an agent, effort conditional on performing the task is* $e_P^* = \frac{(H - L_P)}{k_P}$*. However, performing the task by herself is optimal for the principal if and only if*

$$L_P + \frac{(H - L_P)^2}{2k_P} - F_P \geq \bar{u}_P \,. \qquad (1.1)$$

Proof: In the present case, the principal can directly set the effort level. Thus, the problem to be solved equals

$$\max_{e_P} u_P = e_P H + (1 - e_P) L_P - C_P(e_P) \,, \qquad (1.2)$$

s.t. $U_P \geq \bar{U}_P$. The first-order condition characterizes equilibrium effort given performing the task (note that this condition is also sufficient, provided the assumptions concerning effort costs):

$$(H - L_P) - \mathrm{k}_p \, e_P = 0 \,. \qquad (1.3)$$

Plugging this into the right hand side of (1.2) gives (1.1).

Q.E.D.

It follows from the foregoing that more effort is chosen if variable costs k_P are lower and if the difference between good and bad outcome, $H - L_P$, is larger. The same is true for the probability of performing the task at all, which is also affected by fixed costs, as well as the principal's utility in the bad outcome. A lower L_P indicates that a failure is very detrimental to the principal's interest. For example, the political costs a state has to face in case of a bad outcome can outweigh any potential

gains a military victory provides (see Section 4.2.1). In this case, it will be better for the principal to completely abstain from the task. We briefly illustrate this aspect with the US involvement in the Vietnam War between 1965 and 1975. Against the background of the Cold War, the US intervened in the war between the communist North Vietnam and anti-communist South Vietnam in order to halt the so-called communist expansion. Even though the US was never defeated on the battlefield, the military involvement in the Vietnam War proved to be a political disaster for the US administration. The domestic public opinion turned against the US involvement and eventually caused the withdrawal of US troops from Vietnam particularly because of the brutal acts of war and the high civilian and troop causalities which became known to the US public during the war (Hess, 2009:154ff). In retrospective, one could therefore argue that it would have had been better for the US not to intervene in the Vietnam War in the first place.

4.3.2 Optimal Contract if a Specific Agent is Hired

Now, assume that the principal decides to hire a specific agent. Here, we assume that this is done competitively. All bargaining power is on the principal's side, who can therefore determine the terms of the contract. However, due to the exogenous bounds on compensation (which cannot be negative), the agent might still receive a rent.

Before exploring the agent's actual effort choice and associated incentives, we look at the first-best effort (from the principal's perspective) given the agent is hired and take it as a benchmark. This level would be $e_A^{FB} = \frac{(H - L_A)}{k_A}$ and might or might not be higher than the effort the principal would choose.[49] More precisely, $e_A^{FB} \geq e_P^*$ if $\frac{(H - L_A)}{(H - L_P)} \geq \frac{k_A}{k_P}$. On the one hand, lower marginal effort costs $(k_P \geq k_A)$ rather make it optimal to have $e_A^{FB} \geq e_P^*$. On the other hand, a bad outcome is worse for the principal if it had performed the task itself $(L_A \geq L_P)$, which reduces the need to induce effort.

If the agent's effort was verifiable, it would be optimal to induce e_A^{FB}. In this case, offering a bonus $b(e) = \mathrm{c}_A(e_A^{FB})$ would provide sufficient incentives, and the fixed wage would be set to cover the agent's fixed costs and outside option, i.e. $w_A = F_A + \bar{u}_A = F_A$. However, the agent's effort is not contractible, and the contingent payment b can only be based on the realized outcome. Hence, it might be optimal to actually induce an effort level lower than e_A^{FB}. The reason is that due to the agent's limited liability constraint (i.e. the principal cannot punish the agent in case of a bad

[49] e_A^{FB} would be the agent's effort if the principal were able to directly choose it itself. In this case, the principal solves $\max_{e_A} e_A H + (1 - e_A) L_A - C_A(e_A)$, where the first order condition gives e_A^{FB}.

outcome), the agent must receive a rent absent fixed costs. If F_A is sufficiently small, the agent receives a net rent, and the principal faces a trade-off between effort maximization and rent extraction.[50] This induces him to implement an effort level that is below the first-best, even if the latter were enforceable.

Deriving these results, note that due to b being restricted to non-negative values, it will obviously be optimal to set $b(L_A) = 0$. If high output is realized, the agent receives the payment $b(H) \equiv b$. Given an arbitrary payment b, the agent chooses an effort level to maximize its expected utility level. This is captured by the incentive compatibility (IC) constraint

$$e_A^* = \text{argmax} u_A = w + e_A b + (1 - e_A) \cdot 0 - C_A(e_A).$$

Equilibrium effort is independent of the fixed payment w, which is set at the beginning of the relationship and thus cannot be used to give incentives. Since the conditions to use the first order approach are satisfied, we have equilibrium effort

$$e_A^* = \frac{b}{k_A}.$$

It follows from the foregoing that the agent's equilibrium effort depends on b and k_A. More effort is chosen if variable costs k_A are lower and b is large. Conditional on hiring the agent, the principal sets b and w to

$$\max u_P = e_A(H - b) + (1 - e_A) L_A - w,$$

subject to

(IC)

$$e_A^* = \frac{b}{k_A}$$

(IR)

$$u_A = e_A b - k_A \frac{e_A^2}{2} - F_A + w \geq 0$$

(LL)

[50] In cases in which the agent is risk-neutral but cannot be punished, the optimal contract must satisfy a so-called limited liability constraint additional to incentive and participation constraints (Laffont and Martimort, 2001:149).

***Proposition 2**: Assume the agent is hired.[51] Then, equilibrium effort depends on F_A which determines whether the agent has to get a rent. More precisely, there exist values $\underline{F}_A$ and $\overline{F}_A$, with $\underline{F}_A < \overline{F}_A$, such that*

i) Effort is at its efficient level, $e_A^* = e_A^{FB} = \frac{(H - L_A)}{k_A}$, if $F_A \geq \overline{F}_A$. However, in this case it can only be optimal to hire the agent if doing nothing is less worth than a failure, i.e., if $\overline{u}_P < L_A$.

ii) Effort is at half its efficient level, $e_A^* = \frac{(H - L_A)}{2k_A}$, if $F_A < \underline{F}_A$.

iii) Effort lies between e_A^{FB} and $\frac{e_A^{FB}}{2}$ if $\underline{F}_A \leq F_A < \overline{F}_A$

Thus, for each level of effort that the principal would like to induce exists a corresponding contract which ensures participation and incentive compatibility (Laffont and Martimort, 2001:151). For relatively high fixed costs, the principal does not have to give the agent an extra rent and thus implements first-best effort. However, this case can only be optimal if doing nothing is less worth than a failure, i.e., if $\overline{u}_P < L_A$. This aspect is further explored in Proposition 5. For low fixed costs, the binding limited liability constraint allows the agent to extract some rent. Then, the principal faces a trade-off between surplus maximization and rent extraction, making it optimal to only implement half of first-best effort and paying the agent a rent. For intermediate levels of fixed costs, this trade-off is also present. Then, however, it is optimal to only reduce effort and keep the agent at its outside utility. Thus, effort falls with lower fixed costs, until it reaches half the efficient level, where it becomes optimal to grant the agent a rent. Furthermore, the principal's payoff decreases with F_A as long as $F_A \geq \frac{(H - L_A)^2}{8k_A}$. For $F_A < \frac{(H - L_A)^2}{8k_A}$, u_A^P is independent of F_A.

4.3.3 Comparison

In the following, we compare the principal's decision to perform the task herself with her decision to hire the agent. Generally, we can make the following statement:

***Lemma**: Performing the task herself rather than hiring the agent becomes relatively better for the principal for higher levels of L_P, F_A and k_A, and for lower levels of L_A, F_P and k_P. The impact of a higher H is ambiguous and depends on the size of k_A, k_P, L_A and L_P.[52]*

[51] See Appendix for the proof to Proposition 2.
[52] See Appendix for the proof to Lemma.

Not surprisingly, it becomes less attractive to hire the agent if the latter *ceteris paribus* faces higher operating costs that it must be compensated for, and if a bad outcome after performing the task itself, L_P, is less problematic. The next proposition captures the importance of the difference between L_A and L_P, i.e., the principal's payoff after a failure, dependent on whether the agent was hired or not. In this case, a larger difference always makes it relatively better to hire the agent.

***Proposition 3**: A larger difference between L_A and L_P reduces $u_P^P - u_P^A$.*[53]

The fact that the domestic public opinion might be rather indifferent towards the death of PMSCs personnel compared to the death of regular soldiers leads to a problematic outcome: It not only reduces the implemented effort if the agent is hired, but also makes it more likely that the agent is actually hired. In case of international military interventions, this result connotes a problem for the country in which the intervention takes place (i.e. the host state). Even though the host state mainly cares about how good the job is done - about the level of the implemented effort - it is possible that the wrong player (from the host state's perspective), namely the PMSC instead of the principal's own forces, carries out the task. We further explore this issue in Section 4.5.

Before, we present a further proposition that describes another case of when hiring the agent is always better than performing the task oneself, namely when we assume $F_P \geq F_A$ and the agent's fixed costs are sufficiently high.

***Proposition 4**: Assume $F_P \geq F_A$ and $F_A \geq \frac{(\mathrm{H}-\mathrm{L}_A)^2}{2k_A}$. Then, it is always better for the principal to hire the agent compared to performing the task herself.*

Two aspects drive this result. First of all, high fixed costs alleviate the necessity to give the agent a rent, also making it optimal to induce first-best effort if the agent is hired. Since the principal's fixed costs are even higher, the need to compensate the agent for his fixed costs does drive the principal to perform the task herself. Furthermore, $L_A \geq L_P$ reduces the principal's loss if the task fulfilment is not successful.

However, if the conditions of Proposition 4 are satisfied, it will be very likely that the task it not performed at all. Above, we described that it seems sensible to assume $L_A \leq \overline{u}_P$, i.e. that a failure of the task gives the principal a lower payoff than if it had abstained from performing it from the beginning. Then, we have

[53] See Appendix for the proof to Proposition 3.

***Proposition 5**: Assume* $F_P \geq F_A, F_A \geq \frac{(H-L_A)^2}{2k_A}$ and $\overline{u}_P \geq L_A$. *Then, it is optimal for the principal to abstain from performing the task.*

In all other cases, namely if $F_P < F_A$ or $F_A < \frac{(H-L_A)^2}{2k_A}$ each option can be optimal, and the agent even might be hired if this is with lower effort levels. For example, assume that $k_P = k_A = k$ and $F_A < \frac{(H-L_A)^2}{8k_A}$. Then, hiring the agent is always associated with substantially less effort than if the principal performs the task herself. However, the latter can be optimal, namely if $u_P^P - u_P^A = L_P - L_A + \frac{(H-L_P)^2}{2k} - \frac{(H-L_A)^2}{4k} - F_P < 0$. This is always true for F_P sufficiently large. Moreover, even if $F_P = 0$, this condition can be satisfied, depending on the difference between L_P and L_A (see Proposition 3).

4.4 Repeated Interaction – Dynamic Game

We already discussed that contingent compensation as an official part of agreements between states and PMSCs is basically not observed. Instead, it seems that these components rather enter implicit, namely via future collaborations where the agent will receive a rent. In this section, we incorporate the dynamic nature of the relationship between principal and agent into our model and analyze the consequences when all contingent compensation must be self-enforcing, i.e., it must be optimal for the principal to actually forward it to the agent, so that lastly both parties will not deviate from the contract (see Levin, 2003).

We extend the model in the following way: The principal repeatedly faces the same choice as before, where all aspects of the task - costs, identity of agents and payoffs in case of success or failure - do not vary over time.[54] Furthermore, we abstract from all aspects and tasks of a mission for which the specific agent is not considered, either because others are better suited or because the principal is performing it herself. Formally, we analyze an infinitely repeated game in discrete time; periods are denoted $t = 1, 2, ...$; future periods are discounted with the factor $\delta < 1$.[55] δ not only reflects time preferences, but also issues like the frequency with which this kind of task is carried out or the existence of other, competing agents. Furthermore, we restrict our focus on so-called

[54] This assumption is solely made for concreteness. Besides, letting parameters change stochastically would have no qualitative impact on the point we want to make here.
[55] A complete formal characterization can be found in the Appendix.

stationary contracts, which means that the contract offered by the principal is identical in every period.

At the beginning of each period, the principal either makes an offer to the agent (described by $d_t^P = 1$) or not $(d_t^P = 0)$. This offer consists of a verifiable component $w_t \geq 0$ and the promise to pay a bonus $b_t \geq 0$ whenever $y_t = H$. In order to stay as close as possible to the static case, we still use bonus payments made at the end of a period to reward agents - although we argued that agents are rather compensated within future projects. However, even if we replaced the bonus with a fixed wage w^h $(\text{with } w^h = \frac{b}{\delta} + w)$, paid to the agent at the beginning of each period following a successful one, the following analysis would yield identical outcomes.

If $d_t^P = 1$, the agent decides whether to accept the offer or not, i.e. he chooses $d_t^A \in \{0,1\}$. If the agent is actually hired in period t, i.e. if $d_t \equiv d_t^P d_t^A = 1$, the fixed component w_t is forwarded to the agent, who subsequently chooses effort $e_t \in [0,1]$. Then, output $Y_t \in \{H, L_A\}$ is realized, and the principal has the choice to pay the discretionary bonus $b_t \geq 0$.

Discounted payoff streams are

$$U_{P,t}^A = \sum_{\tau=t}^{\infty} \delta^{t-\tau} \left[d_\tau \left(-w_\tau + e_{A,\tau}(H - b_\tau) + (1 - e_{A,\tau}) L_A \right) + (1 - d_\tau)(1-\delta)\bar{U}_P \right]$$

$$U_{A,t} = \sum_{\tau=t}^{\infty} \delta^{t-\tau} d_\tau \left(w_\tau + e_{A,\tau} b_\tau - \left(F_A + k_A \frac{e_{A,\tau}^2}{2} \right) \right),$$

where $(1-\delta)\bar{U}_P = \max\left\{ L_P + \frac{(H - L_P)^2}{2k_P} - F_P, \bar{u}_P \right\}$ describes the principal's optimal choice - either to perform the task herself or to abstain from doing it - in case the agent is not hired.[56]

The crucial aspect in this section is that it has to be optimal for the principal to actually forward the bonus to the agent after a success. Hence, the principal must fear a punishment after failing to forward the bonus to the agent. This punishment takes the form of a complete loss of trust in the principal by the agent. In other words, the agent only trusts the principal to make future bonus payments as long as the latter has not broken any given promise in the past. After reneging, the principal knows that the agent will not exert effort anymore and hence constitutes a reversion to the static Nash equilibrium where the principal receives $\bar{U}_P$. In this case, it will generally not be optimal to hire the agent for any future mission.

[56] Note, that variable and fixed costs are constant over time and accrue in every period where the agent is hired.

Obviously, the present analysis is only interesting as long as the agent is actually hired in equilibrium. Due to stationarity, if hiring the agent is optimal in one period, it will also be optimal in all periods in equilibrium. In this section, we thus focus on the case when the agent is hired by the principal.[57]

Stationarity implies that all periods are identical. Hence, we can omit time subscripts and have discounted payoff streams

$$U_P^A = \frac{-w + e_A(H-b) + (1-e_A)L_A}{1-\delta}$$

and

$$U_A = \frac{w + e_A b - \left(F_A + k_A \frac{e_A^2}{2}\right)}{1-\delta}.$$

If the agent is not hired (which in this section constitutes the principal's off-equilibrium outside option after breaking a promise), it receives a payoff of zero, whereas the principals has an outside utility payoff stream $\bar{U}_P = \max\left\{\frac{L_P + \frac{(H-L_P)^2}{2k_P} - F_P}{1-\delta}, \frac{\bar{u}_P}{1-\delta}\right\}$, where the first component is the utility level when the principal is active and the second when the principal abstains from the task. We further assume that $\bar{U}_P > L_A - F_A$. Hence, it is never optimal to hire the agent without giving incentives, i.e., when $e_A = 0$.

Now, assume that the agent is hired and supposed to exert an effort level e_A^*. A number of constraints have to be satisfied for e_A^* being part of an equilibrium. As before, the agent's incentive compatibility (IC) constraint must hold,

$$\text{(IC) } e_A^* = \operatorname{argmax} U_A.$$

Due to stationarity, this condition is basically identical to the static game analyzed above, equilibrium effort can be obtained using the first-order approach, and equals

$$e_A^* = \frac{b}{k_A}.$$

Furthermore, the agent's individual rationality (IR) constraint and the limited liability (LL) constraint are

[57] The alternative of performing the task itself is only important as an outside option for the principal. Consequently, the corresponding per-period payoff is identical to the static case.

$$\begin{array}{l}(\text{IR})\ U_A \geq 0 \\ (\text{LL})\ w \geq 0\end{array}.$$

In addition, it must be optimal for the principal to actually make the bonus payment b. As the outcome is not verifiable, the principal will only pay out b if it is optimal to do so. This is the case whenever the future value of cooperation is higher than the future value of non-cooperation, i.e. $\bar{U}_P$. Therefore, the principal's dynamic enforcement (DE) constraint equals

$$(\text{DE})\ -b + \delta U_P^A \geq \delta \bar{U}\ .^{58}$$

Note that whenever a strictly positive bonus and hence effort level can be enforced, then $U_P^A \geq \bar{U}$, and hiring the agent is optimal. In this case, the objective is to maximize U_P^A, subject to the constraints derived above.

In the Appendix, we fully characterize possible outcomes and show that if the principal's (DE) constraint does not bind, the results are identical to the static case derived above. Here, we focus on the situation when (DE) binds. This implies that the principal would like to enforce a higher effort level but cannot commit to compensate the agent accordingly. In this case, the parameters δ and $\bar{U}_P$ are of particular interest to us, and we want to explore their effect on the maximum enforceable value of b and examine what the respective values actually mean for countries that consider hiring a PMSC.

We already mentioned that the discount factor δ reflects time preferences, but also the frequency of potential tasks for which the principal considers hiring the agent. The higher the level of δ, the larger is the effort level that can be enforced in an equilibrium because δ indirectly reflects the principal's expected level of commitment to forward a bonus to the agent.

[58] Note that stationary contracts must satisfy both, the incentive compatibility constraint (for the agent's effort choice) and the dynamic enforcement constraint which ensures that discretionary payments are not too small or too large, i.e. that the principal can commit to pay a higher bonus to increase the agent's effort level. This characterizes the contracts as a self-enforcing contract on contrast to a court-enforced contract (see Levin, 2003).

***Proposition 6**: Equilibrium effort is non-decreasing in δ and strictly increasing when the (DE) constraint binds.*[59]

Whenever the (DE) constraint does not bind and hence not restrict equilibrium effort, a higher δ has no impact on e_A^*. However, if (DE) binds and the principal cannot commit to pay a higher b to increase e_A^*, a higher δ would directly increase effort and hence U_P^A.

In this case, not only total payoff streams increase in δ (which would be a rather trivial result if the future becomes more valuable), but also average, i.e., per-period payoffs. This is further captured by

***Lemma 2**: U_P^A is strictly increasing in δ. Moreover, per-period payoffs $(1-\delta)U_P^A$ are non-decreasing in δ and strictly increasing in δ when the (DE) constraint binds.*[60]

Proposition 6 and Lemma 3 obviously also imply that a higher δ increases the chances that hiring the PMSCs is actually optimal compared to carrying out the task alone. Hence, we should observe that countries that are hardly active in (international) military operations should be less likely to hire PMSCs than those who are repeatedly involved in large-scale projects.[61]

Furthermore, a higher outside option decreases the principal's payoff in the case when hiring the agent is optimal. This might seem counterintuitive, since generally a better alternative option should always benefit a player. However, a higher outside option also reduces the ability of the principal to credibly commit to reward the agent for successfully performing a task.

***Proposition 7**: Equilibrium effort is non-increasing in $\bar{U}_P$ and strictly decreasing when the (DE) constraint binds. Furthermore, per-period payoffs $(1-\delta)U_P^A$ are non-increasing in $\bar{U}_P$ and strictly decreasing in $\bar{U}_P$ when the (DE) constraint binds.*[62]

Assuming that the value of not performing the task, $\bar{u}$, remains constant, the principal might be able to affect $\bar{U}_P$ if she is able to change parameters that determine the value of being active herself. For example, the size of the defence budget could generally affect operating costs for a given mission or task. k_P and F_P might be lower if forces are better trained, or could reflect opportunity costs if forces are not multifunctionally deployable. Hence, lower investments into a country's military might on the one hand have a direct impact on the use of PMSCs - if the defence budget is reduced and the

[59] The proof to Proposition 6 can be found in the Appendix.
[60] The proof to Lemma 3 can be found in the Appendix.
[61] Note, that this result could also induce some kind of reverse causality: Because the payoff of given missions increases in δ, it might be optimal to hire PMSCs also where abstaining from a task would otherwise be optimal.
[62] The proof to Proposition 7 can be found in the Appendix.

amount of activities remains constant, it will naturally be optimal to let more of these activities be performed by PMSCs - and might on the other hand have an indirect impact on the agent's effort level: A lower outside option increases the principal's commitment, and hiring the agent becomes relatively better compared to performing a given task herself. Hence, a reduction of the defence budget could counteract a reduction of δ if it goes hand in hand with a lower frequency of international activities.

In this section we endogenized the maximum enforceable value of b, which we treated before in the static model as a fixed parameter, and incorporated it into our model and showed how the principal can credibly commit to forward a specific value of b to the agent. The most fundamental aspect here is the ability of the principal to implicit forward an actual rent to the agent after a task has been performed, i.e. for which a service in return is not directly observable. Indeed, there is some indication that PMSCs receive rents (see Dickinson, 2007); however this practice is generally regarded as problem - especially in terms of transparency and corruption - that has to be tackled. Hence, competitive bidding processes are demanded as a tool to fight corruption and to enhance transparency (see Dickinson, 2007 and Stöber, 2007). However, our results show that making it impossible or generally harder to (at first sight unnecessarily) forward rents to PMSCs can trigger unintended consequences: The principal's inability to forward rents may reduce the performance of PMSCs, and countries might either abstain or carry out task themselves where hiring a PMSC would otherwise be optimal.

4.5 Impact on Host States

In this section, we analyze one particular scenario, namely the setting in which an international alliance undertakes a military intervention in another country (the host state) and individual states hire PMSCs for specific military or security tasks to be carried out in the host state. When analyzing the impact of PMSCs on the host state, it is less straightforward to define whose preferences are relevant - whether it is the government or just some weighted average of its inhabitants - especially if the purpose of the intervention is to replace the host state's government. Therefore, we make in this section some general points on how the choice of the principal affects the host state. Assume that if the mission does not take place, the host state's payoff is $\overline{u}_H$. If either the principal itself or the agent performs the task, a success triggers a payoff H_H, while a failure is associated with L_H. Furthermore, a mission is always associated with (expected) costs $K_H \geq 0$ for the host state, for example caused by the destruction of infrastructure, loss of human lives, or disruption and polarization of the society. We impose no assumptions on the size of H_H, L_H and K_H. However, it

seems sensible to assume $L_H \leq L_P$, i.e., the consequences of a failure of the task are more detrimental to the host country than to other players. H_H could be larger or smaller than H. On the one hand, a success of the task can have additional benefits to the host state that the principal does not enjoy. On the other hand, the principal might enjoy domestic or reputational benefits that have no impact on welfare in the host state. Generally, it seems sensible to assume that given a task is being performed the host state wants the job to be done as good as possible and prefers the highest possible effort level. However, as already pointed out above, it might very well be that the principal chooses the option where less effort is involved (see Proposition 3). Generally, it is possible that the principal's and the host state's preferences are sufficiently aligned. However, the following cases can occur as well:

First of all, the principal might carry out a task even though the host state would have preferred it to abstain at all. To have this outcome, $\overline{u}_H$ and/or K_H just have to be set sufficiently high and $\overline{u}_P$ sufficiently low. Concerning the latter, just consider domestic conditions making the execution of a mission very tempting for the principal. Furthermore, we might have $H_P > H_H$. In this case, a potential victory would give the principal way more benefits than the host state and thus make it optimal to carry out the task. The military interventions in Afghanistan (2001) and Iraq (2003), for instance, illustrate this case.

Another potentially suboptimal outcome for the host state is the already mentioned possibility that the host state would prefer the principal to carry out the task itself (especially if this was associated with higher effort), but the latter would rather hire the agent. This would be more likely to happen for a larger difference between L_A and L_P (see Proposition 3). This outcome is particularly critical when the PMSC exercises low effort in fulfilling its tasks. Host states are normally war-ridden countries with very limited monitoring and oversight capacities. In case of misconduct of PMSCs, for example, they most likely will not be able to prosecute them appropriately as has happened in Iraq for instance, where employees of the PMSC Blackwater International killed Iraqi civilians in 2007. As Ross (2011:95) puts it: "[…] the Iraqi government attempted to prosecute those involved. It was unable to do so because of Coalition Provisional Authority (CPA) Order 17, which granted PMSCs and their personnel immunity from Iraqi prosecution. Order 17 was repealed in one of the first acts of the Iraqi Parliament in 2009, and the Ministry of Interior used its expanded authority to refuse Blackwater an operating license. Despite decisive action by the Iraqi authorities, the company (now called Xe Services) continues to operate in Iraq and is still the main provider of personal security services for the U.S. State Department." Such occurrences might harm the relation between the host state and the hiring state on the long-term – an outcome that is certainly not in the interest of the principal.

4.6 Conclusion: Translating the Model's Implications into Empirical Analysis

Whereas the support of the private sector in terms of manufacturing and provision of weapons and supplies for regular troops has traditionally been a part of warfare, the increased use of PMSCs to provide services such as logistical support, training of security forces, provision of armed security as well as interrogations, is relatively new for modern nation states. The collaboration between states and PMSCs presents new challenges which – due to the distinct nature of the tasks involved – substantially differ from previously made experiences with subcontracting and privatization. However, PMSCs have become and irreversible fact of the contemporary international security structure and state as well as non-state actors have become increasingly reliant on them. The academic literature on PMSCs is therefore strongly concerned with the implicit risks and imponderabilities of contracting PMSCs in contingency operations (see Chapter 2). Against this background, we developed a formal principal agent moral hazard model in which we addressed the questions (1) why states, while being aware of the complicated agency dilemma, delegate military and security tasks to PMSCs and (2) how they can set the right incentives for PMSCs to act according to the best advantage of their principals. We analyzed the diverging interests of states and PMSCs, the lines of action of both parties and the resulting agency problems. In the following, we discuss the model's major results:

Relating to our first question, one major result of our model is that even if the PMSC is expected to do a worse job than the state would do, delegation can be optimal for the state under specific conditions (see Section 4.3.3). Hence, an outcome that is not in the interest of those affected by the decision (for example the host state) – namely that the party expected to exercise lower effort and do a worse job is performing a given task – might occur.

However, a good performance of PMSCs is generally in the interest of states. Therefore, it is of utmost importance to pursue the question how PMSCs can be motivated to exercise high effort in fulfilling their tasks in order to generate an overall benefit for all involved parties. Which are the parameters the state is capable of changing in order to induce a better performance of PMSCs? Which are the incentives, the state can give to motivate PMSCs to exercise high effort? We reasoned that given the presence of agency problems and the conflict environment, in which the interaction between states and PMSCs takes place (and which additionally reinforces and exacerbates the already existing agency problems), assessing performance and providing incentives through explicit contracting, is hardly feasible.

Therefore, we draw the attention to a more promising way for states to incentivize PMSCs, namely via informal relational contracts. We argued that there exist a mutual implicit understanding

between states and PMSCs whereby the state incentivizes PMSCs with the prospect of re-hiring and a higher rent in case of a repeated collaboration – if and when the PMSC has performed well in the previous collaboration. Given that PMSCs are very often not selected based on a competitive bidding process (see Dickinson, 2007 and Ortiz, 2010a), we believe that rewards in the form of discretionary payments actually play a role in the interaction between states and PMSCs. Our model shows, however, that because this form of reward cannot be verified and enforced by a court, the state must be able to credibly commit to reward the PMSC for its high effort in order to induce a good performance. Our analysis revealed that it is not only the PMSCs' reputation that is of practical relevance, but more importantly the state's credibility to keep the promise of a bonus (of being rehired) after a good outcome. The model suggests that this implicit promise is necessary in order to successfully incentivize the agent to exercise high effort. From a transparency-oriented point of view, this implicit promise may be regarded as a form of corruption. This is reflected in the repeated requests for the enforcement of competitive bidding processes when contracting PMSCs and a greater transparency in contractor-government relations (see for example Stöber, 2007 and Stanger, 2012). The results of this analysis, however, indicate that a high degree of transparency in the contracting process may actually have a negative impact on the performance of PMSCs.

Furthermore, our model shows that states which do not often conduct military operations or are not involved in international military missions should be less likely to hire PMSCs because of their inability to give PMSCs appropriate incentives for exercising high effort. In this context, politico-economic conditions, which indicate a potential demand for the services of PMSCs, as well as the financial ability to compensate PMSCs such as the size of a state's defence budget, the frequency of its military operations, the strength of its own security forces or its overall policy towards outsourcing and the delegation of military and security tasks play a decisive role for the ability of a sate to give PMSCs appropriate incentives. Obviously, strong and weak states will signalize a credible commitment in different ways.

Towards a Quantitative Research Approach[63]

The model's implications are the subject of the empirical chapters of this dissertation. However, before I outline how the empirical analysis of the model's implications unfolds, it is necessary to briefly go into the issue of data availability. As already mentioned, data collecting within this research context is particularly difficult – which is to a large extent due to the secrecy of the industry in general. Nonetheless, previous research has produced a great amount of distinguished empirical analyses (see Chapter 2). Due to the scarcity of available broad and systematic datasets, though, quantitative research on PMSCs is still in its infancy – with the exception of very few studies such as

[63] From this section, I continue using the pronoun "I" again.

Akcinaroglu and Radziszewski (2012). Thus, in this dissertation, I aim at contributing to the quantitative literature on PMSCs by conducting diverse statistical analyses with data drawn from different sources. However, the scarcity of available systematic datasets makes it difficult to directly translate and empirically estimate the model's implications. I rather need to derive indirect measures for the model's variables. Consequentially, the subsequent empirical analyses include additional assumptions, which I expose in the following.[64]

While the model provides many different results, the focus of the subsequent empirical analyses is on PMSCs' effort level and the factors influencing it. I focus particularly on this implication of the formal model because the aim of this dissertation is to contribute to an advanced understanding of the mechanisms driving PMSCs' behaviour and the parameters which states can influence in order to induce a high performance of PMSCs. According to the formal model, the equilibrium effort level of PMSCs is determined by their variable costs and the expected bonus, more precisely, the state's credible commitment to later compensate a PMSC for a good performance (see Section 4.2.2). Hence, I derive the following double-hypothesis:

The higher the chance of a bonus, the higher the effort level of a PMSC will be;
the higher the variable costs a PMSC faces, the lower its effort level will be.

In the subsequent chapters, I examine empirically whether these variables actually play a role and if, how they affect PMSCs' effort level. I start the empirical analysis with the question whether there is evidence that the theoretically predicted implicit contingent compensation exists and is relevant in the interaction between PMSCs and states. Exploring this question proves to be particularly difficult – not at least due to the implicit and informal nature of the subject of interest. However, I approach this question by looking at the conflict intensity of armed conflicts in which PMSCs operated. I operationalize the effort level of PMSCs as the intensity level of an armed conflict, arguing that - in due consideration of intervening variables that might also affect the conflict intensity – a high effort level of the involved PMSCs should negatively affect the intensity of an armed conflict and vice versa. Furthermore, I examine whether there is a difference in the conflict intensity between those conflicts in which the principal (i.e. the state) was able to credibly commit to a bonus and those in which the principal could not promise a bonus. I operationalize the promise of a bonus as the existence of natural resources in a country. I argue that those states which possess high amounts of natural resources should be more likely to successfully incentivize PMSCs for exercising high effort because of their ability to give PMSCs the expectation of having a share in the extraction of those natural

[64] For a discussion of the general problems of a direct empirical estimation of formal models, see Morton (2005:210ff).

resources once the conflict is resolved.[65] Furthermore, I compare the results gained with the conflict intensity in conflicts in which no PMSCs were deployed in order to examine potential differences.

In the second stage of my empirical analysis, I examine whether there is evidence that the variable costs PMSCs face during their operations in conflict zones are actually a relevant factor for their performance. In doing so, I examine the reaction of investors of publicly traded PMSCs. I argue that if variable costs are a relevant factor which negatively affects PMSCs' effort level and consequently their profits, then investors should be aware of this fact and act accordingly. Thus, in my analysis investor reactions towards events which potentially affect operating costs (such as attacks and bombings) serve as a proxy that should provide an indication of the relevance of PMSCs' variable costs.

Intuitively, one would assume that PMSCs generally benefit from a worsening of the security situation in areas they operate in because it guarantees subsequent contracts and therefore more profit. However, more insecurity also raises the costs of the operation not only for the PMSCs involved but also for the state itself. Hence, the effect of increasing insecurity and instability is not as clear as it appears at first. For instance, in the context of military operations, in which the principal herself is also operating, an uncontrollable insecurity situation of which the principal cannot get a grip on might cause the principal's withdrawal from that mission (see Section 4.2.1 on potential political costs a state faces during military operations). An increasing insecurity level could have an ambiguous effect on PMSC's effort: First and foremost, it raises the variable costs for the PMSC. However, it also raises the operating as well as the political costs the principal faces. On these grounds, increasing insecurity might cause eventually the withdrawal of the state from the operation. On the one hand, this move could signal that the principal cannot keep her promise of a bonus in terms of re-hiring and therefore negatively affect the PMSCs' effort level. However, on the other hand, a withdrawal could also signal that all military and security tasks previously carried out by the state can then potentially be carried forward by PMSCs and thus raise the effort level. Analyzing the reaction of investors of publicly traded PMSCs towards insecurity events allows examining these potential implications of rising variable costs.

[65] PMSCs' operations in resource-rich African countries seem to empirically support this assumption. For a detailed description of the involvement of PMSCs in African conflicts, see: Musah and Fayemi (2000).

Part II Empirical Analysis

5 The Impact of PMSCs on Civil War Severity - Do Incentives Matter?

5.1 Overview

The aim of this chapter is to examine the implication of the formal model in the previous chapter regarding the influence of a credibly promised contingent compensation on the effort level of PMSCs. More specifically, in this chapter, I investigate (1) whether there is a measurable difference in the conflict intensity of civil wars in which PMSCs operated compared to those in which PMSCs were not involved; and (2) whether there is a difference in the conflict intensity between those conflicts in which the state was able to credibly commit to a bonus and those in which the principal could not promise a bonus.

The remaining is organized as follows: The next section derives the hypotheses to be tested. The following section introduces the empirical design, explains the data used and the estimation strategies applied. The subsequent sections provide the presentation and analysis of the statistical results and discuss methodological issues at hand. Finally, in the last section, I conclude and discuss the implications of my findings.

5.2 Hypothesizing the Impact of PMSCs on Civil War Severity

There are, to my knowledge, no quantitative studies researching the impact of PMSCs on civil wars to date – with the exception of the recently published paper by Akcinaroglu and Radziszewski (2012) which examines the impact of PMSCs on the duration of civil wars. In consideration of the academic and public concerns on the risks and consequences of using PMSCs in crisis and war regions (see Chapter 2), there is a need in more systematic quantitative studies on the impact of PMSCs on civil wars. Hence, this chapter of the dissertation contributes to both the literature on the intensity of civil wars as well as the literature on the consequences of deploying PMSCs to crisis and war regions by providing the first quantitative study examining the relation between the involvement of PMSCs in civil wars and the intensity of those conflicts.

Akcinaroglu and Radziszewski (2012) show that PMSCs which were compensated with resource concessions are more likely to perform optimally compared to those which were not. In order to

explain this outcome Akcinaroglu and Radziszewski (2012:18) argue that prevalent opportunity structures in conflict determine the effort level of PMSCs and hence reason that "operating in a conflict environment which delivers financial benefits to companies in the form of contracts to extract natural resources means that it is in the interest of a profit seeking company to deliver an optimal service to the government so it could maximize its gains from lucrative contracts in the absence of violence".[66] This study, however, perceives the aspect of "lucrative contracts in the absence of violence" as a state's implicit promise to forward a bonus after a PMSCs' good performance. Given a state's credible promise of a bonus, the respective PMSCs should exercise high effort in the expectation that it will lead to a bonus, and we should, *ceteris paribus*, observe lower levels of conflict intensity. This means, that - dependent on its ability - a state could use different means to credibly promise a bonus. However, in case of politically and financially weak countries, natural resources suggest themselves as the most credible bonus to PMSCs.

In order to test (1) the impact of PMSCs on the conflict intensity of civil wars and (2) the impact of a state's credible promise of a bonus on the effort level of PMSCs, I derive and test the following hypotheses:

	Hypotheses Empirical Analysis I
Hypothesis I.1	Civil wars in which PMSCs operate are more likely to exhibit higher levels of conflict intensity than conflicts without PMSCs' presence.
Hypothesis I.1a	Civil wars are more likely to exhibit higher levels of conflict intensity in the years after PMSCs entered compared to the years before and during PMSCs entered.
Hypothesis I.2	Civil wars in countries with natural resources production and the presence of PMSCs are more likely to exhibit lesser levels of conflict intensity.
Hypothesis I.2a	Civil wars in which natural ressources are available are more likely to exhibit lesser levels of conflict intensity after PMSCs entered compared to the years before PMSCs entered.

Furthermore, an alternative and very intuitive explanation for an increase in the effort level of PMSCs is competition. This is also one of the main findings of Akcinaroglu and Radziszewski (2012). The authors show that as the level of competition among PMSCs increases, they are more likely to exercise high effort. In order to test for this alternative explanation I derive and test the following hypothesis:

Hypothesis I.3	Civil wars in which many PMSCs operate are more likely to exhibit lesser levels of conflict intensity than conflicts in which just one PMSC operates.

[66] It should be kept in mind that Akcinaroglu and Radziszewski (2012) do not control for the influence of natural resources on the duration of the civil wars examined and their results should be assessed in this light (see Ross (2004) for an overview of the relation between natural resources and the duration of civil wars).

5.3 Empirical Design

This section begins with a detailed description and discussion of the data and variables used in the empirical analysis. The subsequent section presents the estimation strategies.

5.3.1 Data and Operationalization

5.3.1.1 Measuring the Effort Level of PMSCs

Following Akcinaroglu and Radziszewski (2012), I define effort as any and every action that contributes to an optimal performance of PMSCs and delivery of military and security services, i.e. a performance that is in the best interest of the principal. I operationalize the effort level as the intensity level of civil wars in which PMSCs operate, arguing that - in due consideration of intervening variables that might also affect the conflict intensity – a high effort level of the involved PMSCs should be negatively correlated with the intensity of an armed conflict and *vice versa*.

I measure conflict intensity as the number of battle-related deaths in civil wars. Therefore, I used the PRIO Battle Deaths Dataset (Version 3.0) (Lacina and Gleditsch, 2005), which contains battle deaths (soldiers and civilians killed in combat) in state-based armed conflicts for the period 1946 to 2008. In the dataset, battle deaths are defined as "(…) deaths resulting directly from violence inflicted through the use of armed force by a party to an armed conflict during contested combat" (PRIO BD 3.0 Codebook, 2009:3). The dataset contains three variables, which measure battle-related deaths. They differ in low, high and best estimates of annual battle-related fatalities.[67] Even though the best estimates variable appears as the most appropriate variable, I refrained from using it because it contains a great number of missing values. Therefore, I present only the results for the low estimates variable below. However, in order to control for potential varying effects due to different coding, I have conducted the analysis with all three variables. Results for the best and high estimates can be found in the appendix (Table 24 and Table 25). Depending on the estimation strategy (that I introduce in the subsequent section), this variable either indicates the annual battle-related fatalities in a civil war or it is calculated as the average death rate over the whole conflict (the intensity).

Furthermore, the dataset distinguishes between four different types of conflict: (1) extra systemic, (2) interstate, (3) internal, and (4) internationalized internal. Since I focus only on civil wars, the dataset has been cleared from observations of extra systemic and interstate armed conflicts. Figure 7 shows the distribution of battle-related deaths over different regions and subdivides them

[67] If different reports provide different estimates and a higher (lower) estimate is considered more reliable, the low (high) estimate is also reported if deemed reasonable. In case of best estimates an examination is made as to what source is most reliable. If no such distinction can be made, the lower figure is given (UCDP Battle-Related Deaths Dataset Codebook, 2011:8).

into civil wars with the involvement of PMSCs and civil wars without the presence of PMSCs. In civil wars without the involvement of PMSCs, African, American and Asian armed conflicts exhibit the highest average battle-related fatalities whereas armed conflicts in Europe exhibit the lowest battle-related fatalities on average. Regarding civil wars with the involvement of PMSCs, armed conflicts in Asia, Africa and Europe show the highest average battle-related fatalities.

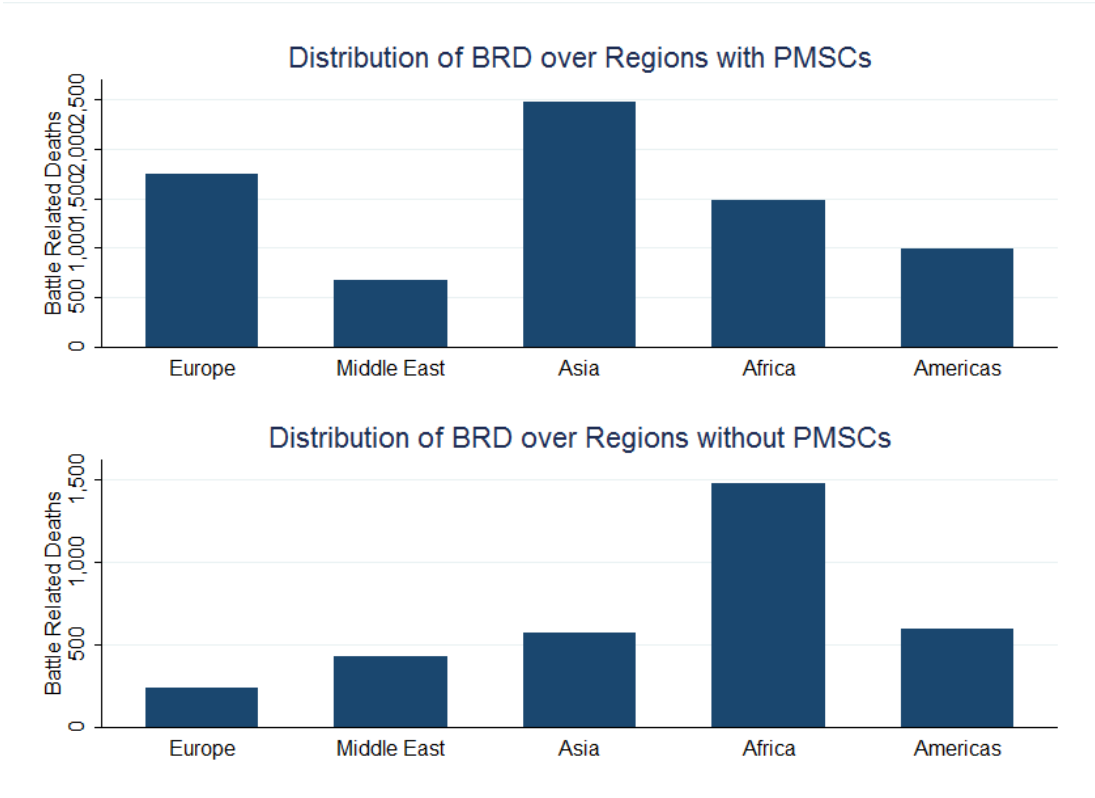


Figure 7: Distribution of Battle Related Deaths (1960 – 2000) [68]

Before I describe my independent and control variables, it is necessary to briefly discuss the controversy over different methodologies estimating battle casualties. Deaths tolls can be estimated either by incident-recording or by deriving estimates from mortality surveys. The controversy is about the different estimates which the two different methodologies produce (Spagat et al., 2009). In a study on war deaths, Obermeyer et al. (2008) criticized the PRIO Battle Deaths Dataset arguing that the dataset systematically underestimates deaths tolls because report-based estimation methodologies are not able to catch the total number of fatalities, particularly those that are not reported. The study attracted much attention and debate, and provoked various responses (see Spagat et al., 2009 for a recap of the debate). Before, criticism of report-based estimates had emerged from a controversy over different estimates of the recent Iraq War casualties (Burnham et al., 2006). However, neither source is in fact a perfect solution and completely reliable. Furthermore, Spagat et al. (2009) show in their response to Obermeyer et al. (2008) that the latter's imputations

[68] Own illustration based on data from Chojnacki et al. (2009) and Lacina and Gleditsch (2005).

regarding the PRIO dataset were unsubstantiated. The PRIO dataset is besides the Correlates of War Project (Singer, 1972) the most widely used dataset on battle-related fatalities in conflict studies. It provides notwithstanding general methodological issues reasonable data to study civil wars. Moreover, I am primarily interested in the ratio and intensity of conflicts and not in absolute numbers. Therefore, I rely in my analysis on the PRIO Battle Deaths Dataset (Lacina and Gleditsch, 2005).

5.3.1.2 Measuring the State's Credible Promise to Forward a Bonus

My main explanatory variable is a state's ability to credibly promise a bonus to a PMSC. Since I examine the involvement of PMSCs in civil wars, I am dealing with weak states as the potential principals of PMSCs. I have argued that strong and weak states have different means at their disposal to incentivize PMSCs optimally. A credible bonus that weak states can offer to PMSCs is, for example, the expectation of having a share in the extraction of natural resources once the conflict is resolved or the expectation of getting a higher rent once the state can access its resource revenues. Hence, I operationalize bonus as the production of natural resources in a state's territory. Using correspondent variables from Lujala's (2009:56) dataset on natural resources and conflict severity, I measure natural resources as the production of hydrocarbon (crude oil and/or natural gas), gemstones (secondary diamonds, rubies, jade, opals, sapphires) and drugs (coca bush, opium poppy, cannabis cultivation).

Lujala's (2009) dataset resorts to PETRODATA (Lujala et al., 2007), DIADATA (Gilmore et al., 2005), GEMDATA (Flöter et al., 2005) and DRUGDATA (Lujala, 2003). Hydrocarbon, gemstones and drug cultivation are dummy variables, coded as 1 if there was production in the country at the time of the conflict and 0 otherwise. I include two further dummy variables: natural resources, taking the value of 1 if there was at least one sort of resource production in the country and 0 otherwise, and natural resources2, taking the value of 1 if there were all three forms of resource production and 0 otherwise. Using dummy variables for resource production also limits the endogeneity problem. Using production volumes would be severe because production volumes and conflict intensity are correlated and can have an amplifying or decreasing impact on each other (see Lujala, 2009:65).

Table 3: Battle-related Deaths and Duration of Civil Wars by Type of Natural Resources and Presence of PMSCs (1960-2000)

		Battle Related Deaths			Duration (Years)		
	N	*Min*	*Mean*	*Max*	*Min*	*Mean*	*Max*
All Conflicts	151	10	1334.14	50000	1	8.75	38
Hydrocarbons (Crude Oil and Natural Gas)							
Civil Wars in Countries with Production	91	10	1485.28	50000	1	9.69	38
Civil Wars in Countries with Production and PMSC Presence	22	32	1309.43	11750	2	11.59	37
Civil Wars in Countries without Production	55	20	1202.88	21101	1	7.47	30
Gemstones (Secondary Diamonds, Rubies, Sapphires, Emeralds and Jade)							
Civil Wars in Countries with Production	68	22	1651.14	50000	1	10.59	38
Civil Wars in Countries with Production and PMSC Presence	24	25	1105.19	7019	3	14.38	37
Civil Wars in Countries without Production	78	10	1141.55	21101	1	7.35	38
Drugs (Coca, Opium, Cannabis)							
Civil Wars in Countries with Cultivation	51	25	2032.19	50000	1	12.73	38
Civil Wars in Countries with Cultivation and PMSC Presence	19	32	2373.66	21101	3	15.37	37
Civil Wars in Countries without Cultivation	95	10	1028.18	20023	1	6.78	38

Notes: own Figure modified from Lujala (2009)
Sources: Lujala (2009) and Chojnacki et al. (2009)

Table 3 shows the average battle-related deaths and the duration of civil wars by type of natural resources and the presence of PMSCs. The data suggests a relationship between battle-related deaths, natural resources and PMSCs. Conflicts in regions with natural resources last in average 10 to 13 years. Conflicts in regions with drug cultivation appear to produce the most battle-related fatalities on average. Civil wars with gemstones and hydrocarbons production in which PMSCs were present depict fewer battle-related fatalities compared to conflicts without PMSCs involvement – except for conflicts with drug cultivation, which depict higher battle-related deaths.

In a recent study on the relation between natural resources and conflict intensity, Lujala (2009) finds that gemstone mining as well as oil and gas increase conflict intensity. She shows that in addition to the general availability of natural resources, their exact locations (accessibility during conflict) as well as their type (lootable or unlootable) are important factors to the severity of a conflict. The findings of this particular study are crucial for my analysis. In relation to my research, Lujala's (2009) results imply an ambitious role of the availability of natural resources: According to my assumption they should serve to incentivize PMSC's to exercise high effort and thus reduce the conflict intensity. According to Lujala (2009), though, they add to a general intensification of civil wars. However, in his case study analysis of the impact of natural resources on the onset, duration, termination, and intensity of thirteen civil wars, Ross (2004) offers opposed findings: The author examines the two divergent assumptions stating that (1) natural resources add to an intensification of conflicts because two sides engage in resource battles and (2) natural resources mitigate conflict intensity because two sides engage in cooperative plunder. He could not find significant evidence for the assumption that natural resources make civil wars longer or more severe; rather the reverse. Hence, it remains to be seen whether there is a measurable difference in the intensity of conflicts in regions with rich resource reservoirs in which PMSCs operated compared to those in which PMSCs were not involved.

5.3.1.3 Measuring the Presence of PMSCs in Civil Wars

The second independent variable of interest provides information on the presence of PMSCs during civil wars. As I have already pointed out, a complete quantification of the private military and security industry does not currently exist; there are not yet any comprehensive datasets available which list all companies operating in the private military and security sector. There are, however, some sources of information.

The first source is a dataset compiled by Chojnacki et al. (2009) which is "based on a systematic analysis of all the articles published in five major US newspapers (New York Times, Washington Post, Los Angeles Times, Christian Science Monitor, and Wall Street Journal)" (Chojnacki et al., 2009:14).[69] The dataset compromises 43 cases of worldwide civil wars in which PMSCs were involved (see Table 20 in the appendix). From this dataset, I derive variable PMSC1, which is a dichotomous variable taking the value 1 if a PMSC was present in a civil war and 0 otherwise. Figure 8 shows the distribution of the involvement of mercenaries over different world regions. The dataset suggests that PMSCs were most often involved in armed conflicts in Africa and Asia.

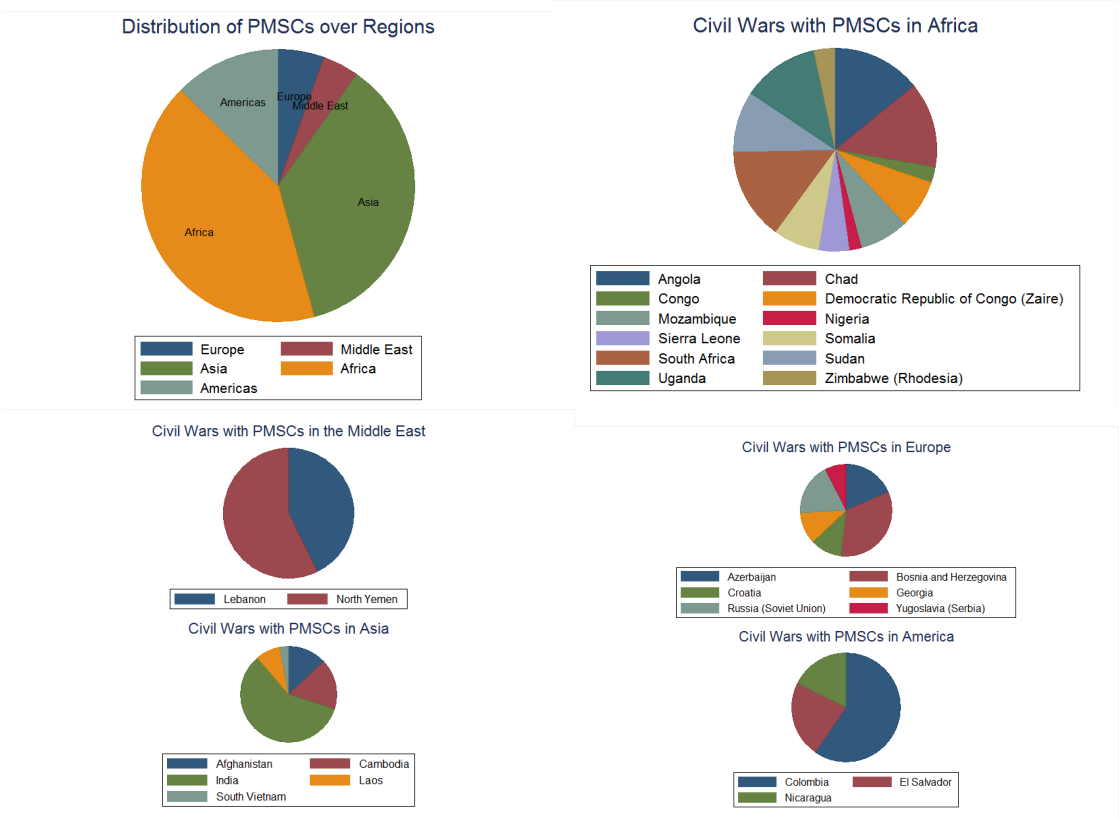


Figure 8: Distribution of PMSCs over Regions[70]

[69] In order to assure completeness, Chojnacki et al. (2009) compared their dataset to the list of mercenary activities in Africa provided in the appendix of Musah and Fayemi (2000), as well as, to the compilation of the UK Foreign and Commonwealth Office, which comprises data on PMSCs involved in African conflicts in the period 1950 to 1999 (FCO, 2002).

[70] Own illustration based on data from Chojnacki et al. (2009)

The second source is a compilation by the UK Foreign and Commonwealth Office (FCO, 2002), which was published in 2002. This compilation depicts 25 African countries in which PMSCs operated in the period from 1950 to 2000.[71] Whereas the Chojnacki et al. (2009) dataset only contains information on whether PMSCs were involved or not, the second dataset includes information on both the exact period of their presence as well as the number of mercenaries involved. From this dataset, I derive the following variables: PMSC2, taking the value 1 if a PMSC was present in a civil war and 0 otherwise; PMSC3, taking the value 1 if a PMSC was present in a conflict year and 0 otherwise; PMSC4, a time-delayed variable taking the value 1 in the conflict year after the PMSC first entered in order to account for a potential time-delayed effect of PMSCs on the conflict intensity; PMSC5, depicting the number of PMSCs present in a conflict year.[72] From the last variable I generate two further dummy variables because the dataset indicates that in most cases only one PMSC was involved in a conflict and in other cases there were often half-dozens involved (see Table 22 in the appendix). Hence, a linear relationship between the effect of the number of PMSCs and the conflict intensity appears to be unlikely. I include therefore PMSC6, which takes the value 1 if only one PMSC was present in a conflict year and otherwise 0; and PMSC7, which takes the value 1 if many PMSCs were present in a conflict year and otherwise 0. For an overview of all PMSC variables, see Table 21 in the appendix.

INTERACTION TERM: I have postulated a conditional hypothesis, arguing that PMSCs show a different effort level if they can expect a bonus after a good performance. Therefore, I need to test the effect of a bonus (production of natural resources in a country) on the effort level of PMSCs (i.e. the conflict intensity). In my analysis, however, I have two main independent variables: the presence of PMSCs in a conflict and the production of natural resources in a country. Therefore, I need to test the mutual effect of these two independent variables on my dependent variable with the help of an interaction term. Thus, I multiply the natural resource dummies and the PMSCs dummies to create a new variable called interaction term.

Before I describe the control variables, it is necessary to briefly take up the scholarly disagreement regarding the distinction between PMSCs and mercenaries because one might criticise that the datasets I use refer to mercenaries rather than PMSCs. As I have already discussed, the question of how to define PMSCs is highly controversial (see Chapter 1) and the literature offers a wide range of different definitions, typologies and approaches (Shearer, 1998; Singer, 2003; Schreier and Caparini, 2005; Kinsey, 2006; Krahmann, 2012). Depending on the respective agenda or normative approach, PMSCs are either put on a level with mercenaries or described as legitimate

[71] I compared this dataset to the list of mercenary activities in Africa provided in the appendix of Musah and Fayemi (2000).
[72] The correlation between the variables PMSC1 (Chojnacki et al, (2009) dataset) and PMSC2 (UK FCO (2002) dataset) amounts to 0.47 (403 observations; region=Africa).

corporate entities (Brooks, 2000; Bjork and Jones, 2005). Singer (2003:47f) characterizes PMSCs in distinction from mercenaries as organizations with a legal corporate structure, public and specialized recruitment, as business profit-driven, and as companies offering various services to a diverse client base with close ties to their home governments and/or corporate holdings. The majority of studies mark the end of the Cold War as the historical turning point for the rise of the corporate and business-driven form of private military and security provision in comparison to mercenary activities prior to that. However, corporate structured companies offering military and security services have existed before the end of the Cold War. Kinsey (2006:46), for example, refers to "Watchguard, the first commercial company of its type selling military style services to be set up in Britain after the Second World War and the first PMC to be established. […] The idea behind the company was to safeguard British interests [….]." Hence, the provision of private military and security services by companies rather than loosely connected individuals is not a new phenomenon commencing in the 1990s. Furthermore, against the background of the legal environment surrounding PMSCs' activities and using a discourse-historical approach, Krahmann (2012) explores how legal constructions of armed military and security providers changed in the course of the last decades. She concludes that the same actors, who were identified as mercenaries before, are referred to as private security contractors nowadays. Following these remarks, I argue that it is legitimate to use the datasets compiled by Chojnacki et al. (2009) and the UK FCO (2002) as well as to examine the period from 1960 to 2000. However, in order to account for further doubts, I have cleared the datasets – wherever relevant information was available – from individually operating private military and security actors and incorporated only actors with a corporate structure.[73] Moreover, as a robustness test, I create a sub-dataset, in which I examine exclusively the period from 1990-2000.

5.3.1.4 Control Variables

My quantitative analysis builds on the empirical literature on civil wars. The literature on civil wars centres mainly on the exploration of civil war onset, its duration, intensity, and termination as well as the risk of recurrence. Theoretically, the literature has largely been driven by economic and political rational choice theories (see Blattman and Miguel (2010), Bussmann et al. (2009) and Hegre and Sambanis (2006) for excellent overviews). Economic theories have focused on the impact of economic modernization on the mobilization of social (or ethnic) groups (Newman, 1991), on economic conditions that facilitate the outbreak of violent conflict (Grossman, 1995) and on the consequences of violent conflict on economic growth (Hirschleifer, 1995). Two recent branches of the literature analyze the outbreak and duration of civil wars in view of (1) political, economic and

[73] This was, however, only possible for the UK FCO (2002) dataset because contrary to the Chojnacki et al. (2009) dataset, this one offers further information.

ethnic grievances (Collier and Hoeffler, 2000) and in view of (2) financial, organizational and political power (Fearon and Laitin, 2003).

Whereas the body of literature on civil war onset, duration and termination keeps constantly growing, research on the intensity of civil wars has remained disregarded. As Lujala (2009:58) puts it: "There is a profound lack of theory in the studies on conflict severity." There are, however, some empirical studies examining the impact of rebels (Benson and Kugler, 1998; Besançon, 2005; Kalyvas, 2006; Lacina, 2006; Weinstein, 2007; Lujala, 2009), political institutions (Krain, 1997; Lacina, 2006; Heger and Salehyan, 2007), or economic grievances (Lu and Thies, 2011) on conflict intensity. Preliminary work on the determinants of conflict intensity was undertaken by Lacina (2006), who investigated the impact of variables usually used in the civil war onset and duration literature on the number of combat deaths in internal conflicts from 1946 to 2002.[74] She found that ethnic homogeneity, the availability of foreign assistance and regime type (i.e. democracy) are negatively related to the severity of a conflict whereas she could not find any evidence for the influence of state strengths or ethnic or religious fractionalization on the intensity of internal armed conflicts.

Based on empirical studies on the determinants of conflict intensity and in particular the studies by Lacina (2006) and Lujala (2009), I include in addition to the main independent variables a number of economical, political and social control variables at the country-level that are commonly proved to affect the intensity of civil wars.

GDP: GDP per capita is the gross domestic product divided by midyear population as conditioned by the World Bank.[75] It is a natural logarithmised variable. Depending on the estimation strategy (cross-section or panel estimation) it is either the average GDP or a lagged variable depicting GDP per capita in the year preceding the first observation. According to Fearon and Laitin (2003) and Sambanis (2004), a low GDP per capita is a good predictor variable for civil wars because GDP indicates a state's strength and capacity. Lacina (2006), however, finds no significant effect of GDP on the intensity of conflicts. I include GDP and test whether it contributes to an intensification of conflicts. The data are in current US dollars. The GDP in this sample ranges from $49.49 (Burundi in 1965) to $24893.49 (United Kingdom in 1998) with an average of $1383.71 (Israel in 1964 with a GDP of 1375.94 being closest to the average value).

POPULATION: Regarding civil war onset, large populations are found to increase the likelihood of civil wars (Fearon and Laitin, 2003). However, regarding the conflict intensity, Lacina (2006) shows that large populations are not related to the intensity of armed conflicts. In order to accommodate for

[74] She examined the following variables: state strength, regime type, ethnicity, and religion.

[75] GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources (World Bank, 2012).

these mixed results, I test whether Population is positively related to conflict intensity. This variable is a natural logarithmised variable. Like GDP, it depicts either the average population or is a lagged variable, which depicts the population in the year preceding the first observation. The country with the smallest population in the sample is Equatorial Guinea in year 1979 and the one with the biggest population is India in year 2000.

INEQUALITY: As Fearon (1998) points out, low income may lengthen civil wars by favouring insurgency, i.e. by favouring recruitment because attracting new members is easier when the economic alternatives are worse. Moreover, civil wars tend to be shorter in countries with higher income levels and less inequality whereas larger (in terms of population and territory) countries appear to have longer wars (Collier et al., 2004). Hence, I also include the variable inequality, measured as the estimated household income inequality (Texas, 2004)[76] to account for potential effects on conflict intensity. Depending on the estimation strategy, this variable either represents the average inequality within the observed period or is a lagged variable depicting the inequality in the year preceding the first observation. This variable, however, features a great many of missing values. Thus, I exclude it from the analysis if necessary.

ETHNIC POLARIZATION: There is controversy in the literature whether it is ethnic fractionalization (the number of ethnic groups in a country) or polarization (large ethnic minority faces a large ethnic majority) that triggers societal conflict. In an often-quoted study, Montalvo and Reynal-Querol (2005) show that polarization is a significant explanatory variable for the incidence of civil wars. Furthermore, Esteban and Ray (2008) argue that the probability of civil war onset is relatively low in highly polarized societies, however, once a civil war occurs its intensity is very severe. Whereas the probability of civil wars in highly fractionalized countries is very high but their intensity is relatively low. Following Montalvo and Reynal-Querol (2005) and Esteban and Ray (2008), I include ethnic polarization into the analysis and expect higher levels of conflict intensity in highly polarized societies. This variable is a dummy variable taken from Lujala (2009) and given the value 1 for high polarization in a country and 0 otherwise.

ETHNIC FRACTIONALIZATION: It is often argued that discrimination along the lines of ethnicity and religion creates grievances that in turn motivate armed conflict (Fearon and Laitin, 2003:79). Several studies argue furthermore that long-lasting insurgency is more common in ethnically diverse countries and that ethnic and religious motivated wars tend to be especially long (Fearon, 1998; Licklider, 1995). In order to examine the effect of ethnic fractionalization on the conflict intensity, I include a variable measuring the degree of ethnic fractionalization in a country. The data is drawn

[76] University of Texas Inequality Project. Estimated Household Income Inequality Data Set (EHII) - is a global dataset, derived from the econometric relationship between UTIP-UNIDO, other conditioning variables, and the World Bank's Deininger & Squire data set.

from Alesina et al. (2003). The dataset measures the degree of ethnic, linguistic and religious heterogeneity in various countries and contains data for only one year for each country. The least fractionalized country in the sample is the Comoros and the most fractionalized country is Yemen.

Table 4: Overview of Variables (Analysis I)

Variables	Source	Exp*	Estimation
Dependent Variable			
Battle Related Deaths	PRIO BD 3.0 (2009)		CSA / PA
Independent Variables			
Natural Ressources	Lujala (2009)	↑	CSA / PA
Production of Hydrocarbon	Lujala et al. (2007)		
Production of Gemstones	Gilmore et al. (2005); Flöter et al. (2005)		
Production of Drugs	Lujala (2003)		
PMSCs			
Presence	Chojnacki et al. (2009); UK FCO (2002)	↑	CSA / PA
Number of PMSCs	UK FCO (2002)	↓	PA
Interaction Variable (Natural Ressources x PMSCs)		↓	CSA / PA
Control Variables			
GDP	World Bank (2012)	↓	CSA / PA
Political Regime	Marshall et al. (2011)	↓	CSA / PA
Population	World Bank (2012)	↑	CSA / PA
Ethnic Fractionalization	Alesina et al. (2003)	↑	CSA / PA
Ethnic Polarization	Lujala (2009)	↑	CSA / PA
Insurgency	UCDP Non-state Actor (2009)	↑	CSA / PA
Inequality	UT EHII (2004)	↑	CSA / PA
Conflict Duration		↑	CSA / PA
Cold War		↑	CSA / PA

*Notes: * expected effect on dependent variable*
CSA = cross-sectional analysis / PA = panel analysis
Research period: 1960-2000

INSURGENCY: Studies show that the interaction of rebels and government highly influence the progress and duration of civil wars. According to the state capacity argument, a state's police, military and institutional capabilities are highly important for successful counter-insurgency operations (Fearon and Laitin, 2003:80). Insurgency groups can better survive if they face a weak government with weak security forces. The number of insurgency groups operating in a country, thus, indirectly represents a state's capacity. In order to examine the effect of insurgencies on the conflict intensity of civil wars, I include data on the number of rebel groups per armed conflict. This data was drawn from the UCDP Non-state Actor Dataset (Version 1-2009). The country with the most insurgency groups (25) in the sample is Chad.

POLITICAL REGIME: The political regime of a country discloses opportunity costs for a rebellion. These tend to be higher in a democratic regime because there are alternative means for resolving problems. Lacina (2006), for instance, finds that civil wars in democracies are expected to result in half the battle deaths compared to civil wars in non-democracies. I use data from the Polity IV dataset in which the political regime type is measured as the openness of political institutions on a scale of +10 (strongly democratic) to -10 (strongly autocratic) (Marshall et al., 2011). Depending on the estimation strategy, this variable either represents the average polity score within the observed

period or it depicts the polity score in the year of the observation. Based on previous empirical findings, I expect that high democracy scores as well as high autocracy scores negatively affect conflict intensity. The countries with the lowest polity score in the sample are Iran, Nepal, Oman, and Saudi Arabia. The countries with the highest score are Israel, the United Kingdom, Malaysia, and Spain.

CONFLICT DURATION and **COLD WAR**: Longer conflicts generally result in more battle-related deaths than shorter conflicts. Hence, I include a control variable counting the years of an ongoing conflict. Following Lacina (2006) and Lujala (2009), who showed that conflicts during the Cold War period were more severe than those after the Cold War, I also include a dummy variable for conflicts that started during the Cold War. The descriptive examination of the data already indicates that longer civil wars result in more battle-related fatalities and civil wars during the Cold War also caused more battle-related deaths than those after the Cold War. The most severe civil wars are conflicts during the Cold War which last between 10 and 20 years (see Table 23 in the appendix).

5.3.2 Estimation Strategy

Since the dependent variable is the number of battle-related deaths, which is the realization of a nonnegative integer, I use a regression method for count data. Using a linear regression model, which assumes a linear relationship between the dependent and the independent variable, would lead to inefficient, inconsistent and biased results. The benchmark model for count data is the Poisson regression model (PM). The Poisson distribution is characterized by certain fundamental properties such as the equality of the mean and the variance (equidispersion property):

$$E(y) = \text{var}(y) = \mu$$

This property is sometimes violated in real samples as the mean of the variance in the data exceeds (overdispersion) or is less than (underdispersion) the mean, which then causes an underestimation of the standard errors (Cameron and Trivedi, 1998:4).[77] The descriptive examination of the data as well as the goodness of fit tests and the likelihood ratio tests show that the conditional variance of the dependent variable does not equal the conditional mean, it is over dispersed. Hence, when using a Poisson model, I need to correct the standard errors for overdispersion ex post. An alternative model for count data is the Negative binomial model (NBM) which allows for overdispersion in the data (Cameron and Trivedi, 1998). Relative to their respective appropriateness, I either use the PM or the NBM in the subsequent analysis. All models are estimated with the statistical software Stata 11.1.

[77] The other main properties are (1) as the mean increases, the mass of the distribution shifts to the right, (2) as the mean increases, the probability of a zero count decreases, and (3) as the mean increases, the Poisson distribution approximates a normal distribution (see Long and Freese, 2003:246).

Sample Splitting

In order to estimate the effect of a credible bonus on the effort level of PMSCs, I conduct a cross-sectional and a panel regression. As I have described in the previous sections, I am utilizing different datasets, which contain differently coded variables on the presence of PMSCs in civil wars and, hence, allow me to undertake different analyses: With the Chojnacki et al. (2009) dataset, which contains only information on whether a PMSC was present in a civil war or not, I conduct a cross-sectional regression. With the UK Foreign and Commonwealth Office (FCO, 2002) dataset, which contains information on the exact period a PMSC was present in a civil war, I conduct a panel regression. A further difference between both datasets is their regional scope: Whereas the Chojnacki et al. (2009) dataset covers civil wars worldwide, the UK Foreign and Commonwealth Office (FCO, 2002) dataset refers only to African civil wars.

5.3.2.2 Cross-Sectional Regression

First, I run a cross-sectional regression using a NBM.[78] The unit of observation is a civil war. The main dependent variables are dummy variables reflecting the production of natural resources in the country at the time of the conflict and the presence of PMSCs in the conflict as provided by the Chojnacki et al. (2009) dataset. Furthermore, I include an interaction term depicting the mutual impact of natural resources and PMSCs on the conflict intensity. The dependent variable is analyzed as the average battle-related death rate over the whole conflict in order to capture the intensity of the conflict. A further variable controlling for the duration of the conflict is additionally included.

The model I use to analyze the cross-sectional data models the expected count (i.e. number of battle-related deaths) as a function of the independent variables and is given by:

$$\log(\text{battledeaths}) = \alpha + \beta_1 \text{PMSCs} + \beta_2 \text{NR} + \beta_3 \text{PMSCs } x \text{ NR} + \beta_4 \text{Controls} + \varepsilon, \qquad (5.1)$$

where ε is the error term, β_{1+2} are dummies for the presence of PMSCs and the production of natural resources in a civil war, β_3 is the interaction term, and β_4 depicts the following control variables: ethnic fractionalization and polarization, the average GDP (log), average population size (log), average inequality degree, average political regime score, the average number of insurgencies during the period of investigation, the conflict duration, and lastly a dummy variable depicting whether the civil war occurred during the Cold War or afterwards.

The research period goes from 1960 and 2000 because comprehensive data on GDP and population are not available before 1960 and because the Chojnacki et al. (2009) dataset only goes

[78] I compare the results to variations of the Poisson model. As recommended by Cameron and Trivedi (2010:330ff), I use Stata's vce (robust) function when running a PM in order deal with overdispersion in the data and to obtain robust standard errors for the parameter estimates. See Table 27 in the appendix.

until 2000. The sample used consists of 151 cases of civil wars in the period from 1960 to 2000 with PMSCs being involved in 42 cases. The sample contains 22 (9) armed conflicts in Europe, 17 (2) in the Middle East, 40 (12) in Asia, 54 (16) in Africa and 18 (3) in the Americas (see Figure 8).[79] Table 5 and Table 6 present the descriptive statistics of the potential determinants of conflict intensity. The most severe conflict is the civil war in Pakistan with 50.000 battle-related deaths (low estimate) in 1971. The civil wars listed in this dataset required on average 1.334 (low estimate) battle-related deaths.

Table 5: Descriptive Statistics of the Determinants of Conflict Intensity (Cross-sectional Analysis)

Variables	*N*	*μ*	*σ*	*Min*	*Max*
Battle Related Deaths (average)					
low estimate	151	1334.14	4853.17	10	50000
high estimate	151	6550.11	24211.76	27	250000
best estimate	114	2476.51	5189.74	20	30882.35
Battle Related Deaths (sum)					
low estimate	151	9819.66	25767.85	10	210575
high estimate	151	48792.22	109099.8	27	800000
best estimate	114	23225.19	65844.22	20	525000
Natural Resources (dummy variables)	146				
PMSCs (dummy variable)	151				
Interaction Variable	151				
GDP (log)	134	6.38	1.04	4.81	9.62
Population (log)	149	16.57	1.70	12.28	20.69
Inequality	94	162.15	1152.67	24.46	11218.71
Political Regime	147	-1.04	5.63	-10	10
Ethnic Fractionalization	148	.53	.23	0	.93
Ethnic Polarization (dummy variable)	142				
Cold War (dummy variable)	151				
Insurgency (number)	149	2.74	3.21	1	25
Conflict Duration (years)	151	8.75	9.68	1	38

5.3.2.3 Panel Regression

Secondly, I run a fixed-effects panel regression with a Poisson estimator. In general, dependent and independent variables can potentially vary over time (so-called within variation) and over cases (so-called between variation). A panel regression allows for capturing both variation over cases (i.e. conflicts) as well as variation over time (Cameron and Trivedi, 1998).[80] The variation structure is important because estimators differ in their use of variations: If here is no or little within variation, coefficients in the fixed effects model will be incorrectly estimated or even not identified at all (Cameron and Trivedi, 2010:244). Time-invariant variables have zero within variation whereas case-invariant variables have zero between variation. In this sample, the variables gemstones, ethnic fractionalization, ethnic polarization, and insurgency are time-invariant. All other variables in the sample exhibit either slightly more between or more within variation. In order to decide which estimator (random or fixed-effects) is the most appropriate one for my analysis, I conducted a

[79] In parentheses: number of civil wars with the involvement of PMSCs.

[80] It should be noted that in panel data model errors are very likely correlated: correlation (or clustering) over time for a given case

Hausman test. The null hypothesis of the Hausman test states that the appropriate model is random effects vs. the alternative fixed effects.[81] The value of the Chi Square statistic is significant. Therefore, I use a fixed-effects estimation model. However, it should be noted that now all cases/all variables that are time invariant will be dropped from the sample.

Furthermore, I use a PM instead of a NBM in this analysis. Allison and Waterman (2002) and Allison (2009:61ff) demonstrate that a fixed-effects NBM does not control for stable covariates but allows for an arbitrary intercept for each case and, hence, is in fact not a real fixed-effects model. Thus, I refrain from using a NBM. However, as I have already mentioned, the descriptive examination of the data shows that the conditional variance of the dependent variable does not equal the conditional mean, it is rather over dispersed. Hence, when using a Poisson model I need to correct the standard errors for overdispersion ex post. Wooldrige (1999; 2002:674ff) recommends a method to compute robust standard errors for fixed-effects PM. Therefore, I run a fixed-effects panel regression with a Poisson estimator and compute robust standard errors as recommended by Wooldrige (1999; 2002:674ff) ex post.[82]

The model I use to analyze the panel data is given by:

$$\ln\mu_{it} = \delta_i + \beta\mathbf{x}_{it} + \varepsilon_{it}, \tag{5.2}$$

where δ_i depicts the fixed effects, ε_{it} the error term, and $\beta\mathbf{x}_{it}$ a vector of exogenous variables including natural resource dummies, dummy variables depicting the presence and number of PMSCs in a conflict, the interaction variable dummies, and various control variables.

The unit of observation is a conflict year. The sample consists of a yearly panel dataset, spanning the years 1960 to 2000. For each civil war, there are different numbers of observation depending on the duration of that particular civil war. Observations with only one conflict year (i.e. no observation in the previous or subsequent years) were excluded from the dataset. The modified final dataset consists of an unbalanced panel of 389 observations (i.e. conflict years; with PMSCs being present in 148 conflict years) and 40 civil wars with PMSCs being involved in 13 conflicts (see Table 22 in the appendix). The most severe conflict is the civil war in Cameroon with 30.000 battle-related deaths (low estimate) in 1960. The civil wars listed in the dataset required on average 1.529 (low estimate) battle-related deaths.

[81] The Hausman test tests whether the unique errors are correlated with the regressor. The null-hypothesis is that they are not.

[82] In order to calculate the robust standard errors, I use the statistical software for Stata provided by the Boston College Department of Economics (2007) that computes robust standard errors as described by Wooldridge (1999).

Table 6: Descriptive Statistics of the Determinants of Conflict Intensity (Panel Analysis)

Variables	*N*	*μ*	*σ*	*Min*	*Max*
Battle Related Deaths					
low estimate	389	1529.25	3562.18	14	30000
high estimate	389	7143.72	16723.32	26	200000
best estimate	210	3937.24	6795.35	25	36250
Natural Resources (dummy variables)	382				
PMSCs (dummy variable)	389				
PMSCs (number)	389	.32	1.19	0	10
Interaction Variable	382				
GDP (log)	337	5.82	.86	3.90	8.13
Population (log)	389	16.43	.98	13.27	18
Inequality	119	44.23	4.55	34.05	56.96
Political Regime	387	-3.91	4.54	-9	8
Ethnic Fractionalization	389	.73	.16	.30	.93
Ethnic Polarization (dummy variable)	387				
Cold War (dummy variable)	389				
Insurgency (number)	149	2.74	3.21	1	25
Conflict Duration (years)	389	8.46	6.64	1	28

5.4 Findings: How the Prospect of a Bonus Affects the Effort Level of PMSCs

Addressing the question whether the prospect of receiving a bonus affects the effort level of PMSCs, I have analyzed the conflict intensity of civil wars. Before I report the results of the cross-sectional and panel analysis, I graphically examine the correlation between battle-related deaths, the presence of PMSCs and the production of natural resources. Results of the correlation using the Chojnacki et al. (2009) dataset are presented in Figure 9, and at first glance confirm the assumed relationship.

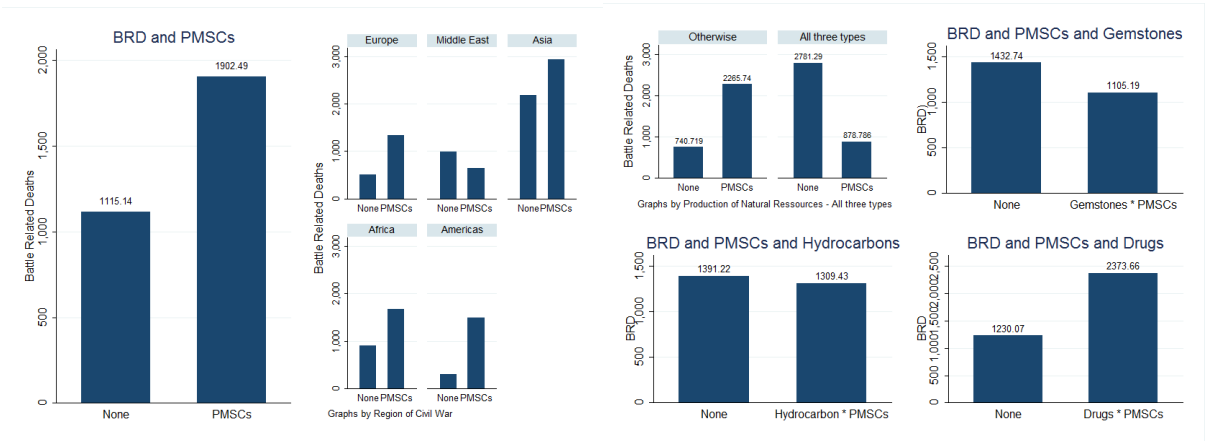


Figure 9: Correlation between Battle-related Deaths, PMSCs and Natural Resources – Based on Chojnacki et al. (2009) Dataset

Figure 9 shows that civil wars in which PMSCs were present exhibit more battle-related fatalities compared to conflicts without the involvement of PMSCs – with the exception of Middle Eastern civil

wars, which exhibit more battle-related fatalities in conflicts without PMSCs involved. This result, however, indicates a potential endogeneity problem because it might be that PMSCs only enter severe conflicts. I discuss this issue in more detail below. When taking the effect of natural resources into consideration, Figure 9 illustrates that the involvement of PMSCs in civil wars without natural resources exhibits more battle-related fatalities than the other way around. Civil wars with the involvement of PMSCs and production of natural resources exhibit fewer battle-related fatalities – that is except for the cultivation of drugs. The production of gemstones and hydrocarbons in conjunction with the presence of PMSCs is correlated with fewer battle-related deaths.

However, when using the UK FCO (2002) dataset the results of the same correlation tell a different story. Figure 10 shows that African civil wars without the involvement of PMSCs exhibit by far more battle-related fatalities than conflicts with PMSCs. As for the effect of an interaction between natural resources and PMSCs, Figure 10 illustrates that the interaction does not appear to have an impact – if anything than a slightly increasing effect. In other words, the graphical examination of the UK FCO (2002) dataset indicates that PMSCs decrease the conflict intensity of civil wars whereas the prospect of a bonus appears not to have an impact on their effort level.

The graphical examination of the two different datasets yields contradicting results on the relationship between PMSCs, natural resources and the intensity of civil wars. However, it should be kept in mind that the datasets substantially differ in coding procedures and geographical scope.

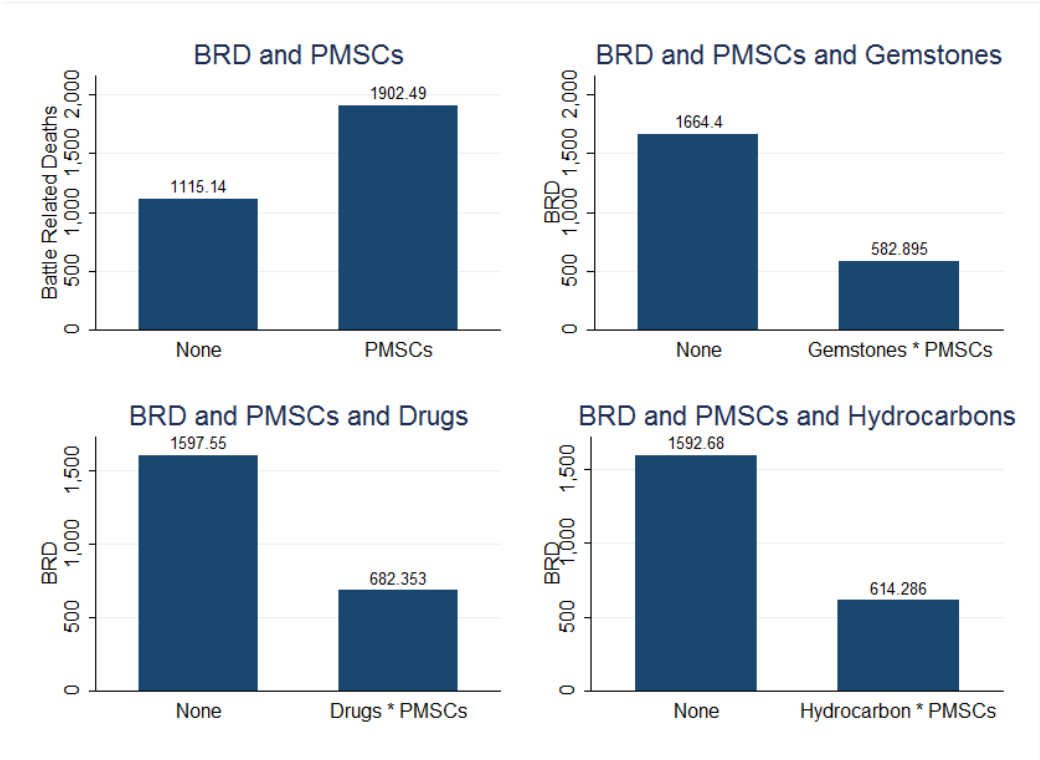


Figure 10: Correlation between Battle-related Deaths, PMSCs and Natural Resources – Based on UK FCO (2002) Dataset

5.4.1 Results of the Cross-sectional Analysis

Table 7 provides the results of the cross-sectional model using a NBM estimator. Compared to the results of the PM (see Table 26 in the appendix), the standard errors of the NBM are smaller. Furthermore, alpha is significantly different form zero. This indicates a large improvement in the fit of the model compared to the PM.[83] Hence, the NBM seems to be a more appropriate parametric model and ensures efficiency gains.

The general picture from Table 7 is that the results largely support Hypotheses I.1 and I.2 which claim that (1) civil wars in which PMSCs operate are more likely to exhibit higher levels of conflict intensity and (2) civil wars in countries with natural resources production in which PMSCs operate are more likely to exhibit lower levels of conflict intensity. Model 1 and 2 include the presence of PMSCs, the production of gemstones and the respective interaction term. As predicted, the presence of PMSCs in a conflict is strongly associated with increased battle-related fatalities. The same holds true for the production of gemstones. The interaction term, however, is significantly associated with decreasing battle-related fatalities and, thus, strongly supports Hypothesis I.2. When omitting inequality, all models gain substantially more statistical power. This is due to the fact that inequality suffers from many missing values and causes a loss of observations. Since inequality seems to be irrelevant for the model, I have spared this variable in the following models. Thus, after excluding inequality from the analysis, all three independent variables become highly significant in Model 2.

Among the control variables only GDP, political regime and ethnic polarization are statistically significant and have a decreasing effect on the conflict intensity. Hence, as anticipated, a high level of economic and political development is strongly associated with lower battle-related deaths. However, a large population, the conflict duration, inequality, insurgency groups, and the Cold War do not seem to be important factors. Models 3 and 4 include the presence of PMSCs, the production of drugs and hydrocarbons, respectively, and the corresponding interaction terms. Here, too, the results support Hypotheses I.1 and I.2: The presence of PMSCs and the production of drugs and hydrocarbons in a conflict are strongly associated with higher levels of conflict intensity, whereas the interaction between the presence of PMSCs and the production of drugs and hydrocarbons is significantly associated with lesser levels of conflict intensity. Model 5 includes the effect of a simultaneous production of all three types of natural resources on the conflict intensity and yields the same results. Model 6 includes the sum of battle-related deaths and shows exactly the same results – however, with the exception that in this model conflict duration becomes statistically significant and exhibits, as anticipated, an increasing effect on battle-related fatalities. In these models, the effect of the presence of PMSCs, the production of natural resources and the interaction

[83] The Pseudo R^2 statistics is considered to measure the goodness of fit of the model. However, the NBM does actually not have an equivalent to the R-squared measure. Hence, I refrain from interpreting this statistic.

between both variables remains always statistically significant. Hypotheses I.1 and I.2, hence, receive continually support.

Table 7: Relation between the Presence of PMSCs, Natural Resources and the Conflict Intensity of Civil Wars (1960-2000) – Cross-sectional Analysis[84]

	Negative Binomial Model							
Battle Related Deaths	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
PMSCs	1.40**	1.32***	.98***	1.70***	.81**	.81**	2.09***	1.11*
	(.61)	(.44)	(.39)	(.44)	(.34)	(.34)	(.54)	(.64)
Natural Resources								
Gemstones	1.70***	1.25***					.45	.04
	(.50)	(.40)					(.38)	(.60)
Drugs			1.14**				-.60	-.36
			(.48)				(.54)	(.83)
Hydrocarbons				1.54***			1.23***	.25
				(.40)			(.48)	(.63)
All Types					2.39***	2.39***	1.77**	-.27
					(.64)	(.64)	(.75)	(1.10)
Interaction Term								
PMSC x G	-1.96**	-1.84***					-.90	-.23
	(.80)	(.61)					(.67)	(1.01)
PMSC x D			-1.88***				-.18	-1.59
			(.70)				(.93)	(1.20)
PMSC x H				-1.94***			-1.54**	-.94
				(.59)			(.77)	(.93)
PMSC x GDH					-2.67***	-2.66***	-.83	2.85*
					(.77)	(.77)	(1.18)	(1.59)
GDP (log)	-.63***	-.60***	-.66***	-.94***	.50***	-.50***	-.77***	-.10
	(.21)	(.17)	(.18)	(.19)	(.19)	(.19)	(.20)	(.26)
Population (log)	.01	.14	.15	.11	-.01	-.01	-.04	.05
	(.14)	(.11)	(.12)	(.12)	(.14)	(.14)	(.14)	(.16)
Political Regime	-.09**	-.06*	-.05*	-.02	-.06**	-.06**	-.04	-.08
	(.04)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.05)
Ethnic Fractionalization	-.19	-.25	-.36	.04	-.41	-.41	-.30	.97
	(1.07)	(.78)	(.79)	(.80)	(.80)	(.80)	(.78)	(1.27)
Ethnic Polarization	-.75	-.81**	-1.21***	-.97***	-1.29***	-1.29***	-1.12***	-.24
	(.47)	(.37)	(.39)	(.39)	(.38)	(.38)	(.39)	(.62)
Cold War	-.03	-.01	.21	.16	-.06	-.00	-.13	
	(.57)	(.32)	(.31)	(.32)	(.05)	(.31)	(.33)	
Insurgency	-.03	-.03	-.04	-.07	-.06	-.06	-.08*	-.09
	(.06)	(.05)	(.05)	(.04)	(.05)	(.05)	(.05)	(.05)
Conflict Duration	.01						.05**	.08
	(.02)						(.02)	(.06)
Conflict Duration (log)		.05	.14	.14	.28*	1.28***		
		(.14)	(.15)	(.14)	(.16)	(.16)		
Inequality	-.00							
	(.00)							
_cons	10.49***	8.27***	8.92***	10.27***	10.45***	10.45***	11.82***	5.59
	(3.20)	(2.29)	(2.39)	(2.83)	(2.57)	(2.57)	(2.69)	(3.69)
Observations	79	121	121	121	123	123	121	78

Notes: coefficients are unstandardized negative Binomialcoefficients
Standard errors in parantheses; DV in Model 6: Sum of Battle Related Death; Model 9: observations after 1990
** p < 0.09, ** p < 0.05, *** p < 0.01*
PMSC x G = mutual effect of PMSCs and gemstones
PMSC x D = mutual effect of PMSCs and drugs
PMSC x H = mutual effect of PMSCs and hydrocarbons
PMSC x GDH = mutual effect of PMSCs and all types

[84] Database: Lacina and Gleditsch (2005), Chojnacki et al. (2009), World Bank (2012), UT EHII (2004), Alesina et al. (2003), Marshall et al. (2011), Lujala (2009)

Model 7 shows the complete model, including all resource and interaction dummies. In this model, the presence of PMSCs still has a statistically significant increasing effect on battle-related fatalities. The same holds true for the hydrocarbons dummy and the dummy for all three types. The interaction term regarding the mutual effect of PMSCs and hydrocarbons also remains statistically significant and has a decreasing effect on the conflict intensity. In other words, contrary to the individual increasing effect of PMSCs and hydrocarbons on the conflict intensity, their combined effect in fact is strongly associated with a decreasing effect. However, the remaining interaction terms as well as the dummy for gemstones and drugs lost statistical significance, but still have the same positive or negative signs, respectively. Only the dummy for drugs became not only statistically insignificant but also exhibits a negative sign in this model. As for the control variables, only GDP, conflict duration and ethnic polarization remained statistically significant. Model 8, finally, serves as a robustness test and reports the results for the period from 1990 to 2000. The presence of PMSCs is still significantly associated with increasing conflict intensity. Due to the significant decrease in sample size, almost all other variables lost statistical significance, but the signs of the coefficients remained the same. The interaction variable depicting the mutual effect of all types of natural resources and the presence of PMSCs, though, constitutes an exception: This variable exhibits a positive coefficient and is statistically significant, indicating an increasing effect on the conflict intensity. However, taken as a whole this model confirms the results of the previous models. In conclusion, the results of the cross-sectional analysis provide strong support for the assumption that the prospect of a bonus increases the effort level of PMSCs.

Table 8 shows the factor change in the expected count of battle-related deaths with regard to the main independent variables. The calculation bases on the complete model (Model 7). Even though not all coefficients are statistically significant in this table, I report the factor change regarding each variable because all variables proved to be significant factors in the other models. When holding all other variables constant, the presence of PMSCs increases the expected number of battle-related deaths by a factor of 8.1. This result again supports Hypothesis I.1 and indicates that PMSCs increase the conflict intensity. The same holds true for gemstones, hydrocarbons and the impact of all three types taken together: The production of gemstones and hydrocarbons increase the number of battle-related deaths by a factor of 1.7 and 3.4, respectively, and the production of all three types by a factor of 5.7, *ceteris paribus*. However, in contrast to the effect of gemstones and hydrocarbons, the production of drugs decreases the number of battle-related deaths by 45%, *ceteris paribus*. The mutual presence of PMSCs and gemstones also decreases the number of battle-related deaths by 59%, the interaction between PMSCs and hydrocarbons decreases the number of battle-related fatalities by even 78%, the interaction between PMSCs and drugs by 17%, and the interaction between PMSCs and all three types taken together decreases the number of battle-related deaths by

56%, *ceteris paribus*. These results confirm the hypothesized positive effect of a bonus on the effort level of PMSCs as postulated in Hypothesis I.2.

Table 8: Percentage Change in Expected Count[85]

Battle Related Deaths	b	z	P>|z|	%	%StdX	SDofX
PMSC	2.08	3.40	0.00	8.07	2.65	0.47
Gemstones	0.44	1.16	0.25	1.56	1.25	0.50
PMSC x Gemstones	-0.90	-1.35	0.18	0.41	0.70	0.40
Drugs	-0.60	-1.12	0.26	0.55	0.75	0.47
PMSC x Drugs	-0.18	-0.20	0.85	0.83	0.94	0.36
Hydrocarbons	1.22	2.55	0.01	3.38	1.82	0.49
PMSC x Hydrocarbons	-1.54	-1.98	0.05	0.22	0.56	0.38
GDH	1.76	2.35	0.02	5.86	1.98	0.39
PMSC x GDH	-0.83	-0.70	0.48	0.44	0.79	0.29

Notes: b = raw coefficient; z = z-score for test of b=0; P>|z| = p-value for z-test
% = percent change in expected count for unit increase in X
%StdX = percent change in expected count for SD increase in X
SDofX = standard deviation of X

The results of the cross-sectional analysis are robust over a range of different model specifications. I have tested alternative specifications in which I estimated a Poisson model with robust standard errors, replaced the dependent variable with the high and best estimates as well as with the sum of battle-related fatalities. Moreover, I have tested for outliers and influential observations and repeated the analysis after dropping those observations. The exclusion of these observations has an influence on the statistical significance of the natural resource dummies. The signs of the coefficients, though, remain on the whole the same. Additionally, I have created a sub-dataset and examined only the period from 1990 to 2000. Almost all coefficients lose statistical significance, but the signs of the coefficients remain on the whole the same. However, since the sample size decreased considerably after dropping all observations before 1990, these results need to be taken with caution (see Table 24 - Table 28 in the appendix).

[85] Database: Lacina and Gleditsch (2005), Chojnacki et al. (2009), Lujala (2009)

5.4.2 Results of the Panel Analysis

As already discussed above, the results of the panel analysis tell a somewhat different story compared to those of the cross-sectional analysis. Table 9 provides the results of the panel regression model. The results are mixed. They neither support the expectation that PMSCs contribute to a worsening of conflict intensity nor provide complete evidence for the assumption that a bonus increases the effort level of PMSCs. On the contrary, the variable PMSCs has even a negative coefficient, indicating that the involvement of PMSCs actually decreases the conflict intensity. The variable remains statistically significant over all models. However, when controlling for a time-delayed effect of PMSCs on the conflict intensity, the coefficients decrease considerably and lose statistical significance. The natural resources dummies lost statistical significance.[86] The interaction term regarding the mutual effect of the presence of PMSCs and the cultivation of drugs, however, is still significantly associated with decreasing battle-related fatalities. Furthermore, its negative coefficient (-2.19) is even larger than the PMSCs coefficient (-1.35) indicating that the mutual effect of both variables has a stronger decreasing impact on the conflict intensity. This result provides light support for the assumption that the prospect of a bonus increases the effort level of PMSCs. Among the control variables only, population and political regime remained statistically significant. Surprisingly, population is significantly associated with decreasing battle-related fatalities and not, as expected, with increasing fatalities.

Models 7 and 8 provide the results regarding Hypothesis I.3 which - based on the findings of Akcinaroglu and Radziszewski (2012) - asserts that civil wars in which many PMSCs operate are more likely to exhibit lesser levels of conflict intensity than conflicts in which just one PMSC operates. Whereas Model 7 includes a variable displaying the number of PMSCs present in a particular conflict year, Model 8 includes two dummies depicting whether only one or many PMSCs were present in a conflict year in order to cope with a potential non-linear relationship between the number of PMSCs and the conflict intensity. However, the expectation that competition between PMSCs has a significant decreasing impact on the conflict intensity could not be confirmed. The models rather indicate that not the number but the mere presence of PMSCs affects conflict intensity.

These findings are robust over a wide range of model specifications. I have tested alternative specifications in which I replaced the dependent variable with the high and best estimates. Moreover, I have created a sub-dataset and examined only the period from 1990 to 2000. Except for the PMSC variable, all variables lost statistical significance. However, the signs of the coefficients remained on the whole the same (see Table 29 and Table 30 in the appendix).

[86] Note, that gemstones (as a time-invariant variable) was dropped from the fixed-effects estimation.

Table 9: Relation between the Presence of PMSCs, Natural Resources and the Conflict Intensity of African Civil Wars (1960-2000) – Panel Analysis[87]

	Fixed-Effects Poisson Model								
Battle Related Deaths	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
PMSCs	-1.13***		-1.63***		-1.35***		-1.79***		-1.00***
	(.29)		(.44)		(.39)		(.50)		(.32)
Lagged		.45		-1.02		-.52			
		(.51)		(.59)		(.72)			
PMSCs (Number)							.17		
							(.15)		
PMSC = 1								-1.61***	
								(.42)	
PMSC > 1								-.92*	
								(.51)	
Natural Resources									
Drugs	.18	.07			.26	.14			-.10
	(.21)	(.25)			(.24)	(.27)			(.43)
Hydrocarbons			1.35	1.05	1.39	.93			
			(1.04)	(1.10)	(1.10)	(1.13)			
Interaction Term									
PMSC x D	-2.60***				-2.19***				-.36
	(.61)				(.74)				(.33)
PMSC x H			.77		.47				
			(.53)		(.52)				
PMSC(lag) x D		-4.15***				-2.93***			
		(.69)				(1.00)			
PMSC(lag) x H				1.91**		1.37*			
				(.69)		(.79)			
GDP (lag)	.25	.31	.30	.39	.28	.37	.28	.28	-.09
	(.23)	(.24)	(.22)	(.23)	(.23)	(.24)	(.22)	(.22)	(.18)
Population (lag)	-2.20	-2.89**	-3.14	-3.98**	-3.17	-3.78*	-2.23	-2.22	.66
	(1.35)	(1.29)	(2.01)	(2.01)	(2.03)	(2.00)	(1.34)	(1.34)	(1.90)
Political Regime	.12***	.10**	.11***	.10**	.11***	.10**	.12***	.12***	.03
	(.04)	(.04)	(.04)	(.04)	(.03)	(.04)	(.04)	(.04)	(.02)
Cold War	.07	.04	.07	.08	.00	.03	.13	.13	
	(.43)	(.45)	(.48)	(.52)	(.46)	(.49)	(.45)	(.45)	
Conflict Duration (log)	.39	.65	.56	.81	.53	.78*	.40	.40	-.04
	(.40)	(.38)	(.48)	(.46)	(.46)	(.44)	(.40)	(.40)	(.33)
Observations	243	243	243	243	243	243	246	246	105

Notes: coefficients are Poisson coefficients (fixed-effects model)
Robust standard errors as recommended by Wooldridge (1999) in parentheses
** p < 0.09, ** p < 0.05, *** p < 0.01*
Model 9 = observations after 1990

The results of the panel analysis are mixed. In contrast to the results of the cross-sectional analysis, they indicate that PMSCs might contribute to a decrease of battle-related deaths. However, when controlling for a time-delayed effect of PMSCs, the variable loses statistical significance and the magnitude of the coefficient decreases considerably. Furthermore, the panel analysis provides conflictive results regarding the hypothesis that the promise of a bonus positively affects PMSCs' effort level (Hypothesis I.2a). With regard to the production of hydrocarbons, the findings reject the

[87] Database: Lacina and Gleditsch (2005), UK FCO (2002), World Bank (2012), UT EHII (2004), Alesina et al. (2003), Marshall et al. (2011), Lujala (2009)

hypothesis. However, with regard to drug cultivation, they provide strong support for the hypothesis indicating that the type of natural resources might play a decisive role. Concluding, the results of the panel analysis could neither support nor reject the results of the cross-sectional analysis. Besides, the analysis could also not confirm the findings of Akcinaroglu and Radziszewski (2012) regarding a positive effect of competition on PMSCs' effort level.

5.4.3 Problematizing Endogeneity Bias: Do PMSCs Enter only Severe Conflicts?

A possible problem in my analysis might be that the decision to hire PMSCs imposes an endogeneity bias: States might hire PMSCs only for severe conflicts. In other words, PMSCs might only intervene in civil wars where the conflict intensity is already high. Thus, my dependent variable (battle-related deaths) might have a causal effect on my independent variable (the presence of PMSCs in civil wars). Hence, I need to inspect the data for potential endogeneity bias that might have driven my results. The common approach of addressing a potential endogeneity bias is to use instrumental variables. Instrumental variables allow addressing the problem of omitted variables, measurement errors and the problem of reverse causality, where the latter might be a serious problem in my analysis. An instrumental variable is a variable that is only related to the dependent variable through the endogenous variable and uncorrelated with the error term (assumption of instrument exogeneity), but highly correlated with the endogenous independent variable (assumption of instrument relevance) (Stock and Watson, 2007:421ff). In order to yield robust results, the correlation between the instrument and the endogenous variable must not be small. If this condition is violated, then the instrument is weak and an estimation of its effect might be biased (Bound et al., 1995). Hence, it is very difficult to find valid instruments in the first place. Moreover, a further serious concern is the sample size. Using weak instruments in small samples even reinforces the bias of the instrumental variable estimator. Since my analysis is confronted with both problems, I refrain from utilizing the instrumental variables method. Instead, I address the endogeneity problem by investigating the dataset in detail, case-by-case in order to make a clear statement about the validity of my results.

Table 10: Conflict Intensity of Civil Wars with and without PMSCs[88]

	N*	μ	σ	Min	Max
Cross-sectional Analysis					
with PMSCs	42	1902.49	3760.25	25	21100.6
without PMSCs	108	662.50	2210.05	10	20023.33
Panel Analysis					
with PMSCs	54	612.04	484.71	25	2200
without PMSCs	332	1511.33	3129.67	14	18193

*Notes: * without outliers*

[88] Database: Lacina and Gleditsch (2005), UK FCO (2009), Chojnacki et al. (2009)

Table 10 shows the conflict intensity in civil wars with and without the involvement of PMSCs. As for the cross-sectional analysis, the descriptive statistics show that the average battle-related fatalities in civil wars with PMSCs are 2.87 times higher than in civil wars without PMSCs. This indicates that PMSCs are especially hired in very severe conflicts. However, the statistics for the panel analysis exhibits that battle-related fatalities in conflict years without PMSCs were on average 2.47 times higher than the other way round. This statistic mirrors the results of the statistical analyses above. However, in order to make a conclusive statement, I need to take a closer look at the individual civil wars in which PMSCs were present, and examine whether the conflicts were less or more deadly before, during, or after the deployment of PMSCs. Table 11 shows all civil wars from the UK FCO (2002) dataset which lasted at least five years and in which PMSCs operated. The table is divided in conflict duration and conflict intensity in the years before PMSCs entered, in the years during their operation, and the years after PMSCs left the conflict.

Table 11: African Civil Wars in which PMSCs Operated[89]

Civil War	Conflict Years		Intensity		
	total	*with PMSCs*	*before PMSCs**	*during PMSCs*	*after PMSCs**
Zaire	10	3	-	1176.67	2075
Sudan	20	10	-	1000	884.13
Sierra Leone	10	7	-	460	3012.5
Angola	24	5	1000	820	5500
Uganda	25	4	6604.68	61.25	87.5
Mozambique	16	13	25	871.15	-
Liberia	9	1	350	25	-
Rwanda	9	1	800	25	-
Algeria	10	1	39	600	2512.5
Congo	5	1	98	220	1908.33

*Notes: * conflict years immediately before/after PMSC intervention*

Regarding the cases for which data on the conflict intensity before the deployment of PMSCs is available, Table 11 illustrates that (except for Mozambique) the conflict intensity before PMSCs entered was higher than afterwards. This again indicates that PMSCs' presence is correlated with a decrease in conflict intensity. However, concerning the question whether PMSCs only enter severe conflicts, this examination reveals that in most cases the conflict intensity before the deployment of PMSCs was even below the average conflict intensity of 1529 battle-related fatalities (see Table 6). Hence, from the inspection of the data it can be concluded that there is no evidence for endogeneity bias to the effect that PMSCs only enter severe conflicts. It seems rather that PMSCs enter both conflicts with very high and relatively low levels of conflict intensity. However, as I have already discussed above the sample size of the datasets is too small for making general and final statements.

[89] Database: Lacina and Gleditsch (2005), UK FCO (2009)

Further research needs to be done in order to collect more reliable data and establish more broad datasets to gain more consistent results.

5.5 Conclusion

This chapter set out to examine the influence of a credibly promised contingent compensation on the effort level of PMSCs as postulated by the results of the formal model in Chapter 4. Using a cross-sectional and a panel regression I tested the hypotheses whether (I.1) civil wars in which PMSCs operate exhibit higher levels of conflict intensity than conflicts without the presence of PMSCs; (I.2) civil wars in countries with natural resources and the presence of PMSCs are more likely to exhibit lesser levels of conflict intensity; and (I.3) competition between PMSCs induces a better performance of PMSCs.

The results of the cross-section analysis clearly confirm Hypotheses I.1 and I.2 and show that the presence of PMSCs is significantly associated with increasing battle-related fatalities, and that the mutual effect of PMSCs and production of natural resources in a conflict country is significantly associated with decreasing battle-related fatalities. The results of the panel regression, however, neither confirm nor reject the results of the cross-sectional regression. Rather, they indicate a decreasing effect of PMSCs on the conflict intensity. Regarding the mutual effect of PMSCs and natural resources, the panel regression provided light support in favour of my hypothesis. Hypotheses I.3 concerning a positive effect of competition between PMSCs on their effort could also not be confirmed. However, the results of the statistical analyses need to be assessed in the light of a potential endogeneity problem which due to the small sample size and poor quality of the data could not be completely cleared. Even though the detailed examination of the data indicated that PMSCs appear to operate in both conflicts with high levels and relatively low levels of conflict intensity, I could not make conclusive statements due to the small sample size. Future data collection is required in order to exactly determine how PMSCs and the prospect of a bonus affect the effort level and, thus, the conflict intensity of civil wars.

6 Profit through Insecurity? Investors' Expectations about PMSCs' Future Profits

6.1 Overview

The previous chapter examined how the prospect of a bonus influences the effort level of PMSCs. This chapter investigates the second implication of the formal model regarding the influence of high variable costs on the effort level and thus on the profit of PMSCs. Variable costs include material and labour costs necessary to carry out a task. The circumstances and conditions of the area of operation affect to a great extent the variable costs PMSCs face. For instance, increasing insecurity raises the operation costs of PMSCs. Intuitively, one would assume that PMSCs generally benefit from a worsening of the security situation because it guarantees subsequent contracts and hence more profit. This assumption corresponds to the way PMSCs are perceived in the media and in parts of the academic literature, namely as the economic gainers, the "wartime profiteers", who have intrinsic incentives in the continuation of conflict and insecurity in areas they operate in (Cilliers and Mason 1999; Uesseler 2006). The existence of conflict on the global, regional, or national level is obviously and certainly the pre-condition for PMSCs to operate in crisis and war regions. Nevertheless, contrary to most actors of the so-called "war profiteering" defence industry (such as arms manufacturers) PMSCs are in fact operating within the conflict setting. In this context they are directly exposed to high risks. When confronted with increasing insecurity in the form of attacks, bombings, or ambushes, PMSCs bear additional costs. They need to invest more in material and personnel costs in order to keep their performance level high and to compensate their employees with more danger money. Moreover, they are faced with increasing insurance expenses. For example, under the US Defence Base Act US employers are required to provide insurance to their employees for the event of death or disability. Therefore, the more a security situation deteriorates, the more do insurance tariffs rise (Isenberg, 2004:25). Furthermore, PMSCs need to acquire better qualified employees and replace damaged equipment. Hence, rising variable costs reduce PMSCs' total payoffs – at least on a short-term basis. A company faced with increasing variable costs might therefore tend to optimize its cost structure – for instance by hiring cheaper and thus poorer qualified personnel - and exercise lower effort. However, the decrease in effort level reduces at the same time the likelihood to receive a bonus according to the results of the formal model.

An alternative explanation is the following: More insecurity does not only raise PMSCs' variable costs but might also raise the political costs of their principal. For example, in the context of military operations, in which the principal herself is also operating, an uncontrollable insecurity situation of

which the principal cannot get a grip on might cause the principal's withdrawal from that mission (see Chapter 4). According to the results of the formal model, this move could signalize that the principal cannot keep her promise to forward a bonus in terms of re-hiring and therefore negatively affect PMSCs' effort level. However, on the other hand, a withdrawal could also signalize that all military and security tasks previously carried out by the principal can then potentially be carried forward by PMSCs and thus raise their effort level in order to receive a bonus in the form of reappointments.

Statistically testing how rising variable costs affect PMSCs' effort level and with that their total payoffs – in other words directly testing the formal model's implication - is desirable. However, due to a lack of available data it is not realizable.[90] In the following, I try to indirectly examine the effect of rising variable costs on the profits of PMSCs. Therefore, I explore how investors of publicly traded PMSCs react to increasing variable costs in the form of a deteriorating security situation in countries which the companies operate in. I argue that if variable costs are a relevant factor, which negatively affect PMSCs' effort level and consequently their profits, then investors should be aware of this fact and act accordingly. Then, any change in the security situation should induce a change in the expected value of a PMSC through a change in the expected prospect of receiving a bonus. Thus, in my analysis investor reactions towards events which potentially affect operating costs (such as attacks and bombings) serve as a proxy that should provide an indication of the implications of rising variable costs. I believe that investors could react in two ways towards insecurity events: They could react negatively because they might believe that insecurity events increase variable costs which in turn decrease PMSC's effort level. Thus, the expected value of a PMSC should decrease because the expected chance to receive a bonus decreases. On the other hand, they could also react positively because they might anticipate that a deteriorating security situation could lead to a withdrawal of the principal in favour of PMSCs. Then, the expected value of a PMSC should increase because the expected chance to receive a bonus increases. The reaction of investors of publicly traded companies serves as a suitable measure to assess whether rising variable costs triggered by a deteriorating security situation benefits or harms PMSCs. Hence, in the following I examine how investors of six publicly traded PMSCs react to insecurity events in countries the companies operate in – that is in Afghanistan and Iraq.

The rest of the chapter is organized in four sections. In the next section, I briefly outline the related literature on the interaction between political events and the economy and present the underlying theory on which the hypotheses to be tested are built. Then, I introduce the empirical design, explain the estimation strategy and the data used. The subsequent section provides the

[90] Such an analysis requires data, for example, on how much PMSCs invest on their material and personnel costs or data on their employees' composition which is not available.

presentation and analysis of the statistical results. Finally, in the last section, I conclude and discuss the implications of my findings.

6.2 Related Literature

The analysis in this chapter builds on the literature regarding the interaction between policy and economy. Most studies in this field focus on the influence of political parties on the economic performance of states (Hibbs, 1977), or on the influence of political institutions on government spending (Alesina, 1987). These studies assess long-term policy implications. In contrast, research analyzing short-term effects is outnumbered (Frey and Kucher, 2000). Research analyzing short-term effects trace back to studies exploring the effects of national policies on capital markets. Pioneering research in this field are the articles of Nordhaus (1975) and MacRae (1977), who introduced the opportunistic business cycle model and the article of Hibbs (1977), who established the partisan business cycle model. However, research on the implications of political events on capital markets, more precisely on specific sectors of the economy, are rare. Most studies that have approached the topic, have analyzed the effect of presidential elections on the performance of the US stock market (Roberts, 1990; Herron et al., 1999; Leblang and Mukherjee, 2005). Some studies have examined pre- and post election effects on sector-specific stock prices for the European Union (Bechtel and Schneider, 2010) and individual countries like Netherlands, Greece, the United Kingdom (Herron, 2000; Siokis and Kapopoulos, 2007; Brunner, 2009), and Germany, (Bechtel, 2009; Brunner, 2009; Bechtel and Füss, 2010). Another branch of the literature has examined the opposite effect, namely the influence of economic actors through lobbying on politics (Knight, 2006). Only in recent years, some research has been published examining the effect of conflictive and cooperative political events in war regions on global financial markets (Schneider and Troeger, 2006; Schneider et al., 2009). This chapter of the dissertation particularly contributes to this latter strand of the literature. It is to my knowledge the first to analyse the effects of conflictive political events on the economic performance of PMSCs.

6.3 Efficient Market Hypothesis

The basic assumption underlying this branch of research is that international political events have an impact on capital markets, i.e. that capital market stakeholders evaluate and react to international political events that they consider to be economically important for the profit of individual companies or economic sectors (Leblang and Mukherjee, 2005; Bechtel and Schneider, 2010). This assumption comes along with another one, namely that capital market stakeholders are rational actors who process information that is relevant for the market and appraise investments efficiently.

Relying on new information, they update their beliefs in order to maximize the expected utility. The most important theory in this context is the efficient market hypothesis (EMH). The EMH was developed by Paul Samuelson (1965) and Eugene Fama (1965) in the 1960s and explains why and how stock prices change and serves therefore as an essential theoretical basis for the empirical analysis in this chapter. The EMH claims that current stock prices fully reflect available information about the value of a company: each stock price reflects the discounted present value of the sum of future earnings. A market is considered to be "efficient" if it fully reflects available information - more precisely if all pertinent information is released to all market participants simultaneously and the prices adjust immediately to that information (see Figure 11).[91]

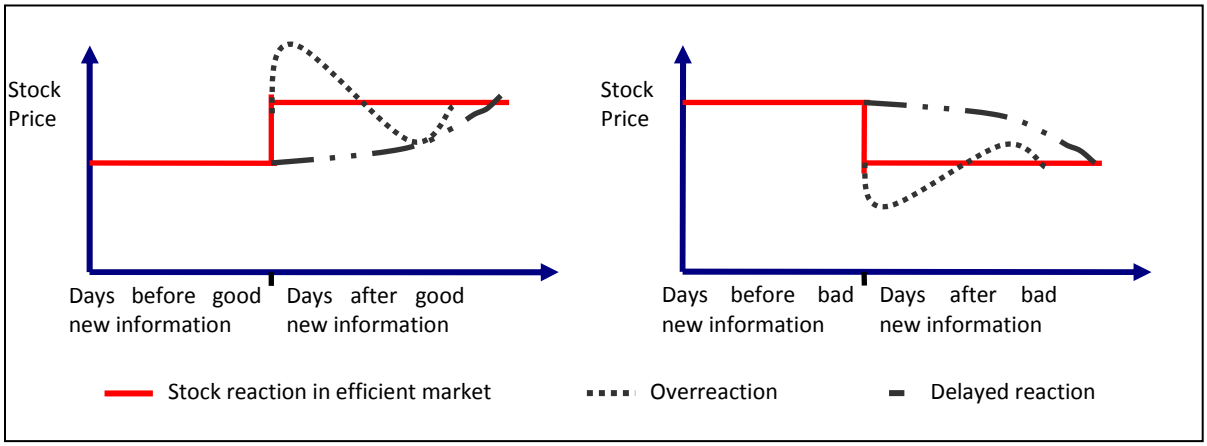


Figure 11: Stock Market Reaction in Efficient Markets[92]

Fama (1970) distinguishes between the weak form (stock prices only reflect historical information from past trading), the semi-strong form (all publicly available information is reflected in the stock prices) and the strong form of efficient markets (all information relevant to a firm, including both public and insider information, is reflected in its stock price). Even though the EMH is one of the cornerstones of modern financial theory since the 1970s, it has been the subject of highly controversial academic discussions to date.[93] Behavioural finance, for example, claims that emotional biases create anomalies in capital markets and cause investors to act both irrationally and predictably (Bondt and Thaler, 1984; Sheffrin, 1996; Barber and Odean, 2001; Hirshleifer, 2001). Debate continues about the question whether perfectly efficient markets are possible at all. Grossman and Stiglitz (1980:404), for instance, argue that if it is the case that prices always reflect all available information, "then informed traders could not earn a return on their information." Other critics argue that there exist a small number of individual investors who have been able to outperform the market over long periods of time (see Burton, 2003:76ff). Various studies on efficient

[91] This assumption implies that it is impossible to outperform the market on a risk-adjusted basis over time.
[92] Own figure, modified from http://financeunleashed.blogspot.de/2007/12/market-efficiency-and-financial.html.
[93] For a detailed examination of the critics, see Dimson and Mussavian (1998) and Burton (2003).

markets have produced a considerable body of evidence for as well as against the EMH (LeRoy and Porter, 1981; Shiller, 1981; Bondt and Thaler, 1984; Marsh and Merton, 1986).[94] So far, there has been little consensus among academics whether the assumption of efficient financial markets is correct. Nevertheless, the EMH remained the central paradigm of finance to date. The weak- and semi-strong form are generally supported by the data (Pearce and Roley, 1985; Keown et al., 1992). Following this, in this analysis I subscribe to the view that markets are neither perfectly efficient nor completely inefficient, i.e. to the semi-strong form of efficient capital markets.

On the basis of the EMH and the assumption that investors react to events which provide information on the expected profitability of an industrial sector or individual companies, I derive in the following hypotheses with which I examine the implications of rising variable costs on the effort level and the profits of PMSCs.

I argue that investors thoroughly evaluate the security situation in countries PMSCs operate in. If the implication of the formal model regarding the influence of rising variable costs on PMSCs' effort level and thus their profit is accurate, then insecurity events which indicate a deteriorating security situation - and hence cause rising variable costs - should decrease investors' expectations about future profits of PMSCs. Therefore, I believe that investors will invest less in PMSCs' stocks, leading to a lower price of the companies' stocks. I derive and test the following hypothesis:

	Hypotheses Empirical Analysis II
Hypothesis II.1	Insecurity events that indicate a deteriorating security situation decrease the returns on PMSCs' stocks.

As I have mentioned above, a rival explanation for the effect of rising variable costs might be the intuitive assumption regarding a positive effect of deteriorating security on future profits of PMSCs, i.e. the "war-profiteers" argument. However, it might also be that a deteriorating security situation increases the principal's political costs (as discussed in Chapter 4) and lead to her withdrawal from that mission. Then, it might be that investors believe that the tasks previously carried out by the principal can then potentially be carried forward by PMSCs. Against this background, a deteriorating security situation might indeed increase investor's expectation about PMSCs' future profits. Therefore, I also test for this complementary explanation and derive the following hypothesis:

	Hypotheses Empirical Analysis II
Hypothesis II.2	Insecurity events that indicate a deteriorating security situation increase the returns on PMSCs' stocks.

I measure insecurity via events such as armed attacks, assaults and bombings. Both countries of investigation (Afghanistan and Iraq) see insecurity incidents almost every day. Therefore, I assume that the media, the public and investors are used to news about insecurity incidences and only take

[94] For a comprehensive overview of the evidence, see Lo (2007).

notice of very severe and crucial insecurity events. Thus, I consider additional factors such as the target/victim of an attack, a certain threshold of fatalities, as well, as the location into my analysis. Hence, I derive and test the following hypotheses:

	Hypotheses Empirical Analysis II
Hypothesis II.3	Insecurity events in strategically crucial locations and with security forces victims decrease the returns on PMSCs' stocks.
Hypothesis II.3b	Investors do not react to insecurity events in strategically irrelevant locations and civilian-only victims.

6.4 Empirical Design

6.4.1 Estimation Strategy

In order to examine the effect of insecurity events on PMSCs' stock prices, I conduct an event study. Event studies enable researchers to estimate reactions of the capital market by measuring the impact (direction and magnitude) of a specific event on the value of a company (i.e. its stock price).[95] The event study approach estimates the normal return for a security and calculates the direction and size of the excess return which is relatable to unanticipated information (Fama et al., 1969; Campbell et al., 1997; MacKinlay, 1997).[96] Therefore, an event date (time when the market first learns of the new information), an event window (number of trading days preceding and following the event date), and an estimation period (period for calculating how the returns should behave in the absence of new information) have to be identified (see Figure 12). In this study, the event date (0) is the date of the occurrence of the insecurity event and the event window is at the day of the event to two days after the event (+2).[97] In order to catch the overall effect of events on the companies' security prices, I test different event windows: (0:1); (0:2) and (0:3).

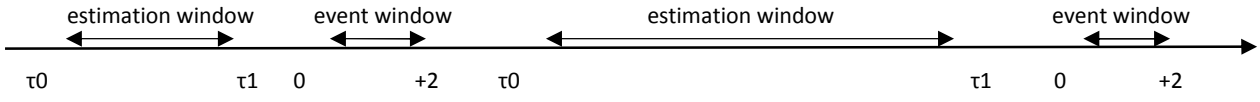


Figure 12: Event Window, Event Date and Estimation Period

[95] In the following, I use the words stock prices and security prices interchangeably.
[96] See Ball and Brown (1968) and Fama et al. (1969) for the first event studies ever conducted.
[97] In event studies it is prevalent to use an estimation window which lays prior the event. However, in this analysis I adopt a different approach: Due to the high frequency of insecurity events in Afghanistan and Iraq, it is impractical to calculate an appropriate estimation window for every event. Hence, following the approach of Fahrholz and Schneider (2006) I adopt several combined estimation windows in order to calculate the normal performance of the returns.

The expected normal returns (NR) are calculated via the market return model approach, which assumes a linear relation between the market return and the security return (MacKinlay, 1997):

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \tag{6.1}$$

where R_{it} are the period-t returns on security i, R_{mt} the period-t returns on market portfolio m, ε_{it} the zero mean disturbance term, and α_i and β_i parameters of the market model.

The abnormal returns (AR) are calculated as:

$$\hat{AR}_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}, \tag{6.2}$$

where $\hat{AR}_{it}$ are the abnormal returns for time period-t, R_{it} the actual returns of security i for time period-t, $\hat{\alpha}_i$ and $\hat{\beta}_i$ the estimated parameters of the market model, and R_{mt} the period-t returns on market portfolio m.

In order to assess the overall impact on the PMSC's stock returns, the literature suggests calculating the cumulative abnormal returns (CAR) (MacKinlay, 1997):

$$\hat{CAR}_i(t_1, t_2) = \sum_{t=t_1}^{t_2} \hat{AR}_t. \tag{6.3}$$

I test the impact of insecurity events on the stock returns by using a sign test (see Büning and Trenkler, 1994). The sign test examines whether an event influenced the cumulative abnormal returns positively or negatively.

6.4.2 Case Selection

I apply a purposeful sampling strategy (so-called criterion sampling) and examine - due to my methodological approach - only publicly traded PMSCs which operated in Afghanistan and Iraq in the period 2004-2010 (Teddlie and Yu, 2007). I focus on the wars in Afghanistan and Iraq because these two conflict regions have been the main areas of operation for the private military and security industry since 2001. Furthermore, during the investigation period both conflicts were ongoing and no withdrawal date was set on the part of the international community yet. Therefore, both conflicts are relevant to the conceptual framework of this study and potentially generate rich information.

However, only very few PMSCs headquartered in leading industrial countries are listed on stock exchanges. This approach might raise representativeness issues regarding the whole industry which comprises numerous large, as well as, small companies from all over the world. Nonetheless, systematically analyzing publicly traded PMSCs allows for an empirical examination of the industry's "global players" and yields relevant and rich information, and hence contributes an added value to the existing literature.

6.4.2.1 Publicly Traded PMSCs

I compiled a dataset comprising daily security prices of six publicly traded PMSCs from January 2004 to December 2010. In the following section, I introduce the sampled companies with an emphasis on their activities in Afghanistan and Iraq during the research period. The exact investigation period for the individual companies differs due to mergers and acquisitions and different contracting periods in Afghanistan and Iraq. Table 12 shows which companies are included and the corresponding investigation periods.

Table 12: Research Period According to Stock Exchange Listing Date and Contracting Period

PMSC	Research Period
ArmorGroup International / G4S	December 9, 2004 - 2010 (June 6, 2008 acquired by G4S)
DynCorp International	May 4, 2006 – July 8, 2010 (acquired by Cerberus Capital)
Garda World Security Corporation	November 2005 - 2010
Military Professional Resources Incorporated Inc.	2004 - 2010
PAE Government Services	2006 - 2010 (Afghanistan) and May 2004 – May 2006 (Iraq)

I have collected the following information on the companies' activities in Afghanistan and Iraq by conducting an extensive literature and newspaper research using Anglophone press via "LexisNexis", the world's largest electronic database for public-record related information. For detailed information on PMSCs' activities and the procedural method applied to obtain the data, see Table 36 in the appendix.

ArmorGroup International / G4S

London-based ArmorGroup is one of the largest PMSCs in the world. It is active in more than 30 countries with the most important operations in Afghanistan and Iraq. ArmorGroup has been awarded numerous security services contracts in Afghanistan and Iraq. In 2006, the company was contracted to provide security services to the UK Government in Afghanistan, to provide mentoring and consultancy services to the Afghan National Police and to protect World Bank members. The largest single contract the company ever got was to provide security for the US embassy in Kabul in 2007. The five-year contract with the US State Department was worth $189 million. The contract expired in June 2010 but ArmorGroup continued to guard the embassy through the end of 2010.[98] In Iraq, ArmorGroup provides convoy escort services, mine clearance services and security services for private corporations and government officials. In 2009, it got a $22.5 million contract to protect the Baghdad airport. The company was listed on the London Stock Exchange from December 2004 until April 2008, when it was acquired by G4S plc. ArmorGroup is now a subsidiary of G4S's Risk Management and Consultancy branch. In 2010, G4S got a contract to clear the mines from the West Qurna oil field in Iraq (see Table 36 in the appendix).

[98] EPD Technology, Inc. was selected to take over.

DynCorp International

The Texas-based company is one of the leading military contractors "in support of U.S. national security and foreign policy objectives, delivering support solutions for defense, diplomacy, and international development" (DynCorp Homepage, 2012). DynCorp has been awarded various contracts by the US Department of Defence and the US Department of State to provide security services, destruction of landmines, drug eradication services, as well, as logistics and contingency support in Africa (Somalia), Asia (Afghanistan and Iraq), Europe (Bosnia and Kosovo) and Latin America (Columbia and Haiti). Since 2002, DynCorp has been awarded several contracts in Afghanistan and Iraq, among them a contract to provide armed bodyguards and other security for President Karzai in Afghanistan. In 2004, the company got a contract with potential revenue of $1.36 billion to provide 30 senior-level police advisers directly to the Afghan Ministry of Interior. DynCorp also got contracts to train, equip and build the capacity of the police forces in Afghanistan and to assist the Combined Security Transition Command-Afghanistan (CSTC-A) and NATO Training Mission by providing mentors and trainers to develop the Afghanistan Ministry of Defence in 2005 and 2010. Furthermore, DynCorp established and staffed training centers for Iraqi police officers in Baghdad and Jordan in 2004. In 2007, DynCorp was awarded to provide field service representatives, operators and trainers for Mine Resistant and Ambush Protected vehicles in Iraq. DynCorp was acquired by the private-equity firm Cerberus Capital Management in a deal valued at $1.5 billion and ceased trading at the New York Stock Exchange in July 2010 (see Table 36 in the appendix).

Garda World Security Corporation

Montreal-based Garda World has been active in conflict zones around the world since November 2005, when it started acquiring companies providing security to diplomats, aid workers and companies in Afghanistan and Iraq. Garda World purchased Virginia-based Vance International in November 2005, London-based Kroll Security International in December 2006 and in February 2007, GSS Global, a British investigation and security company. With these acquisitions Garda World became one of the largest integrated security companies worldwide. Vance International, for example, had got a contract to train the Iraqi Army in 2003. In 2005, Garda World was awarded a contract by the United Nations to provide security advice and logistical support during the 2005 Afghan parliamentary elections. The company provides security to oil and gas construction company workers in Iraq. In 2009, Garda World got another contract to provide security for British diplomats in Iraq (see Table 36 in the appendix).

Military Profession Resources Incorporated (MPRI)

Virginia-based MPRI, a subsidiary of L-3 Communications, is one of the largest and most well known PMSCs.[99] The company became prominent due to its involvement in the Balkans in the mid 1990s where the company got several contracts among them one awarded by the Republic of Croatia to provide assistance in transforming its army into a professional military (Singer, 2003:125). In Iraq and Afghanistan, MPRI got numerous contracts among them a contract to train a new Iraqi army in 2003, a contract for education and training services at the Counterinsurgency Center for Excellence in Baghdad in 2007, and a contract for the extension of mentoring and training support services for the reformation of the Afghan Ministry of Interior and Afghan National Police in 2010. MPRI's involvement in Afghanistan began in 2002 in support of the US military for the training of the Afghan National Security Forces. In 2005, MPRI got a contract to provide mentoring, training, subject matter expertise, and programmatic support to the Combined Security Transition Command – Afghanistan (CSTC-A) staff, the Afghan Ministry of Defence and the Afghan Ministry of the Interior (see Table 36 in the appendix).[100]

PAE Government Services

Los Angeles-based PAE Government Services provides services in training and capacity building, logistics, expeditionary construction, and operations and maintenance. In 2004, PAE Government Services got a contract to train firefighters in Iraq. In Afghanistan, PAE Government Services was awarded contracts to assist the Afghan Ministry of Justice Prison Administration by providing corrections training (such as prisoner transportation, inmate services, and probation and parole) and to support the maintenance of the Afghan National Army in 2006 and 2008 (see Table 36 in the appendix).

6.4.2.2 Afghanistan and Iraq

The following quote illustrates the magnitude of PMSCs' involvement in Afghanistan and Iraq and explains why this study centres these two conflicts: "As of March 2011, DOD [US Department of Defence] had more contractor personnel in Afghanistan and Iraq (155,000) than uniformed personnel (145,000). Contractors made up 52% of DOD's workforce in Afghanistan and Iraq" - 18% of them being companies that exclusively offer (armed and unarmed) security services (see Figure 13 and Schwartz and Swain 2011:2).[101] In the following, I give a general overview of PMSCs' activities in

[99] L-3 Communications is a prime defence contractor in C³ISR systems (a military term for Command, Control, Communication, Intelligence, Surveillance and Reconnaissance).

[100] For further information, see the testimony of Richard C. Nickerson before the Commission on Wartime Contracting in Iraq and Afghanistan (2009).

[101] According to the US Congressional Research Service, armed services include static (site) security, convoy security, security escorts, and personal security details, whereas unarmed services include operational coordination, intelligence analysis, hostage negotiations, and security training (Schwartz, 2011:2).

Afghanistan and Iraq. In the subsequent sections, I discuss the data collection process and the operationalization of the variables.

Afghanistan

PMSCs were an integral part of the US-led military operation in Afghanistan from the beginning (Rimli and Schmeidl, 2008:10). PMSCs in Afghanistan are hired by international military forces and governments, diplomatic agencies, international (non-)governmental organizations, as well as, the private sector. According to the US Congressional Research Service (2011), the use of these companies has vastly increased from 2009 on (see Figure 13). Currently, about 52 PMSCs are officially registered in Afghanistan. In March 2011, almost 19.000 private security contractor personnel were working only for the US Department of Defence in Afghanistan (Schwartz, 2011). However, the exact figures - regarding the total number of employees and the number of unregistered companies – are unknown.

In August 2010, Afghan president Hamid Karzai announced that the Afghan government aims at disbanding PMSCs from the country.[102] The Afghan government aims at abolishing all foreign parallel and uncontrollable structures and institutions, particularly parallel security structures created by PMSCs (Giannini and Graaff, 2010). Critics argue that the immense presence of PMSCs in Afghanistan causes that funds – in terms of financial and human capital - are less spent in the national security sector, but are channelled to the private sector (Ayub et al., 2009). The most alarming aspect in this context is the indirect forwarding of international funds to Taliban and insurgency groups by PMSCs. In 2010, it became public that it is customary for PMSCs to bribe Taliban and insurgency groups to allow convoys for safe passage along supply routes (Tierney, 2010). However, the question arises whether a continuation of post-conflict reconstruction and humanitarian and development aid efforts without the support of PMSCs in high risk provinces is possible at all. Given the enormous outcry within the international community regarding the imminent waste of reconstruction and development projects in high risk provinces which would have had been cancelled otherwise, the Afghan government altered their decision and allowed PMSCs to continue working in Afghanistan (Rubin, 2010). However, as of 2012 the Afghan Public Protection Force (APPF) – an enterprise owned by the Afghan state under the authority of the Afghan Ministry of Interior – has started to take over

[102] Particularly seven controversial companies were targeted for disbandment by the Presidential Decree: (1) NCL Security (originally established by the son of Afghan Defence Minister Rahim Wardak), (2) Strategic Security Solutions International (linked to the brother of First Vice President Marshal Fahim), (3) Watan Risk Management (closely linked to Karzai relative), (4) Elite (belongs to son of Sibghatullah Mojadedi), (5) Asia Security Group (founded by Karzai relative), (6) Logistic Solutions Group (linked to Afghan National Army division commander), and (7) Shepherd Security (linked to cousin of Head of the Afghan Olympic Committee 2012, formerly responsible for private security contractor registration in the Afghan Ministry of the Interior). For more information, see Afghanistan Analysts Network's report "The Survival of the Private Security Companies" and The Killid Group's report "Top Leaders Tied to Security Companies" (http://aan-afghanistan.com/index.asp?id=1582 and http://www.tkg.af/english/reports/political/234-top-leaders-tied-to-security-companies).

the responsibility for security of humanitarian and reconstruction projects from PMSCs.[104] According to the 16th quarterly report of the Special Inspector General for Afghanistan Reconstruction (SIGAR), 36 PMSCs will continue providing security to the International Security Assistance Force (ISAF) until March 2013 (SIGAR, 2012:69).

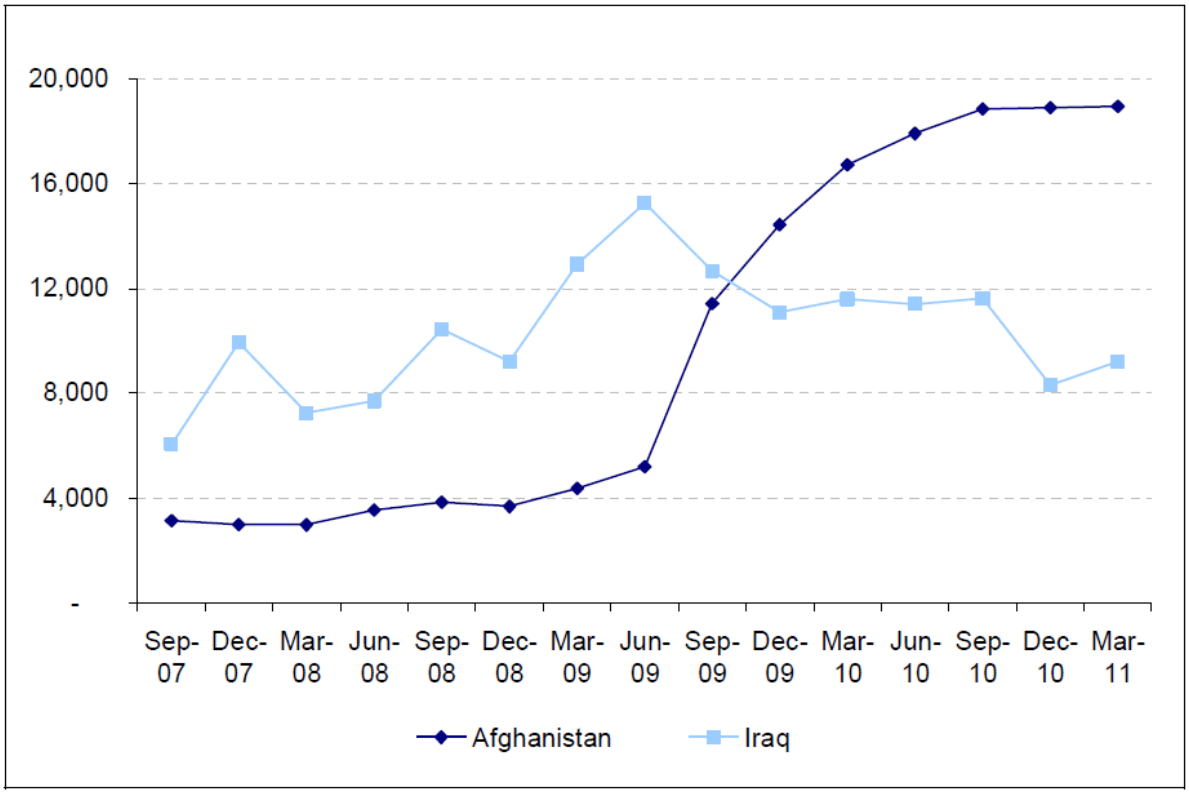


Figure 13: Private Security Contractor Personnel in Afghanistan and Iraq (2007 – 2011) [105]

Iraq

When the so-called "Coalition of the Willing", a military alliance between the US and UK, intervened in Iraq in March 2003 with the objective of destroying the alleged mass destruction weapons of Iraq, they were accompanied by numerous PMSCs. The number of PMSCs in relation to regular forces even increased in the course of the conflict: According to a US Congressional Research Service Report "some 50 private security contractors employing more than 30,000 employees are working in Iraq for an array of clients, including governments, private industry, and international organizations such as the United Nations" (Elsea et al., 2008:3).[106] Never before had a military intervention been backed up by such a large number of private contractors (Ortiz, 10b:28). The fact that private contractors were hired for such a broad set of services, ranging from logistics to military services, attaches a new

[104] The Afghan Government launched a „Bridging Strategy" which organizes the transition process from private security contractors to the APPF, for more information see Mohamadi and Ghani (2011).
[105] Source: Schwartz (2011:7)
[106] In Iraq PMSCs offer a broad range of military and security services to a manifold client base such as training of military and police, risk assessment and intelligence services, interrogations, translations, static guards, and armed convoy escorts.

dimension to the term "privatized war". The underestimation of the US administration regarding the number of troops necessary for providing security and stability in the aftermath of the combat operations, as well as, the urge for beginning reconstruction projects as soon as possible in spite of a deterioration of the security situation have been identified as major contributing causes for the enormous reliance on private security contractors in Iraq (Isenberg, 2007: 83).[107] The case of Iraq illustrates the direct use of PMSCs by strong states, as well as, the risks involved: PMSCs' activities in Iraq were accompanied by great public attention and a series of incidents which disclosed the challenges involved with using PMSCs. In March 2004, for instance, four employees of the US PMSC Blackwater were killed, their bodies dragged through the streets and then hung for display in Fallujah. In the same year, another incident came to public attention: Prisoners detained in the Abu Ghraib prison in Baghdad were physically, psychologically and sexually abused by US forces, as well as, private security contractors. In September 2007, Blackwater again hit the headlines when its employees shot and killed seventeen Iraqis in Baghdad. Due to a deficient judicial framework that surrounds PMSCs operations, prosecution of these criminal activities could not be pursued. These incidences clearly revealed the undissolved accountability, legal, management, oversight, and transparency issues related to contracting PMSCs. Thus, PMSCs' activities in Iraq thoroughly unfold the complexity of hiring PMSCs which goes beyond legal issues and tackles ethical, political, and operational concerns. In December 2010, there were about 100 registered companies offering security services in Iraq (Schwartz, 2011:3). As a result of the transition activities, the overall number of private security contractors decreased from a peak of almost 16.000 in June 2009 to around 9.000 personnel in March 2011.

6.4.3 Data and Operationalization

6.4.3.1 Measuring Investor Reactions

The dependent variable is the change in PMSCs' rate of returns, i.e. the change in their security prices over a period of time plus the dividend during that period. It is calculated as continuously compounded returns (MacKinlay, 1997).[108] All returns are logarithmised and first-differenced over the period $t-1$ to t. These returns are then multiplied by 100 in order to obtain returns as a percentage (see Fahrholz and Schneider, 2006). The frequency used is a trading day. Data on the companies' security prices were accessed via the database "Datastream", the world's largest financial statistical database.

[107] Iraqi PMSCs are not included.

[108] $\ln R_t = r_t = \ln(P_t - 1) = p_t - p_t - 1$

Table 13: Private Military and Security Companies Listed on Stock Exchanges

PMSC	Holding Company	Trading Place	Market Index
ArmorGroup International		London Stock Exchange	FTSE All-Share Index
DynCorp International Inc.		New York Stock Exchange	S&P 500 Composite Index
G4S Risk Management		London Stock Exchange	FTSE All-Share Index
Garda World Security Corporation		Toronto Stock Exchange	S&P/TSX Composite Index
Military Professional Resources Inc.	L-3 Communications	New York Stock Exchange	S&P 500 Composite Index
PAE Government Services Inc.	Lockheed Martin	New York Stock Exchange	S&P 500 Composite Index

The stock prices were obtained from three different stock exchanges (see Table 13): G4S and ArmorGroup International are traded at the London Stock Exchange, DynCorp International Inc., L-3 Communications and Lockheed Martin are traded at the New York Stock Exchange, and Garda World is traded at the Toronto Stock Exchange. Two of the companies - Military Professional Resources Inc. and PAE Government Servics Inc. - are part of greater arms manufacturers with general activity in the defence sector. Therfore, I include the S&P 500 Aerospace and Defence Index as a control variable when exploring the effects of insecurity events on L-3 Communications and Lockheed Martin (see Table 14). In doing so, I control for intrinsic market dynamics which could influence the stocks of L-3 Communications and Lockheed Martin.

Table 14: Overview of Variables (Analysis II)

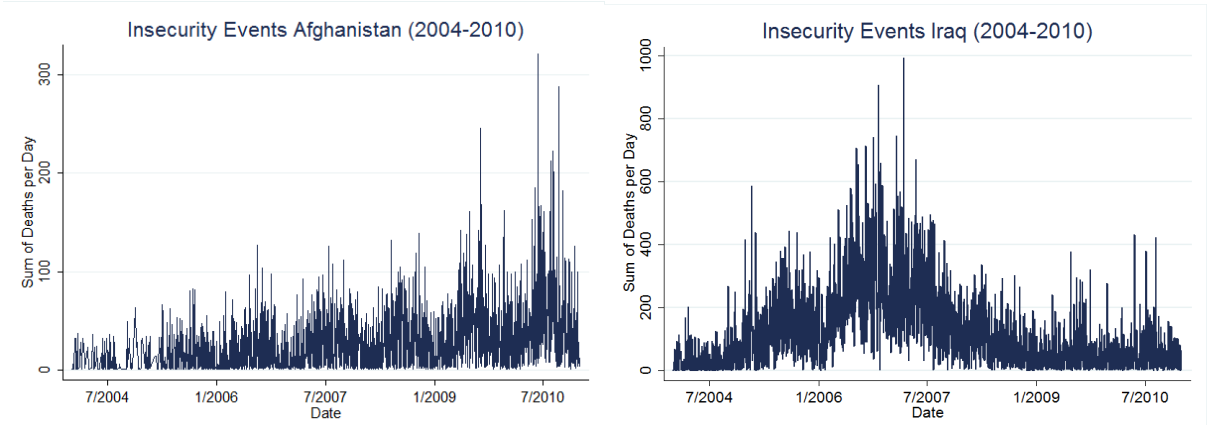
Variables	Source
Dependent Variable	
Change in PMSC's Stock Returns	Datastream Financial Database
Independent Variables	
Insecurity Events in Afghanistan and Iraq *armed attacks bombings, assassinations, assaults, terrorism*	Worldwide Incident Tracking System Database
Control Variables	
Industrial Index / Market Index	Datastream Financial Database
Company Related Announcements	LexisNexis Database

6.4.3.2 Measuring Insecurity Events

The independent variable is insecurity events in Afghanistan and Iraq. I subsume under insecurity events all kinds of events that contribute to insecurity, such as armed attacks (against civilians, national and international security forces), bombings, assassinations, assaults, and suicide-terrorism. Data on insecurity events in Afghanistan and Iraq were accessed through the U.S. National Counterterrorism Centre dataset "Worldwide Incidents Tracking System".[109] This dataset offers data on armed attacks, bombings, assassinations, assaults, and suicide-terrorism, specifying for instance the date of the incident, its location and the target of the incident, as well, as the number of victims for the period January 1, 2004 to December 31, 2010.

[109] Existing databases on political events, such as the "Kansas Event Data System" or the "World Event Interaction Survey", cannot be employed due to the topicality of the research question: the conflicts in Afghanistan and Iraq are ongoing and most PMSCs started to be listed at various stock exchanges only a couple of years ago.

Figure 14 shows all insecurity events and the number of deaths per day for Afghanistan and Iraq in the period from 2004 to 2010.[110] Several events taking place on one day are combined as one event by summing up the numbers of death casualties. Events taking place on the weekend are either attached to trading days before (in case of Saturdays to Fridays) or after (in case of Sundays to Mondays) the actual event. Wounded casualties are not considered here because I assume that compared to wounded casualties death casualties attract more attention in the media and, thus, more attention of investors.



AFG	Obs	μ	σ	Min	Max
Deaths	2073	29.64	31.93	1	321

Iraq	Obs	μ	σ	Min	Max
Deaths	2498	121.95	123.50	1	994

Figure 14: Insecurity Events in Afghanistan and Iraq[111]

As these figures illustrate, events indicating insecurity took place almost every day, both in Afghanistan (a total of 4.192 observations) and in Iraq (a total of 11.142 observations). In order to estimate the normal performance of stock returns, the event study approach requires estimations windows in which events of interest do not take place (MacKinlay, 1997). Besides, I believe that closely spaced events, as well as, large numbers of insecurity events cause a degree of habitualness and indifference in the media and public. In order to attract media and public attention, and by association the attention of investors, insecurity events have to be particularly severe or of political or strategic significance. For these reasons, I have modified the sample establishing the following criteria of which I believe that they particularly attract investors' attention:

TARGETS: I only include insecurity events which definitely involve security forces such as police, army, or private security contractors. I believe that those incidents attract more attention in the media and, thus, attraction of investors.

[110] The outliers in the Afghan sample are: August 20th, 2009 (246 fatalities), June 7th, 2010 (321 fatalities) and September 18th, 2010 (288 fatalities). The outliers in the Iraq sample are: October 29th, 2006 (908 fatalities) and March 6th, 2007 (994 fatalities).
[111] Source: Worldwide Incidents Tracking System

LOCATION: I only include insecurity events taking place in strategically crucial locations because I believe that only those incidents arouse great interest. I consider locations as strategically crucial which constitute a political, military, or economic significance for the host states, as well as, the intervening countries. Therefore, I include locations of NATO's Provincial Reconstruction Teams and cities close to the most important (NATO) transport routes into the Afghanistan sample and refinery locations into the Iraq sample. Furthermore, I include the 25 biggest cities of Afghanistan and Iraq. In total, 43 cities in Afghanistan and 25 cities in Iraq are considered in the analysis (see Table 31 and Table 32 in the appendix).

THRESHOLD OF DEATH CASUALTIES: I introduce a threshold of death casualties in consideration of the fact that both countries see insecurity incidents almost everyday, anyway, and the media, public, as well as, investors are used to news about attacks and bombings. I argue that only especially severe events (i.e. events with a high number of fatalities) attract attention in the media and in this way the attention of investors. Therefore, I only include events with a minimum of 20 deaths per day in the Afghanistan sample and events with a minimum of 50 deaths per day in the Iraq sample. I use a higher threshold of fatalities for Iraq because the violence level is significantly higher in Iraq (on average 122 deaths per day) compared to the level in Afghanistan (on average 30 deaths per day – see Figure 14).

Thus, the sample consists of 11 insecurity events in the Afghan (with min 21 and max 100 fatalities) and 34 insecurity events in the Iraqi (with min 50 and max 155 fatalities) case (see Table 33 and Table 34 in the appendix).

Counter Sample

In order to thoroughly assess the validity of my above specified criteria, I conduct a second analysis with a "counter" sample. This counter sample includes all insecurity events with victims other than security forces and locations other than strategically crucial locations. The counter sample consists of 15 insecurity events in the Afghan (with min 20 and max 54 fatalities) and 14 insecurity events in the Iraqi (with min 52 and max 443 fatalities) case (see Table 33 and Table 35 in the appendix).

6.4.4 Descriptive Statistics

Table 15 shows the distributional characteristics of the returns of the single stocks and the market indexes. All means are approximately zero. ArmorGroup and the FTSE Index feature the largest kurtosis, whereas L-3 Communications is closest to a normal kurtosis. The negative values for the skewness indicate that all single stocks and market indexes are slightly right skewed (see Figure 15 in the appendix). The high values of the Jarque Bera test suggest that the null hypothesis of normal distribution can be rejected for all single stocks and market indexes. However, the graphical

description shows that company returns are in general approximately normal distributed (see Figure 16 in the appendix). Hence, in principle a parametric test could be applied to test for statistical significance. However, to be on the safe side and following MacKinlay (1997) and (Büning and Trenkler, 1994), I use a non-parametric sign test to test the impact of the security events on the PMSCs' stock returns.

Table 15: Descriptive Statistics of the Returns of Single Stocks and Indexes[112]

	N	μ	σ	Min	Max	K	S	JB
ArmorGroup International	911	-0.08	16.32	-128.09	289.04	125.64	4.91	5.7e+05***
G4S Risk Management	669	0.01	1.97	-9.80	10.83	6.76	0.09	396***
DynCorp International	1090	0.01	3.18	-14.02	38.08	24.88	1.89	2.2e+04***
Garda World Security Corp.	1348	-0.03	5.29	-78.27	51.93	55.68	-1.29	1.6e+05***
L-3 Communications (MPRI)	1826	0.01	1.62	-8.35	8.94	5.91	-0.08	645.1***
Lockheed Martin (PAE)	1304	-0.00	1.76	-9.28	9.79	7.39	-0.24	1060***
DEFIN	1826	0.02	1.45	-7.70	11.47	5.91	-0.08	2123***
FTSE	911	0.01	1.00	-6.26	4.52	125.64	4.91	672.4***
SP500	1826	0.00	1.42	-9.11	10.37	5.91	-0.08	5237***
SPTSX	1348	0.02	1.68	-12.75	9.60	55.68	-1.29	3226***

*Notes: returns are standard continuous returns; ***p<.01; **p<.05; *p<.10;*

μ = mean; σ = standard deviation; K = Kurtosis; S = Skewness;

JB =Jarque-Bera test for normality (chi-squared distributed with 2 degrees of freedom)

Table 16 shows the test results for unit roots, autocorrelation and heteroscedasticity. As the Augmented Dickey Fuller (ADF) test and the Phillips-Perron (PP) test indicate, the null hypothesis that the series has a unit root can be rejected for all single stocks and market indices returns. Furthermore, the results of the Durbin Watson test for autocorrelation show that the null hypothesis of autocorrelation can be rejected. The Durbin Watson d-statistic constitutes upper and lower critical values for d (where a d closer to 4 means negative autocorrelation and a d closer to 0 means positive autocorrelation) with a zone of indecision for values of d close to 2 (i.e. 1.5 – 2.5) (Dougherty, 2007:358). However, these results need to be taken with caution. The Durbin Watson test assumes that the returns are normally distributed whereas the assumption of normality was rejected by the Jarque Bera test. Nevertheless, the correlograms of the company's returns also support the Durbin Watson results by depicting little dependencies between the returns of date t and tk. Furthermore, the ARCH Lagrange Multiplier (ARCH-LM) test suggests that the null hypothesis of the absence of an ARCH(p) process can be rejected for all stocks and indexes, with the exception of DynCorp International.

[112] Source: Datastream

Table 16: Pre-Test Result for the Returns of Single Stocks and Indexes[113]

	ADF	PP	Durbin Watson	ARCH-LM
ArmorGroup International	-16.97***	-38.86***	2.44	58.25***
G4S Risk Management	-12.99***	-25.91***	2.01	29.76***
DynCorp International	-17.09***	-33.59***	2.04	0.27
Garda World Security Corp.	-16.93***	-30.27***	1.63	38.96
L-3 Communications (MPRI)	-21.08***	-47.76***	2.22	161.00***
Lockheed Martin (PAE)	-18.16***	-42.48***	2.32	67.91***
DEFIN	-12.19***	-47.73***	2.22	48.68***
FTSE	-8.42***	-34.85***	2.29	60.86***
SP500	-12.64***	-52.74***	2.37	83.17***
SPTSX	-10.52***	-37.11***	2.02	169.23***

*Notes: ***p<.01; **p<.05; *p<.10*

***ADF** = Augmented Dickey Fuller Test conducted in four variations (trend, drift, with/without intercept); lag-order obtained via Akaike's Information Criterion (AIC)*

***PP** = Phillips-Perron Test conducted in three variations (trend, with/without intercept); lag-order obtained via Akaike's Information Criterion (AIC)*

***ARCH-LM** = Lagrange Multiplier Test for ARCH effects; chi-squared distributed with 1 degree of freedom; H0 = no ARCH effects*

***Durbin Watson** = Tests for the presence of autocorrelation; H0 = no autocorrelation; range 0-4, with 2 denoting no autocorrelation*

6.5 Findings: How Investors Assess Rising Variable Costs

I have argued that investors thoroughly evaluate the security situation in countries which PMSCs operate in. Hence, a deteriorating security situation, which consequently increases PMSCs' variable costs and therefore might lower their effort level, should decrease investors' expectations about future profits of PMSCs. I have hypothesised that insecurity events lead to a decrease in the return on PMSCs' stocks (Hypothesis II.1). However, in order to take complementary explanations into account, I have also discussed the possibility that a deteriorating security situation might increase investor's expectations about PMSCs' future profits because of the prospect of future tasks. Therefore, I have derived Hypothesis II.2 stating that insecurity events lead to a decrease in the return on PMSCs' stocks.

Table 17 reports the results of the nonparametric sign test of the null hypothesis that the cumulative abnormal returns (CARs) of the sample companies are zero across all events against the alternative that they are either greater (positive abnormal returns) or less than zero (negative abnormal returns). In other words, Table 17 reports whether investors actually reacted to insecurity events in Afghanistan and Iraq – and if so, whether they invested less or more in PMSCs' stocks after insecurity events. I have tested a total of three different event windows (0-1, 0-2, and 0-3). The first part of the table comprises the results regarding Hypotheses II.1 and II.2 and the second part of the table comprises the results of the counter sample regarding Hypothesis II.3.

At first glance, the results appear to confirm my key assumption and show that investors actually react to insecurity events in Afghanistan and Iraq. As can be seen in Table 17, all companies exhibit

[113] Source: Datastream

statistically significant CARs in both samples. The investor's reactions, though, are quite mixed. Regarding Hypotheses II.1 and II.2, Table 17 (first part) shows that investors of some companies invest less whereas investors of other companies invest more after insecurity events. In general, the investors of DynCorp International, G4S and Garda World invest less after insecurity invests - where Garda World investors appear to react only to events in Iraq and G4S investors only to events in Afghanistan. Investors of ArmorGroup and MPRI (L-3 Communications) react to insecurity events with investing more - where ArmorGroup investors react only to events in Iraq. The results for PAE (Lockheed Martin) are inconclusive.[114] It is striking that – with the exception of ArmorGroup – the investors of "pure" PMSCs, i.e. those which are not part of arms manufacturers, tend to invest less after insecurity events. This finding appears to confirm Hypothesis II.1 which states that high variable costs decrease investors' expectations about future profits of PMSCs. When interpreting the results for MPRI (L-3 Communications) and PAE (Lockheed Martin), however, it should be kept in mind that they are subsidiaries of a greater holding. They constitute only a part of their holding companies' overall revenues. Hence, their CARs cannot be traced to a single cause.

Table 17: Event Study Results for Cumulative Abnormal Returns

	Afghanistan			Iraq		
Event Window	0-1	0-2	0-3	0-1	0-2	0-3
ArmorGroup	-	-	-	-	> 0**	-
DynCorp	< 0*	-	-	-	-	< 0**
G4S	< 0**	< 0***	< 0***	-	-	-
Garda World	-	-	-	-	-	< 0**
MPRI / L3	-	> 0***	> 0***	-	-	-
PAE / LM	< 0**	-	> 0**	> 0**	-	-

Counter Sample

	Afghanistan			Iraq		
Event Window	0-1	0-2	0-3	0-1	0-2	0-3
ArmorGroup	-	-	-	-	-	-
DynCorp	-	-	-	-	-	< 0**
G4S	-	< 0**	< 0*	-	-	-
Garda World	> 0**	> 0***	> 0**	-	< 0***	< 0**
MPRI / L3	-	< 0**	< 0*	< 0**	< 0**	-
PAE / LM	-	-	-	< 0**	-	< 0***

Notes: a non-parametric test was conducted. The null hypothesis is: median of CARs = 0;
** p < 0.09, ** p < 0.05, *** p < 0.01*
blue = investors invest less
grey = investors invest more

Regarding Hypothesis II.3, which states that investors react only to insecurity events that they consider strategically relevant for the revenue of a PMSC, Table 17 (second part) shows that – except for investors of ArmorGroup – all investors react to insecurity events in locations of minor strategic importance and with civilian-only victims. Hence, both the location and the target seem to be

[114] In the following, I refrain from interpreting the results for PAE and ArmorGroup because of their inconsistency and (relatively) weak statistical significance.

irrelevant for the judgement of investors. Thus, Hypotheses II.3 cannot be confirmed. The investor's reactions, though, are slightly different in the counter samples: Except for Garda World (in the Afghanistan counter sample), all PMSCs exhibit statistically significant negative CARs – where DynCorp International investors appear to react only to events in Iraq this time and G4S investors only to events in Afghanistan. Garda World exhibits statistically significant negative CARs in the Iraq-counter sample but significant positive CARs in the Afghanistan counter sample. Surprisingly, both MPRI (L-3 Communications) and PAE (Lockheed Martin) exhibit statistically significant negative CARs this time – where PAE investors react only to events in Iraq.

From these results, it can be concluded that investors of publicly traded PMSCs evaluate insecurity events in Afghanistan and Iraq – regardless of their location or the victims of the incident - and react accordingly. Therefore, I continue with the interpretation of the results by pooling the results of both analyses.

Pooling the results of both analyses is revealing in several ways. The pooled results show that investors consider insecurity in general as harmful to the profits of PMSCs. It can be seen from Table 17 that in most of the cases investors react with investing less after insecurity events. This finding contradicts the so-called "war-profiteering" argument, which states that PMSCs benefit in general from conflict and insecurity. Rather, the finding indicates that the relation between conflict and profit is not as evident as it appears at first. This becomes clearer when examining the findings for the Iraq sample in more detail. Investors of almost all companies under investigation invest less after insecurity events in Iraq. Taking a closer look at the companies concerned (DynCorp International, Garda World, MPRI, and PAE) and their role in Iraq during the investigation period conveys potential reasons. All companies are directly or indirectly related to the security sector in Iraq via the training of the Iraqi army and police forces. For example, DynCorp International established and staffed training centres for Iraqi police officers and MPRI was contracted to train the Iraqi army (see Section 6.4.1.1). Apparently, investors believe that the performance of the companies - as related to the training of the Iraqi security forces - was insufficient and their expectations about future profits of those PMSCs decreased, and as a result, they invested less. Furthermore, this finding shows that a deteriorating security situation is not beneficial to PMSCs, as stated in Hypothesis II.2. If the assumption of Hypothesis II.2 regarding the positive effect of deteriorating security on future profits of PMSCs was true, then investors must have reacted in a different way – especially, when considering the high level of insecurity in Iraq during the investigation period (see Figure 14).

Turning now to the results of the Afghanistan sample, it can be seen in Table 17 that investors of G4S and DynCorp react with investing less, whereas investors of Garda World invest in general more after insecurity events. The results for MPRI are ambiguous: MPRI exhibits positive CARs in the first

and negative CARs in the second sample. However, the results in the first sample are statistically highly significant whereas the results in the second sample exhibit only weak statistical significance.[115] Taking a closer look at the companies' roles in Afghanistan during the investigation period helps to identify potential reasons. First, G4S acquired ArmorGroup in 2008. I have therefore examined the stocks of G4S starting in 2008 until 2010. During this period, ArmorGroup was contracted to provide security for the US embassy in Kabul (see Section 6.4.1.1). At that time, the company hit the headlines with "misconduct and poor management that jeopardized the security of the US embassy" (Sherman and DiDomenico, 2009:1). The negative reaction of investors can be attributed to ArmorGroup's low performance, which caused a damage of the company's reputation and discontinuance of its contract eventually. Second, the activities of DynCorp International and MPRI in Afghanistan are indirectly related to the country's security forces: DynCorp International and MPRI have been largely contracted for advice and training of Afghan security forces (see Section 6.4.1.1). It might be that investors believe that the performance of the companies – as related to the Afghan security forces – was low and therefore invest less in the companies' stocks. However, it should be kept in mind that these results exhibit only weak statistical significance.

The results for Garda World and MPRI (in the first sample) are statistically highly significant and indicate that investor's expectations about the future profits of these companies increased. During the investigation period, Garda World provided security services for individuals and property in Afghanistan (see Section 6.4.1.1). These results indicate that - in contrast to a very high level of insecurity as in Iraq - a relatively moderate level of insecurity (as it was the case in Afghanistan until 2009/10, see Figure 14) might increase investors' expectations about PMSC's future profits through the prospect of future contracts. This finding supports Hypothesis II.2.

The findings of this analysis reveal several important insights: First, investors of publicly traded PMSCs indeed respond to insecurity events in Afghanistan and Iraq. Second, insecurity appears to affect investor's expectations about future profits of PMSCs in two ways: A very high level of insecurity decreases investor's expectations about future profits of PMSCs. This result supports Hypothesis II.1. A relatively moderate level of insecurity, however, increases investor's expectations about future profits. This result supports Hypothesis II.2. Apparently, not every conflict environment is equally profitable for PMSCs, and insecurity seems to affect PMSCs' variable costs, the calculability of risks, the prospect of future contracts, and lastly their performance. This leads to the third important finding of this analysis: Investors appear to evaluate the performance of PMSCs. The results for G4S in the Afghanistan sample and the results for DynCorp International, Garda World, MPRI, and PAE in the Iraq sample indicate that a low effort level of PMSCs (or at least investors'

[115] As explained above, I refrain from interpreting the results for PAE.

perception of such) decreases investors' expectations about future profits of PMSCs. Hereby, this finding supports the implication of the formal model regarding the relation between high variable costs, PMSCs' effort level and their profits.

Problematizing Confounding Events

In the following, I test the robustness of my findings by taking a closer look at the individual events that have driven the results of the CARs. More precisely, I discuss the abnormal returns for individual events especially with regard to confounding events, i.e. company-related events and news, such as mergers and acquisitions, earnings announcements, or (insecurity) events in the companies' other areas of operation that might have influenced the stock prices, and therefore might have biased the results. In order to identify confounding events, I conducted a newspaper research using Anglophone press via the database "LexisNexis" (see Table 37 in the appendix for all results).

Table 18: Statistically Significant Abnormal Returns for Individual Events – Afghanistan Sample[116]

Afghanistan	Event Window				
Event	0-1	0-2	0-3	**PMSC**	**Confounding Event**
June 1, 2006 (21 deaths in Kandahar)			1.87*	ArmorGroup	
August 28, 2006 (22 deaths in Lashkar Gah)			-1.86*	DynCorp	
		-1.86*		Garda World	
February 27, 2007 (23 deaths in Kandahar et al.)	-2.12**	-2.53**	-2.91***	ArmorGroup	*yes*
	-2.14**			MPRI / L3	*yes*
	1.77*			PAE / LM	
February 2, 2009 (25 deaths in Tarin Kot)			2.04**	DynCorp	
September 2, 2009 (24 deaths in Mehtar et al.)	2.16**			Garda World	
March 12, 2010 (35 Deaths in Kandahar)		1.97**	2.58**	G4S	*yes*
Counter Sample					
October 16, 2008 (40 deaths in Maywand)	2.17**			Garda World	
	-1.82*	-2.13**		MPRI / L3	
August 6, 2009 (27 deaths in Garmsir and Qarghani)		1.79*	2.05**	MPRI / L3	
September 11, 2009 (23 deaths in Chowreh et al.)		-1.75*	-2.35**	Garda World	*yes*
June 7, 2010 (22 deaths Naveh-ye Barkaza'I et al.)	-2.25**	-2.21**	-2.49**	G4S	*yes*
June 10, 2010 (54 deaths in Nagahan et al.)	2.10**			MPRI / L3	*yes*

Notes: two-sample Wilcoxon rank-sum (Mann-Whitney) test:
H0 = abnormal returns [event window=0] = abnormal returns [event window=1]
** p < 0.09, ** p < 0.05, *** p < 0.01*

Table 18 presents the individual events with statistically significant abnormal returns (ARs) for the Afghanistan sample. Out of 11 insecurity events in the sample, PMSCs exhibit only for six events statistically significant ARs. The reactions are, however, neither consistent across event window nor across PMSC. Only in case of one event a total of three companies exhibit statistically significant ARs (where ArmorGroup even exhibits statistically significant ARs across all event windows). However, for two of the companies I found confounding company related events which might have driven the results (see Table 37 in the appendix).[117] For all other events, the companies either show only weak

[116] Source: Datastream and LexisNexis

[117] I present here only positively verified confounding events which I have found during my research in LexisNexis. However, it may well be that there are further confounding events which couldn't be detected via a LexisNexis search.

statistical significance in only one event window or there has been a confounding event. The same holds true for the counter sample.

Table 19 presents the individual events with statistically significant abnormal returns (ARs) for the Iraq sample. Out of 34 insecurity events, PMSCs exhibit for only 13 events statistically significant ARs (see Table 34 in the appendix). The ARs are neither consistent across event window nor across PMSC. I found for 10 of the 13 statistically significant ARs confounding company-related events which might have driven the results (see Table 37 in the appendix). The same holds true for the counter sample.

Concluding, the detailed examination of the individual events calls the findings of the event study analysis into question. I could not detect a general pattern that explains the reactions of PMSCs' investors as indicated by the results of the CARs. It seems rather that the results of the CARs were driven by confounding events.

Table 19: Statistically Significant Abnormal Returns for Individual Events – Iraq Sample[118]

Iraq	Event Window				
Event	0-1	0-2	0-3	**PMSC**	**Confounding Event**
January 5, 2006 (66 deaths in Ba'qubah et al.)	-1.85*	-2.19**	-1.82*	PAE / LM	*yes*
August 11, 2006 (73 deaths Baghdad and Tikrit)			2.02**	DynCorp	
	1.80*		1.86*	MPRI / L3	*yes*
December 12, 2006 (86 deaths in Kirkuk et al.)	-1.99*	-1.93*	-1.76*	Garda World	*yes*
February 1, 2007 (77 deaths in Al Hillah and Mosul)	-2.03**			MPRI / L3	*yes*
February 23, 2007 (52 deaths in Baghdad et al.)	2.04**			MPRI / L3	*yes*
March 23, 2007 (59 deaths in Mosul et al.)		-1.73*		MPRI / L3	
July 25, 2007 (56 deaths in Karbala and Baghdad)		-1.94*		ArmorGroup	
	1.71*			MPRI / L3	*yes*
August 28, 2007 (54 deaths in Mosul et al.)	2.22**			Garda World	
March 6, 2008 (70 deaths in Baghdad)	-2.29**			ArmorGroup	*yes*
December 11, 2008 (55 deaths in Kirkuk)			1.94*	Garda World	*yes*
October 23, 2009 (155 deaths in Baghdad)	1.89*	2.43**		Garda World	
December 8, 2009 (129 deaths in Baghdad et al.)	-2.29**			Garda World	*yes*
May 10, 2010 (69 deaths in Al Fallujah et al.)		-1.91*	-2.11**	G4S	*yes*
Counter Sample					
February 10, 2004 (53 deaths in Al Iskandariyah)		2.04**	1.83*	MPRI / L3	
July 15, 2005 (91 deaths in Ad Dulu'iyah and Al Musayyib)	1.88*	2.20**	1.72*	ArmorGroup	*yes*
July 18, 2006 (59 deaths in Al Kufah)	-2.33**			DynCorp	
February 23, 2007 (52 deaths in Al Habbaniyah)	2.02**			MPRI / L3	*yes*
August 14, 2007 (443 deaths in At Taji et al.)		1.83*		DynCorp	*yes*
February 22, 2008 (63 deaths in Al Iskandariyah)		-2.03**		MPRI / L3	*yes*
April 23, 2009 (57 deaths in Khanaqin and Imam Ways)			1.78*	G4S	

Notes: two-sample Wilcoxon rank-sum (Mann-Whitney) test:
H0 = abnormal returns [event window=0] = abnormal returns [event window=1]
** p < 0.09, ** p < 0.05, *** p < 0.01*

[118] Source: Datastream and LexisNexis

6.6 Conclusion

Do rising variable costs in the form of a deteriorating security situation decrease investor's expectations about future profits of PMSCs? The analysis could not find an entirely satisfactory answer to this question. At first sight, the results for the event study appeared to support the hypotheses that investors respond to insecurity events in Afghanistan and Iraq, that insecurity affects investor's expectations about future profits of PMSCs, and that a low effort level of PMSCs decreases investors' expectations about future profits of PMSCs. However, a detailed look into the individual events revealed that these results are not robust. First, the results were not consistent across different event windows and second, they were not consistent across all PMSCs. I could not discover a general pattern supporting or opposing the argument that a deteriorating security situation decreases investor's expectations about future profits of PMSCs. It appears rather that the results of the CARs were driven by confounding events. However, it should be kept in mind that slightly different periods were investigated for each company, that the sample of companies was relatively small, and that the results are based on a small sample of countries in a specific region. These conditions might have contributed to an impeded detection of general patterns.

The event study approach is generally a promising approach to examine how investors react to events that they consider relevant for a company's revenue. Investors usually react to short-term impacts on a company's profit – and an insecurity event certainly means first and foremost more costs in terms of personnel and material. However, the analysis could not help in conclusively disclosing whether increasing variable costs through rising insecurity decrease investor's expectations about future profits of PMSCs. A reason might be that investors consider a deteriorating security situation as not relevant for PMSCs' profits. In this case one could test for different reasons, for instance political events that might affect PMSCs' profits. Since the focus of my analysis is on how rising variable costs affect PMSCs effort level and their profits, I have refrained from analyzing political events. However, future research could examine how investors react to political events that they consider relevant for PMSCs' revenues. Another reason might be that publicly traded companies are major players in their market segment who are not affected by rising variable costs in a way that their effort level or overall profits could be decreased. However, it might very well be that smaller companies are affected more heavily by rising variable costs. However, it is very difficult to obtain the necessary data to assess how small companies are affected by insecurity events. Also, it might be that rising variable costs have a more long-term impact on PMSCs' effort level and profits. However, the analysis of investor reactions naturally cannot take hold of potential long-term effects.

7 Conclusion and Outlook

7.1 Summary and Findings

This dissertation began with a crucial question: How can PMSCs be motivated to exercise high effort when fulfilling their tasks in order to induce a performance that is in the best interest of all parties concerned? This question mirrors one of the major puzzles in the study on PMSCs, namely under which conditions PMSCs contribute to a deterioration or stabilization of armed conflicts. This dissertation theoretically and empirically examined this puzzle.

Theoretical Findings

I started the analysis with a literature review, which disclosed that much of the research on PMSCs is concerned with identifying contextual factors for the evolution and growth of the private military and security industry (Shearer, 1998; Zarate, 1998; Singer, 2003; Kinsey, 2006; Rosén, 2008; Branović, 2011; Buchan, 2011). Furthermore, there is a large focus on the influence of PMSCs on issues such as sovereignty, authority, security (Biersteker and Hall, 2002; Avant, 2005; Leander, 2005b; Leander, 2005a; Krahmann, 2008; Abrahamsen and Williams, 2010; Krahmann, 2010), democratic mechanisms (Stanger, 2009; Avant and De Nevers, 2011), human rights (Del Prado, 2008; Francioni and Ronzitti, 2011; White, 2011), or the legitimate use of force (Francis, 1999; Avant, 2005; Pattison, 2012). However, arguments are often normatively loaded, and parts of the discussion suffer from polarization - by either condemning or praising the private military and security industry. In addition, little rigorous analysis has been devoted to the question which contextual factors account for a stabilizing or spoiling role of PMSCs in conflict zones (Musah, 2002; Vauters and Smith, 2006; Akcinaroglu and Radziszewski, 2012). To a large extent, this is driven by the difficulty of finding sufficient empirical evidence. Those studies that have approached this question are largely driven by a legal approach. This strand of the literature has focused on how to establish effective accountability, monitoring, prosecution, and regulatory mechanisms in order to minimize the risks associated with the use of PMSCs (Kinsey, 2005; Cameron, 2006; Gillard, 2006; Chesterman and Lehnardt, 2007; Cockayne et al., 2009; De Nevers, 2009; Francioni and Ronzitti, 2011).

However, given that state and non-state actors have become increasingly reliant on the services of PMSCs, it is of utmost importance to understand the mechanisms driving their behaviour and to identify parameters which can be influenced in order to benefit from the advantages and minimize the risks associated with the use of PMSCs. Hence, in this dissertation, I focused on factors which states are actually capable of exerting influence on. Therefore, I analyzed contractual arrangements between states and PMSCs. I developed a formal principal-agent model with which I scrutinized the

exact mechanisms driving the behaviour of PMSCs and identified decisive contractual factors that can be constituted by states in order to induce a desired performance of PMSCs.

Approaching the use of PMSCs with the lense of principal-agent theory helps to focus on the essentials: the delegation of a task to an agent and its associated consequences. The basic ideas of principal-agent theory, namely that principal and agent have diverging interests and that there exist information and preference asymmetries, apply to problems inherent in the relationship between states and PMSCs. Using the principal-agent framework, I analyzed why states - although they are aware of the complicated agency dilemma - delegate military and security tasks to PMSCs in the first place and, furthermore, how they can set the right incentives for PMSCs to act according to the best advantage of their principals. The results of the formal model show that even if the PMSC is expected to do a worse job than the state would do, delegation can be optimal for the state under specific conditions. Hence, an outcome that is not in the interest of those affected by the decision (for example the host state) – namely that the party expected to exercise lower effort and thus do a worse job is performing a given task – might occur.

However, since a good performance is in the interest of states, they therefore need to contrive ways and means to make sure that PMSC exercise high effort in fulfilling their tasks. Previous literature on PMSCs, which used principal-agent approaches, has focused on accountability mechanisms and called for more explicit contracts which better ensure oversight and monitoring mechanisms (Cockayne, 2007; Dickinson, 2007; Stöber, 2007). Better monitoring and oversight mechanisms are certainly one of the main, crucial parameters to ensure. However, the conflict environment in which the interaction between states and PMSCs takes place inevitably exacerbates the existing agency problems and makes monitoring and explicit contracting particularly tricky: The ability of the state to optimally control and monitor the PMSC is particularly constrained in conflict regions. Furthermore, traditional ways of assessing the performance of PMSCs and providing incentives through an explicit contract is also hardly feasible in conflict regions. The state does not have the ability or it is too costly for it to cover all potential contingencies and specify all actions which are necessary in order to achieve a certain outcome ex ante – particularly in a way which is also verifiable by a court ex post. Under these circumstances it is difficult to motivate PMSCs to exercise high effort with an explicit contract.

Therefore, I brought attention to the use of relational contracts. A relational contract is a non-contractual, implicit agreement between principal and agent which is sustained by the value of future collaborations. It cannot be enforced by a court but has to be self-enforcing which means that it must be optimal for both contracting parties to stick to the contract in every contingency. However, parties will only stick to the contract if there is repeated interaction and the value of a

continued cooperation is higher than any outside option (Levin, 2003). Since it is very likely that states and PMSCs (at least potentially) interact repeatedly, a relational contract qualifies as a very appropriate contractual commitment for both. This means that states can implicitly base compensation on the outcome of a past performance for example as the expectation of being rehired for future tasks and forwarded a (higher) rent. In this way, they can incentivize PMSCs to exercise high effort in fulfilling their tasks. Indeed, there is evidence that these considerations play a role because PMSCs are very often not chosen via a competitive bidding process (Berrios, 2006; Dickinson, 2007; Ortiz, 2010a). The results of the formal model show, however, that because this form of reward cannot be verified and enforced by a court, the state must be able to credibly commit to reward the PMSC for its high effort in order to induce a good performance. The analysis revealed that it is not only the PMSCs' reputation that is of practical relevance, but more importantly the state's credibility to keep the promise of a bonus (of being rehired) after a good outcome. The model suggests that this implicit promise is necessary in order to successfully incentivize the agent to exercise high effort. From a transparency-oriented point of view, this implicit promise may be regarded as a form of corruption. This is reflected in the repeated requests for the enforcement of competitive bidding processes and the enhancement of transparency when contracting PMSCs (see for example Stöber, 2007). The results of this analysis, however, indicate that a high degree of transparency in the contracting process may actually have a negative impact on the performance of PMSCs. In other words, a high degree of transparency makes it harder for the state to implicit forward a rent, and because of its resultant problem of credibility, the state is not able anymore to optimally incentivize the PMSC to exercise high effort.

Furthermore, the formal model shows that states which cannot signal a potential demand for the services of PMSCs as well as the financial ability to compensate PMSCs should be less likely to hire PMSCs because of their inability to give PMSCs appropriate incentives for exercising high effort. For example, states which do not often conduct military operations, or are not often involved in international military missions should be less likely to hire PMSCs. In this context, politicoeconomic conditions, such as the size of a state’s defence budget, the frequency of its military operations, the strength of its own security forces, or its overall policy towards outsourcing and the delegation of military and security tasks, might play a decisive role for the ability of a state to give PMSCs appropriate incentives.

Empirical Findings

In the second part of the dissertation, I translated the formal model’s implications into empirical analyses. In doing so, I focused in my analysis on PMSCs’ effort level and the factors influencing it. According to the formal model, the equilibrium effort level of PMSCs is determined by their variable

costs and the expected bonus, or more precisely, the state's credible commitment to later compensate a PMSC for a good performance. In other words, the higher the chance of a bonus, the higher the effort level of a PMSC will be; and the higher the variable costs a PMSC faces, the lower its effort level will be. Hence, in the empirical chapters, I examined whether these variables actually play a role and if, how they affect PMSCs' effort level.

Empirical Analysis I

I started the empirical analysis with the question whether there is evidence that the theoretically predicted implicit contingent compensation exists and is relevant in the interaction between PMSCs and states. Exploring this question proved to be particularly difficult – not at least due to the implicit and informal nature of the subject of interest. However, I approached this question by looking at the conflict intensity of civil wars in which PMSCs operated. I operationalized the effort level of PMSCs as the intensity level of civil wars, arguing that - in due consideration of intervening variables that might also affect the conflict intensity – a high effort level of the involved PMSCs should negatively affect the intensity of a civil war and vice versa. The formal model showed that a high effort level can be induced through the promise of a bonus in case of a good performance. Therefore, I examined whether there is a difference in the conflict intensity between those conflicts in which the principal (i.e. the state) was able to credibly commit to a bonus and those in which the principal could not promise a bonus. This means, that - dependent on its ability - a state could use different means to credibly promise a bonus. However, in case of politically and financially weak and war-ridden countries, natural resources suggest themselves as the most credible bonus to PMSCs. Hence, I operationalized the promise of a bonus as the existence of natural resources. I argued that those states which possess high amounts of natural resources should be more likely to successfully incentivize PMSCs for exercising high effort because of their ability to give PMSCs the expectation of having a share in the extraction of those natural resources once the conflict is resolved.[119]

Using two different sources on the presence of PMSCs in civil wars, I conducted two analyses: First, I conducted a cross-sectional analysis using a dataset compiled by Chojnacki et al. (2009), which entails data on worldwide civil wars in which PMSCs were involved. Then, I conducted a panel analysis using a dataset compiled by the UK Foreign and Commonwealth Office (2002), which entails data on African civil wars in which PMSCs operated. This dataset includes information on both the exact period of their presence as well as the number of PMSCs involved.

The results of the cross-sectional analysis confirm the hypothesis that the presence of PMSCs in civil wars is significantly associated with increasing conflict intensity. Civil wars in which PMSCs

[119] Operations of PMSCs in resource-rich African countries seem to empirically support this assumption (see Musah and Fayemi, 2000).

operated show a 2.87 times higher conflict intensity (measured as battle-related deaths) than civil wars in which no PMSCs operated. Furthermore, the empirical results support the implication of the formal model regarding the impact of a bonus on the effort level of PMSCs. The mutual effect of PMSCs and production of natural resources in a conflict country is significantly associated with decreasing conflict intensity. In other words, the prospect of a bonus appears to increase the effort level of PMSCs. The results of the cross-sectional analysis are robust over a range of different model specifications.

The results of the panel analysis, however, are mixed. They neither support the expectation that PMSCs contribute to a worsening of conflict intensity, nor do they provide evidence for the assumption that a bonus increases the effort level of PMSCs. Rather, the results of the panel analysis indicate that the involvement of PMSCs actually decreases the conflict intensity of civil wars. Moreover, I could also not find evidence for the assumption that competition between PMSCs increases the effort level of PMSCs as found out in previous studies (Akcinaroglu and Radziszewski, 2012) .

Empirical Analysis II

In the second stage of my empirical analysis, I examined the second implication of the formal model regarding the influence of high variable costs on the effort level and thus on the profit of PMSCs. Variable costs include material and labour costs necessary to carry out a task. The circumstances and conditions of the area of operation affect to a great extent the variable costs PMSCs face. For instance, increasing insecurity raises the operation costs of PMSCs. Intuitively, one would assume that PMSCs generally benefit from a worsening of the security situation because it guarantees subsequent contracts and hence more profit. However, more insecurity also raises the costs of the operation for PMSCs. They need to invest more in material and personnel costs in order to keep their performance level high. Hence, rising variable costs reduce PMSCs's total payoffs – at least on a short-term basis. Thus, a company faced with increasing variable costs might tend to optimize its cost structure – for instance by hiring cheaper and thus poorer qualified personnel - and exercise lower effort. However, the decrease in effort level reduces at the same time the likelihood to receive a bonus according to the results of the formal model.

In order to examine the effect of rising variable cost on the profits of PMSCs, I explored how investors of publicly traded PMSCs react to increasing variable costs in the form of a deteriorating security situation in countries which the companies operate in. I argued that given variable costs are a relevant factor which negatively affects PMSCs' effort level and consequently their profits, then investors should be aware of this fact and act accordingly. Then, any change in the security situation should induce a change in the expected value of a PMSC through a change in the expected prospect

of receiving a bonus. Thus, in my analysis investor reactions towards events which potentially affect operating costs (such as attacks and bombings) serve as a proxy that should provide an indication of the implications of rising variable costs.

Using stock market data of six publicly traded PMSCs and data on insecurity events in Afghanistan and Iraq, I conducted an event study in order to examine whether a deteriorating security situation decreases investor's expectations about future profits of PMSCs. At first sight, the results supported the hypothesis that investors react to insecurity events in Afghanistan and Iraq and that they tend to invest less in PMSCs' stocks. However, a detailed look into the individual events revealed that these results are not robust. The results were not consistent across different model specifications and, additionally, they were not consistent across all PMSCs. In other words, I could not discover a general pattern supporting or opposing the argument that a deteriorating security situation decreases investor's expectations about future profits of PMSCs. It appears rather that the results were driven by confounding events (i.e. other events which might be relevant to the company and were announced in the same period as the event of interest).

The analysis could not help in disclosing whether increasing variable costs through rising insecurity decrease investor's expectations about future profits of PMSCs. A reason might be that investors consider a deteriorating security situation as not relevant for PMSCs' profits. In this case one could test for different context factors, for instance political events that might affect PMSCs' profits. Since the focus of my analysis is on how rising variable costs affect PMSCs effort level and their profits, I have refrained from analyzing political events. However, future research should examine how investors react to political events that they consider relevant for PMSCs' revenues. Another reason might be that publicly traded companies are major players in their market segment who are not affected by rising variable costs in a way that their effort level or overall profits could be decreased. It might very well be that smaller companies are affected more heavily by rising variable costs. However, it is very difficult to obtain the necessary data to assess how small companies are affected by insecurity events. Also, it might be that rising variable costs have a more long-term impact on PMSCs' effort level and profits. However, the analysis of investor reactions naturally cannot take hold of potential long-term effects.

7.2 Contribution

This is one of the first studies to analyze the implications of the use of PMSCs in crisis and war regions using a formal model and quantitative methods. Thereby, this dissertation contributes to the theory building in this theoretically rather underdeveloped research area. Furthermore, this study makes a contribution to a methodological enlargement of this particularly by case studies conditioned field of study (Howe, 1998; Cilliers and Mason, 1999; Francis, 1999; Mills and Stremlau, 1999; Cleaver, 2000; Dokubo, 2000; Büttner, 2003; Singer, 2003; Avant, 2005; Abrahamsen and Williams, 2007; Gumedze, 2008; Hansen, 2008; Abrahamsen and Williams, 2009; Gumedze, 2011).

The results of this dissertation contribute to the research on contextual factors that are conducive to a spoiling or stabilizing role of PMSCs in crisis and war regions – a branch of research of highly practical relevance. More precisely, the theoretical and empirical findings of this study contribute to an advanced understanding of the political, financial and operative reasons underlying the decision of states to delegate military and security tasks to PMSCs. This study illustrated under which circumstances it is beneficial for the states to hire PMSCs and under which circumstances states should better abstain from delegating. Furthermore, this study helped to disclose the incentives and exact mechanisms that drive PMSCs behaviour as well as to specify the problems that arise between states and PMSCs. Based on these insights, it identified critical parameters that determine the effort level of PMSCs and pinpointed at optimal incentive schemes and those parameters that can be influenced by states in order to induce a desired performance of PMSCs. Thereby, this study adds to pragmatic-oriented approaches in the literature on PMSCs and helps to draw the scholarly attention away from very normative approaches that have dominated the research field long time.

The study has also impact on the study of civil wars and on the study of the influence of political events on capital markets. The results are consistent with previous research on the determinants of conflict intensity (Lacina, 2006; Lujala, 2009) and to previous studies on the negative relation between conflict and firm value (Collier, 1999; Collier and Duponchel, 2013). They are also consistent relating to concerns within the PMSC literature regarding an exacerbating influence of PMSCs on conflicts they operate in. However, they are not consistent with previous literature on PMSCs which call for more transparency and the improvement of explicit contracts when hiring PMSCs (Dickinson, 2007: Stöber, 2007). The results of this study showed that explicit contracting is particularly difficult in contingency operations. Furthermore, transparency makes it more difficult for the state to agree on implicit contracts and forward discretionary payments and in this way to optimally incentivize PMSCs.

7.3 Policy Implications

The theoretical and empirical findings of this study have three major policy implications for the use of PMSCs by states.

First, the empirical analysis of the impact of PMSCs on civil wars shows that the presence of PMSCs is strongly correlated with higher levels of conflict intensity. This finding is highly relevant given the increased use of PMSCs by state as well as non-state actors in crisis and war regions. It stresses the imperative of designing the necessary legal, accountability and monitoring mechanisms in order to minimize the risks associated with the use of PMSCs. Policy-makers are under the direct duty to espouse the necessary national, regional and international conditions.

Second, the empirical analysis supports the theoretical argument of an implicit agreement between states and PMSCs and revealed that the presence of PMSCs in civil wars in which they were given the prospect of a bonus is strongly correlated with lower levels of conflict intensity. This finding implies that states can exert a positive influence on the performance of PMSCs by setting the right incentives. This result offers crucial recommendations for policy-makers: It shows that states have the ability to actively influence the performance of PMSCs - if they can credibly commit to forward a bonus for example in the form of re-hiring the PMSC or compensating it with a higher rent. This means that it is highly important to establish long-term relationships with PMSCs. States have to systematically punish those PMSCs with a bad performance by not hiring them again and reward those with a good performance by re-hiring them. This is the crux of the matter: both the reputation of the PMSC as well as the reputation of the state hiring the PMSC matter when states and PMSCs interact with each other. The reputation of the PMSC provides considerable information for the state about the PMSC's expectable effort level, and the reputation of the state (regarding its ability to keep its promise to forward a bonus after a PMSC's good performance) provides information for the PMSC whether it pays off for it to exercise high effort or not. By implication, this means that those states which are not able to credibly commit to a discretionary payment should refrain from delegating military and security tasks to PMSCs if they wish the task to be performed with a high effort level.

Third, under specific conditions states might hire PMSCs although PMSC might exercise a lower effort level than the state would exercise itself. Such a condition is, for example, if the state fears political risks when performing the task itself and believes that in case of a negative outcome it would be worse if the state itself was responsible. This, from political cost-effectiveness considerations, reasonable decision involves, however, pitfalls for those affected by the activities of PMSCs – for example in case of a military intervention particularly for the host state, who of course is interested in the highest possible effort level. This approach of the hiring (respectively intervening) state can corrupt its relation with the host state in various ways and, moreover, harm its reputation

and threaten its acceptance by the host state's population. Hence, states should be mindful of potential throwbacks when hiring PMSCs in order to keep the aforementioned risks low.

7.4 Avenues for Future Research

An essential difficulty in the empirical study of PMSCs is the problem of data availability as well as the quality of the data that is available. Even though I have collected and selected the data that I have employed with special diligence, they do not possess the desired quality and do not always contain the desired information. Furthermore, the sample size in both empirical studies is relatively small, which makes it difficult to gain conclusive and robust findings. The findings of the empirical analyses should be therefore interpreted against this background. Future data collection is required in order to create broad and systematic datasets for future research and to be able to make robust, generalizable statements. In addition to the exact time period of PMSCs' presence, it would be interesting to have information on the companies' specific tasks (lethal or non-lethal), or the identity of their principals (the state itself, a rebel group, or a third party), or information on their employees (nationality, professional experience). On basis of these datasets, future research could continue the research conducted in this study and advance the knowledge of the impact of PMSCs on armed conflicts and thoroughly examine the causal mechanisms behind a spoiling or stabilizing role of PMSCs in armed conflicts. This dissertation has identified and examined two parameters that affect the effort level of PMSCs: the prospect of a bonus and rising variable costs. Future studies using broad and systematic datasets could clarify whether the relationship found in this study is robust and generalizable by examining different regions. Regarding the impact of rising variable costs on PMSCs, this study could not directly assess the long-term relationship between rising variable costs, the effort level of PMSCs and their profits. The impact of rising variable costs might have long-term implications for the performance and profits of PMSCs. Future studies could examine this black box.

Concluding, as this dissertation's title suggests, PMSCs can principally affect armed conflicts in two different ways: They can either turn into spoilers and deteriorate the situation or they can contribute to stabilizing armed conflicts by performing in the best interest of all parties concerned. However, which role they lastly play depends on contextual factors and an optimal arrangement of incentives and control mechanisms. The state - as still the major player at the national, regional and international level - bears not only special responsibility, but – as this dissertation has shown - has also different means available to create the necessary conditions. The academia, on the other hand, has the responsibility to explore contextual factors and the causal mechanisms in order to assist in identifying the means of the state and the necessary conditions it has to create.

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Appendix

1. Appendix to Chapter 4

Proof to Proposition 2:

First, note that Proposition 2 is equivalent to

Proposition 2': *Assume the agent is hired. Then, equilibrium effort depends on* F_A *which determines whether the agent has to get a rent. More precisely,*

If $F_A \geq \frac{(H-L_A)^2}{2k_A}$, effort is at its efficient level, $e_A^* = e_A^{FB} = \frac{(H-L_A)}{k_A}$. A necessary condition for hiring the agent being optimal is $u_P^A = e_A^*(H-b)+(1-e_A^*)L_A - w = L_A - (F_A - \frac{(H-L_A)^2}{2k_A}) \geq \overline{u}_P$, which can only be satisfied when $L_A > \overline{u}_P$.

If $\frac{(H-L_A)^2}{8k_A} < F_A < \frac{(H-L_A)^2}{2k_A}$, effort is inefficiently low and characterized by $k_A \frac{(e_A^*)^2}{2} - F_A = 0$, where we further have $\frac{(H-L_A)}{2k_A} < e_A^* < \frac{(H-L_A)}{k_A}$. A necessary condition for hiring the agent being optimal is $L_A + \sqrt{2\frac{F_A}{k_A}}(H-L_A) - 2F_A \geq \overline{u}_P$, where $\sqrt{2\frac{F_A}{k_A}}(H-L_A) - 2F_A > 0$ and decreasing with F_A.

If $F_A \leq \frac{(H-L_A)^2}{8k_A}$, effort is half the efficient level, i.e., $e_A^* = \frac{(H-L_A)}{2k_A}$. A necessary condition for hiring the agent being optimal is $\frac{(H-L_A)^2}{4k_A} + L_A \geq \overline{u}_P$.

Proof: Given (IC), it is not necessary to impose the constraint $b \geq 0$, as long as the optimal effort choice is strictly positive (which will always be the case). Furthermore, we can use (IC) to plug in $b = e_A^* k_A$ into the principal's problem, who is thus effectively able to choose effort.

Then, the Lagrange function equals

$$\max_{e_A, w} L = e_A H - e_A^2 k_A + (1-e_A)L_A - w + \lambda_{IR}\left[k_A \frac{e_A^2}{2} - F_A + w\right] + \lambda_{LL} w.$$

First order conditions are

$$\frac{\partial L}{\partial e_A} = (H-L_A) - 2e_A k_A + \lambda_{IR} k_A e_A - \lambda_B k_A = 0 \tag{1.4}$$

$$\frac{\partial L}{\partial w} = -1 + \lambda_{IR} + \lambda_{LL} = 0 \tag{1.5}$$

Complementary slackness conditions are

$$\lambda_{IR}\left[k_A\frac{e_A^2}{2}-F_A+w\right]=0$$

$$\lambda_{LL}w=0$$

$$\lambda_{IR},\lambda_{LL}\geq 0$$

Condition (1.5) implies that at least one of (IR) or (LL) has to bind. Analyzing all three possible cases gives the results stated in the proposition.

(A) (IR) binds, $\lambda_{LL}=0$.

Then, we can use $\lambda_{IR}=1$ from (1.5) and plug it into (1.4), which becomes $(H-L_A)-e_Ak_A-\lambda_Bk_A=0$. Then, it will be optimal for the principal to implement first-best effort. Thus, we have e_{FB} if $\lambda_B=0$. Furthermore, hiring the agent will not be dominated by not performing the task at all as long as $u_P^A=e_A^*(H-b)+(1-e_A^*)L_A-w\geq\overline{u}_P$. We already know that $e_A^*=\frac{H-L_A}{k_A}$ and $b=e_A^*k_A$. To obtain w, we use the fact that (IR) binds and thus $u_A=e_A^*b+w-k_A\frac{(e_A^*)^2}{2}-F_A=0\Rightarrow w=F_A-\frac{(H-L_A)^2}{2k_A}$. Plugging these values into the entry condition gives $L_A-(F_A-\frac{(H-L_A)^2}{2k_A})\geq\overline{u}_P$. Finally, this case is only feasible as long as $w=F_A-\frac{(H-L_A)^2}{2k_A}\geq 0$.

(B) (LL) binds, $\lambda_{IR}=0$, i.e., the agent gets a rent. Equation (1.4) now gives

$$e_A^*=\frac{(H-L_A)}{2k_A}$$

Now, equilibrium effort is only half its first-best level. Thus, the need to give a rent to the agent substantially reduces the implemented effort. The necessary condition to make entry optimal (note that $w=0$ becomes $u_P^A=e_A^*(H-b)+(1-e_A^*)L_A=\frac{(H-L_A)^2}{4k_A}+L_A\geq\overline{u}_P$. Finally, this case is only feasible as long as $u_A=k_A\frac{e_A^2}{2}-F_A=\frac{(H-L_A)^2}{8k_A}-F_A\geq 0$.

(C) (IR) and (LL) bind. From (A) and (B) it follows that the present case is relevant for $\frac{(H-L_A)^2}{8k_A}<F_A<\frac{(H-L_A)^2}{2k_A}$. Here, effort is thus characterized by binding (IR) and (LL) constraints, i.e., $k_A\frac{e_A^2}{2}-F_A=0$. Plugging in the boundaries of F_A gives $\frac{(H-L_A)}{2k_A}<e_A^*<\frac{(H-L_A)}{k_A}$. Plugging this value into u_P^A further gives us the necessary condition for an entry being optimal. There, $\sqrt{2\frac{F_A}{k_A}}(H-L_A)-2F_A$ has to be non-negative because otherwise, the principal could just enforce the same effort as in case (A),

furthermore paying $w=0$ and receiving L_A in expectation. More precisely, $\frac{\partial\sqrt{2\frac{F_A}{k_A}}(H-L_A)-2F_A}{\partial F_A}=\sqrt{\frac{(H-L_A)^2}{2k_AF_A}}-2\le 2-2=0$. Thus,

$$\sqrt{2\frac{F_A}{k_A}}(H-L_A)-2F_A\ge\sqrt{\frac{\frac{(H-L_A)^2}{2k_A}}{k_A}}(H-L_A)-2\frac{(H-L_A)^2}{2k_A}=\frac{(H-L_A)^2}{k_A}-\frac{(H-L_A)^2}{k_A}=0$$

Proof to Lemma 2: Immediately follows from differentiating

$u_P^P-u_P^A=L_P-L_A+\frac{(H-L_P)^2}{2k_P}-\frac{(H-L_A)^2}{2k_A}-F_A-F_P$ (in the case of $F_A\ge\frac{(H-L_A)^2}{2k_A}$),

$u_P^P-u_P^A=L_P-L_A+\frac{(H-L_P)^2}{2k_P}-\sqrt{2\frac{F_A}{k_A}}(H-L_A)-F_P+2F_A$ (for $\frac{(H-L_A)^2}{8k_A}<F_A<\frac{(H-L_A)^2}{2k_A}$),

or $u_P^P-u_P^A=L_P-L_A+\frac{(H-L_P)^2}{2k_P}-\frac{(H-L_A)^2}{4k_A}-F_P$ (for $F_A<\frac{\left(H-L_A\right)^2}{8k_A}$), taking into account that $L_A\ge L_P, k_A\le k_P$ and $(H-L_A)<k_A$.

Proof to Proposition 3: Define $\Delta L\equiv L_A-L_P\ge 0$ and plug it into $u_P^P-u_P^A$, further keeping L_P constant. Then,

For $F_A\ge\frac{\left(H-L_A\right)^2}{2k_A}$, $\frac{\partial\left(U_P^P-U_P^A\right)}{\partial\Delta L}=-2+\frac{\left(H-\Delta L-L_P\right)}{k_A}$, which is negative due to Assumption 3 ($(H-L_A)<k_A$)

For $\frac{(H-L_A)^2}{8k_A}<F_A<\frac{\left(H-L_A\right)^2}{2k_A}$, $\frac{\partial\left(U_P^P-U_P^A\right)}{\partial\Delta L}=-1+\sqrt{2\frac{F_A}{k_A}}$. Since $F_A<\frac{\left(H-L_A\right)^2}{2k_A}$ and $(H-L_A)<k_A, -1+\sqrt{2\frac{F_A}{k_A}}\le -1+\frac{\left(H-L_A\right)}{k_A}<0$

For $F_A<\frac{\left(H-L_A\right)^2}{8k_A}$, $\frac{\partial\left(U_P^P-U_P^A\right)}{\partial\Delta L}=-1+\frac{(H-(\Delta L+L_P))}{2k_A}<0$

Q.E.D.

Proof to Proposition 4: We have $\frac{\partial\left(u_P^P-u_P^A\right)}{\partial k_P}=-\frac{(H-L_P)^2}{2k_P^2}<0$. Since $k_P\ge k_A$, it is thus sufficient to show that $u_P^P-u_P^A<0$ for $k_P=k_A$.

If $k_P=k_A=k, u_P^P-u_P^A=L_P-L_A+\frac{2H\left(L_A-L_P\right)-\left(L_A^2-L_P^2\right)}{2k}+F_A-F_P=L_P-L_A-\left(L_P-L_A\right)\frac{H-L_A+H-L_P}{2k}+F_A-F_P$.

Since $L_A\ge L_P, (H-L_A)<k_A$ and thus $\frac{H-L_A+H-L_P}{2k}<1$ - and since $F_P\ge F_A$ is assumed - the last expression above is negative.

Q.E.D.

Proof to Proposition 5: From Proposition 2 we know that in the case of $F_A \geq \frac{(H-L_A)^2}{2k_A}, u_P^A = L_A - \left(F_A - \frac{(H-L_A)^2}{2k_A} \right)$. Since the term in brackets is positive, and since we assume $\overline{u}_P \geq L_A$, the condition $u_P^A \geq \overline{u}_P$ can never be satisfied. If the exogenous bound on bonus payments binds, u_P^A is further reduced. Finally, we can use Proposition 3, stating that the option of the principal performing the task itself is always dominated by the option of hiring the agent instead.

Q.E.D.

Endogenous b

Formal description

The solution concept used is Public Perfect Equilibrium. This describes a Nash equilibrium for each date t and history, together with the assumption that players only use public strategies. The latter implies that any player's strategies only depend on publicly observable information. In particular, the agent's strategies are independent of its past effort choice. We are interested in the equilibrium that maximizes the principal's payoff, however impose a restriction to stationary contracts.

This gives constraints

(IR) $$\frac{w + k_A \frac{e_A^2}{2} - F_A}{1-\delta} \geq 0$$

(DE) $$-e_A k_A + \delta \left(\frac{e_A H + (1-e_A) L_A - w - e_A^2 k_A}{1-\delta} - \overline{U} \right) \geq 0,$$

where we already used $b = e_A k_A$ from the agent's (IC) constraint.

Then, we have the Lagrange function

$$L = \frac{e_A H + (1-e_A) L_A - e_A^2 k_A - w^L}{(1-\delta)} + \lambda_{IR} \left[\frac{w - F_A + k_A \frac{e_A^2}{2}}{(1-\delta)} \right] + \lambda_{DE} \left[\delta \frac{e_A H + (1-e_A) L_A - e_A^2 k_A - w^L}{(1-\delta)} - \delta \overline{U}_P - e_A k_A \right] + \lambda_{LL} w^L$$

and necessary conditions

$$\frac{\partial L}{\partial w} = -\frac{1}{(1-\delta)} + \lambda_{IR} \frac{1}{(1-\delta)} - \lambda_{DE} \frac{\delta}{(1-\delta)} + \lambda_{LL} = 0$$

$$\frac{\partial L}{\partial e_A} = \frac{H - L_A - 2 e_A k_A}{(1-\delta)} + \lambda_{IR} \frac{k_A e_A}{(1-\delta)} - \lambda_{DE} k_A \left[2 e_A \frac{\delta}{(1-\delta)} + 1 \right] = 0$$

$$\lambda_{IR} \left[\frac{w - F_A + k_A \frac{e_A^2}{2}}{(1-\delta)} \right] = 0$$

$$\lambda_{DE} \left[\delta \frac{e_A H + (1-e_A) L_A - e_A^2 k_A - w^L}{(1-\delta)} - \delta \overline{U}_P - e_A k_A \right] = 0$$

$$\lambda_{LL} w = 0$$

$$\lambda_{IR}, \lambda_{DE}, \lambda_{LL} \geq 0$$

The following cases are possible:

(DE) does not bind

If the principal's (DE) constraint does not bind, the situation is basically identical to the static case:

(A) (IR) binds, $\lambda_{LL} = 0$.

Then, we have $\lambda_{IR} = 1$ and hence $e_A = \frac{H - L_A}{k_A}$, i.e. effort is at its efficient level. Since (IR) binds, it can be used to obtain w which equals $w = F_A - \frac{(H - L_A)^2}{2k_A}$.

Hence, the conditions for this case to hold are $F_A - \frac{(H - L_A)^2}{2k_A} \geq 0$ and - via (DE) – $\frac{\delta}{1-\delta}\left(\frac{(H - L_A)^2}{2k_A} + L_A - F_A\right) - (H - L_A) \geq \delta \bar{U}_P$. Note this is only feasible if $\bar{U}_P < 0$, since the left hand side of this condition is negative then.

(B) (LL) binds, $\lambda_{IR} = 0$, i.e., the agent gets a rent. Then, we have $e_A = \frac{H - L_A}{2k_A}$. Conditions for this case to hold are $F_A - \frac{(H - L_A)^2}{8k_A} \leq 0$ and $\frac{\delta}{(1-\delta)}\left[\frac{(H - L_A)^2}{4k_A} + L_A\right] - \frac{H - L_A}{2} \geq \delta \bar{U}_P$

(C) (IR) and (LL) bind. From (A) and (B) it follows that the present case is relevant for $\frac{(H - L_A)^2}{8k_A} < F_A < \frac{(H - L_A)^2}{2k_A}$. Effort is characterized by binding (IR) and (LL) constraints, i.e., $e_A = \sqrt{\frac{2F_A}{k_A}}$. Plugging in the boundaries of F_A gives $\frac{(H - L_A)}{2k_A} < e_A < \frac{(H - L_A)}{k_A}$.

Furthermore, now (DE) is satisfied as long as $\delta \frac{\sqrt{\frac{2F_A}{k_A}}H + (1 - \sqrt{\frac{2F_A}{k_A}})L_A - 2F_A}{(1-\delta)} - \delta \bar{U}_P - \sqrt{\frac{2F_A}{k_A}}k_A \geq 0$

(D) $\lambda_{LL} = \lambda_{IR} = 0$

This case is not feasible, since it would imply $-\frac{1}{(1-\delta)} = 0$

(DE) binds

(A) (IR) binds, $\lambda_{LL} = 0$.

Then, $w = F_A - k_A \frac{e_A^2}{2}$, and effort is characterized by $\delta \frac{e_A H + (1 - e_A)L_A - F_A - k_A \frac{e_A^2}{2}}{(1-\delta)} - \delta \bar{U}_P - e_A k_A = 0$, at least as long as this is solved by a strictly positive effort level.

Note that effort is inefficiently small in this case:

$$\lambda_{IRA} = 1 + \delta\lambda_{DE}$$

$$\frac{H - L_A - e_A k_A}{(1-\delta)} - \lambda_{DE} k_A \left[e_A \frac{\delta}{(1-\delta)} + 1 \right] = 0$$

(B) (LL) binds, $\lambda_{IR} = 0$.

Then, $w = 0$, and effort is characterized by $\delta \frac{e_A H + (1-e_A)L_A - e_A^2 k_A}{(1-\delta)} - \delta \bar{U}_P - e_A k_A = 0$, at least as long as this is solved by a strictly positive effort level. Furthermore, $e_A < \frac{H - L_A}{2k_A}$, since

$$\frac{H - L_A - 2e_A k_A}{(1-\delta)} - \lambda_{DE} k_A \left[2e_A \frac{\delta}{(1-\delta)} + 1 \right] = 0$$

(C) (IR) and (LL) bind.

Since $w = 0$, this case only reflects one point, namely where the conditions $\delta \frac{e_A H + (1-e_A)L_A - e_A^2 k_A}{(1-\delta)} - \delta \bar{U}_P - e_A k_A = 0$ and $-F_A + k_A \frac{e_A^2}{2} = 0$ give the same effort level.

To see that effort is continuous around that point we the binding (DE) constraints in cases (A) and (B), i.e., $\delta \frac{e_A H + (1-e_A)L_A - F_A - k_A \frac{e_A^2}{2}}{(1-\delta)} - \delta \bar{U}_P - e_A k_A = \delta \frac{e_A H + (1-e_A)L_A - e_A^2 k_A}{(1-\delta)} - \delta \bar{U}_P - e_A k_A$, which is satisfied for $-F_A + k_A \frac{e_A^2}{2} = 0$, namely where (IR) binds. Hence, $e_A < \frac{H - L_A}{2k_A}$ here as well.

(D) $\lambda_{LL} = \lambda_{IR} = 0$

This case is not feasible, since it would imply $-\frac{1}{(1-\delta)} - \lambda_{DE} \frac{\delta}{(1-\delta)} = 0$.

This analysis allows us to prove

Proposition 6: Equilibrium effort is non-decreasing in δ and strictly increasing when the (DE) constraint binds.

Proof: If the (DE) constraint does not bind, equilibrium effort either equals $\frac{H - L_A}{k_A}, \sqrt{\frac{2F_A}{k_A}} or \frac{H - L_A}{2k_A}$ and hence is independent of δ If (DE) binds, equilibrium effort is characterized by $\delta \frac{e_A H + (1-e_A)L_A - F_A - k_A \frac{e_A^2}{2}}{(1-\delta)} - \delta \bar{U}_P - e_A k_A = 0 (w > 0)$ or $\delta \frac{e_A H + (1-e_A)L_A - e_A^2 k_A}{(1-\delta)} - \delta \bar{U}_P - e_A k_A = 0 (w = 0)$. Thus, the implicit function theorem gives

$$\frac{de_A}{d\delta}=\begin{cases}-\dfrac{\frac{1}{(1-\delta)^2}\left(e_AH+(1-e_A)L_A-F_A-k_A\frac{e_A^2}{2}\right)-\bar{U}_P}{\delta\frac{H-L_A-k_Ae_A}{(1-\delta)}-k_A} & \text{if } w>0\\ -\dfrac{\frac{1}{(1-\delta)^2}\left(e_AH+(1-e_A)L_A-e_A^2k_A\right)-\bar{U}_P}{\delta\frac{H-L_A-2e_Ak_A}{(1-\delta)}-k_A} & \text{if } w=0\end{cases}$$

To see that both expression must be positive, first note that the denominators, the partial derivatives of (DE) with respect to e_A, must be negative. If any of them were positive, a higher effort level would relax the constraint, contradicting that (DE) binds and e_A is inefficiently small at the same time (what we established above). Furthermore, nominators have to be positive. In the first case a binding (DE) constraint implies $\frac{e_AH+(1-e_A)L_A-F_A-k_A\frac{e_A^2}{2}}{(1-\delta)}-\bar{U}_P=\frac{e_Ak_A}{\delta}$. Hence, we have

$$\frac{1}{(1-\delta)^2}\left(e_AH+(1-e_A)L_A-F_A-k_A\frac{e_A^2}{2}\right)-\bar{U}_P\geq\frac{1}{(1-\delta)}\left(e_AH+(1-e_A)L_A-F_A-k_A\frac{e_A^2}{2}\right)-\bar{U}_P=\frac{e_Ak_A}{\delta}>0$$

Equivalent considerations help to establish that the nominator of the second expression - i.e. when (LL) binds - is positive as well. Q.E.D.

Furthermore, we can prove

Lemma 2: U_P^A is strictly increasing in δ. Moreover, per-period payoffs $(1-\delta)U_P^A$ are non-decreasing in δ and strictly increasing in δ hen the (DE) constraint binds.

Proof: Obviously, given we have proven the claims for per-period payoffs $(1-\delta)U_P^A$, the result for total payoff streams is implied as well. The principal's per-period payoffs are $(1-\delta)U_P^A=\begin{cases}e_AH+(1-e_A)L_A-k_A\frac{e_A^2}{2}-F_A & \text{if } w>0\\ e_AH+(1-e_A)L_A-e_A^2k_A & \text{if } w=0\end{cases}$, with

$$\frac{d\left((1-\delta)U_P^A\right)}{d\delta}=\begin{cases}\frac{de_A}{d\delta}\left(H-L_A-e_Ak_A\right) & \text{if } w>0\\ \frac{de_A}{d\delta}\left(H-L_A-2e_Ak_A\right) & \text{if } w=0\end{cases}$$

.Above, we established that $H-L_A-e_Ak_A>0(w>0)$ and $H-L_A-2e_Ak_A>0(w=0)$, which together with Proposition 6 ($\frac{de_A}{d\delta}=0$ if the (DE) constraint does not bind and $\frac{de_A}{d\delta}>0$ if it does) proves the Lemma. Q.E.D.

Finally we prove

Proposition 7: Equilibrium effort is non-increasing in $\bar{U}_P$ and strictly decreasing when the (DE) constraint binds. Furthermore, per-period payoffs $(1-\delta)U_P^A$ are non-increasing in $\bar{U}_P$ when the (DE) constraint binds.

Proof: If the (DE) constraint does not bind, equilibrium effort is independent of $\bar{U}_P$ (see the proof to Proposition 6). Otherwise, we have $\frac{de_A}{d\bar{U}_P} = \begin{cases} \frac{\delta}{\delta\frac{H-L_A-k_Ae_A}{(1-\delta)}-k_A} & \text{if } w>0 \\ \frac{\delta}{\delta\frac{H-L_A-2e_Ak_A}{(1-\delta)}-k_A} & \text{if } w=0 \end{cases} > 0$,

since the denominators must be negative (see the proof to Proposition 6). Again, the principal's per-period payoffs are $(1-\delta)U_P^A = \begin{cases} e_AH+(1-e_A)L_A-k_A\frac{e_A^2}{2}-F_A & \text{if } w>0 \\ e_AH+(1-e_A)L_A-e_A^2k_A & \text{if } w=0 \end{cases}$, with

$\frac{d\left((1-\delta)U_P^A\right)}{d\bar{U}_P} = \begin{cases} \frac{de_A}{d\bar{U}_P}\left(H-L_A-e_Ak_A\right) & \text{if } w>0 \\ \frac{de_A}{d\bar{U}_P}\left(H-L_A-2e_Ak_A\right) & \text{if } w=0 \end{cases}$, which is strictly negative if the (DE) constraint binds. Q.E.D.

2. Appendix to Chapter 5

Table 20: Presence of PMSCs in Civil Wars Worldwide (1950-200) – Chojnacki et al. (2009)

Chonjacki et al. Dataset (2009)		
Civil War	**Period**	**Period Investigated in this Study**
Afghanistan	1978-1992	1978-2000
	1992-2003	
Angola	1975-1995	1975-1995
	1998-2002	1998-2002
Azerbaijan	1992-1994	1992-1994
Bosnia and Hercegovina	1992-1995	1992-1995
Cambodia	1970-1975	1967-1998
Chad	1966-1977	1966-1972; 1976-1984;
	1978-1993	1986-1987; 1989-1994
China	1946-1950	-
Colombia	1965-2003	1964-2003
Congo, Republic of	1997-1999	1993-2002
Congo, Democratic Republic of	1960-1964	1960-1962
	1964-1966	1964-1965
	1967	1967
	1977-1978	1977-1978
	1996-1997	1996-2001
Costa Rica	1948	-
Croatia	1991-1994	1992-1993; 1995
El Salvador	1979-1991	1979-1991
Georgia	1992-1993	1992-1993
Guatemala	1954	-
India	1956-1958	-
	1989-2003	1989-2003
Ivory Coast	2002-2003	-
Laos	1963-1973	1960-1973
Lebanon	1975-1990	1975-1990
Mozambique	1979-1992	1977-1992
Nicaragua	1978-1979	1978-1979
	1981-1990	1981-1989
Nigeria	1967-1970	1967-1970
	1999-2003	-
Russia	1994-1996	1994-1996
	1999-2003	1999-2003
Serbia Montenegro	1998-2000	1998-1999
Sierra Leone	1991-2000	1991-2000
Somalia	1988-1991	1978; 1982-1984; 1986-1996
South Africa	1984-1994	1981-1988
Sudan	1983-2003	1971; 1976; 1983-2003
Uganda	1981-1986	1978-1992
Yemen	1962-1970	1962-1970
Vietnam	1960-1975	1960-1964
Zimbabwe	1973-1979	1973-1979

Table 21: Overview of PMSC Variables

Variable	Description	Source
PMSC1	taking the value 1 if a PMSC was present in a civil war and 0 otherwise	Chojnacki et al. (2009)
PMSC2	taking the value 1 if a PMSC was present in a civil war and 0 otherwise	FCO (2002)
PMSC3	taking the value 1 if a PMSC was present in a conflict year and 0 otherwise	
PMSC4	time-delayed variable taking the value 1 in the conflict year after the PMSC first entered	
PMSC5	depicting the number of PMSCs present in a conflict year	
PMSC6	taking the value 1 if only one PMSC was present in a conflict year and otherwise 0	
PMSC7	taking the value 1 if many PMSCs were present in a conflict year and otherwise 0	

Table 22: Presence of PMSCs in African Civil Wars (1950-2000) – UK FCO Dataset (2002)

UK Foreign and Commonwealth Office Compilation 2002			
Civil War	**Period**	**Number of PMSCs**	**PMSCs Involved**
Angola	1975-?*	1	Security Advisory Services Ltd
	1992	1	EO
	1993	1	EO
	1994	4	EO, Capricorn Systems International, Saracen International, Teleservices International
	1995	4	Saracen International, Alpha-5, Teleservices International, Ibis Air International (formerly Capricorn Systems International)
	1996	10	Alpha-5, Teleservices International, Ibis Air International (formerly Capricorn Systems International), Saracen International, Stabilco, Omega Support Ltd., Shibata Security, Longbeach Pty Ltd, Defence Systems Ltd (DSL), MPRI
	1996-?*	4	Panasec Corporate Dynamics, Bridge Resources, COIN Security, Corporate Trading International
	1997	7	Teleservices International, Stabilco, Omega Support Ltd, Strategic Concepts Pty Ltd, Panaseac Corporate Dynamics, International Defence and Security (IDAS), AirScan
	1998	8	Teleservices International, Stabilco, Omega Support Ltd, Strategic Concepts Pty Ltd, Panaseac Corporate Dynamics, International Defence and Security (IDAS), AirScan, IRIS
Algeria	1992	1	Eric SA
Benin* **	1977		"Force Omega"
Botswana* **	1991	1	EO
	1992	1	EO
Cameroon* **	1992	1	Secrets
Congo-Brazzaville	1994-1996	1	Levdan
Congo, Democratic Republic of	1960-1961	1	Compagnie Internationale
	1964-1965*	1	"Five Commando"
	1967*	1	Remnants of "Five Commando"
	1975-?*	1	
	1996	1	Omega Support Ltd + 2000 mercenaries
	1997	7	Omega Support Ltd, EO, Sandline, International Defence and Security (IDAS), Stabilco, GeoLink, Intercon Consulting Services
	1998	5	DSL, SafeNet (formerly Stabilco), IRIS, Silver Shadow, Angolan EO spin-offs + more than 100 South African and French troops
Kenya*	1960s-1970s		Kulinda Security Ltd (Watchguard)
	1980s-early 1990s		Defence Systems Ltd (DSL)
Liberia	1995	1	MPRI
Malawi	1960s-1970s*		Kulinda Security Ltd (Watchguard)
	1995***	1	EO
Mozambique	1980s*	1	Lonrho
	1980s-early 1990s** (1980-1992)	1	Defence Systems Ltd (DSL)
	1995***	1	EO
	1996-1997***	1	Ronco Consulting Corporation

Notes:

** imprecise time, country or company specification (only mercenaries); dropped*

*** precise time specification assumed after comparison with other sources*

**** conflict (year) not listed in PRIO Dataset; dropped*

UK Foreign and Commonwealth Office Compilation 2002 Cont'd			
Civil War	**Period**	**Number of PMSCs**	**PMSCs Involved**
Namibia	1991***	1	EO
Nigeria*	1967	1	group of French mercenaries
Rwanda	1994	1	Ronco Consulting Corporation
Sierra Leone	1991	1	Specialist Services International
	1992	1	Marine Protection Services
	1994	2	Special Protection Services, Frontline Security Services
	1995	6	EO, Ibis Air International (formerly Capricorn Systems International), Gurkha Security Guards Ltd (via J&S Franklin), Control Risks Group, Group 4, DSL
	1996	5	EO, Ibis Air International (formerly Capricorn Systems International), Sandline International (EO UK), LifeGuard Management (from EO), Teleservices International
	1997	7	EO, Teleservices International, LifeGuard Management, Sandline International, Cape International Corporation, ICI, Pacific Architects Engineers
	1998	7	EO, Sandline International, Cape International Corporation, ICI (International Charter Incorporated), Pacific Architects Engineers, LifeGuard Management, DSL
Sudan	1980s-early 1990s** (1983-1992)	1	Defence Systems Ltd (DSL)
Seychelles*	1986-?	1	Longreach Pty Ltd
Southern Africa*	1986-1990	2	KAS Enterprises, Watchguard
South Africa***	1989	1	EO
	1990	1	*
	1991	1	EO
Tanzania*	1960s-1970s	1	Kulinda Security Ltd (Watchguard)
Togo***	1995	1	Service and Security
Uganda	1991***	1	EO
	1995	1	EO
	1996	1	Saracen Uganda
	1997	1	AirScan
	1998	1	AirScan
Zambia***	1967-1969	1	Watchguard
	1995	1	EO
Zimbabwe*	1965-1980	1	former UK soldiers

Notes:

** imprecise time, country or company specification (only mercenaries); dropped*

*** precise time specification assumed after comparison with other sources*

**** conflict (year) not listed in PRIO Dataset; dropped*

Table 23: Battle Related Deaths by Conflict Duration and Cold War

		Battle Related Deaths (Sum)			Battle Related Deaths (Average)		
Duration	*N*	*Min*	*Mean*	*Max*	*Min*	*Mean*	*Max*
< 5 years	77	10	2863.05	60070	10	1501.36	50000
During Cold War	40	10	4515.6	60070	10	2483.54	50000
After Cold War	37	25	1076.51	20825	23	439.55	5206.25
5 - 10 years	30	125	8225.43	105503	24.5	1344.88	21100.6
During Cold War	18	150	9145.11	105503	25	1564.81	21100.6
After Cold War	12	125	6845.92	20895	24.5	1014.99	3605
10 - 15 years	20	245	10777.35	34025	24.5	897.95	2430.36
During Cold War	17	365	10914	34025	36.5	879.89	2430.36
After Cold War	3	245	10003	20739	24.5	1000.3	2073.9
15 - 20 years	16	450	11061.19	24750	25	659.03	1455.88
During Cold War	16	450	11061.19	24750	25	659.03	1455.88
After Cold War							
> 20 years	19	562	38583	210575	25.55	1384.33	7019.17

Notes: own Figure modified from Lujala (2009)

Source: BD 3.0 (2009)

Cross-sectional Analysis – Robustness Tests

Table 24: Negative Binomial Model – Battle Related Deaths (high estimates)

		Negative Binomial Model						
Battle Related Deaths (high estimates)		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
PMSCs		.69	1.38***	.66*	1.67***	.72**	.72**	1.70***
		(.56)	(.41)	(.35)	(.41)	(.31)	(.31)	(.48)
Natural Resources								
	Gemstones	1.69***	1.27***					.53
		(.49)	(.37)					(.36)
	Drugs			.92**				-.67
				(.45)				(.46)
	Hydrocarbons				1.41***			1.02**
					(.36)			(.41)
	All Types					2.31***	2.31***	1.63**
						(.55)	(.55)	(.65)
Interaction Term								
	PMSC x G	-1.08	-1.87***					-1.25**
		(.78)	(.57)					(.62)
	PMSC x D			-.76				.95
				(.66)				(.81)
	PMSC x H				-1.64***			-1.06
					(.55)			(.68)
	PMSC x GDH					-2.22***	-2.22***	-1.08
						(.73)	(.73)	(1.07)
GDP (log)		-.44**	-.37**	-.50***	-.82***	-.36**	-.36**	-.56***
		(.20)	(.16)	(.17)	(.19)	(.16)	(.16)	(.19)
Population (log)		-.05	.19*	.11	.13	-.02	-.02	.02
		(.14)	(.10)	(.11)	(.11)	(.12)	(.12)	(.12)
Political Regime		-.13***	-.09***	-.07**	-.04	-.07**	-.07**	-.07**
		(.04)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)
Ethnic Fractionalization		.37	.20	.22	.07	.24	.24	.31
		(.94)	(.70)	(.69)	(.70)	(.63)	(.63)	(.71)
Ethnic Polarization		-.71	-.75**	-.97**	-.80**	-1.23***	-1.23***	-.76**
		(.45)	(.35)	(.37)	(.36)	(.35)	(.35)	(.37)
Cold War		-.21	.07	.27	.18	.13	.13	.08
		(.53)	(.31)	(.30)	(.30)	(.28)	(.28)	(.30)
Insurgency		.00	.04	.02	.01	.00	.00	.00
		(.06)	(.05)	(.05)	(.05)	(.05)	(.05)	(.05)
Conflict Duration		-.00						.01
		(.02)						(.02)
Conflict Duration (log)			-.08	-.05	-.01	.17	.17***	
			(.14)	(.16)	(.14)	(.16)	(.16)	
Inequality		.00						
		(.00)						
_cons		11.77***	7.24***	9.75	10.63***	10.88***	10.88***	10.66***
		(3.19)	(2.16)	(2.28)	(2.65)	(2.22)	(2.22)	(2.40)
Observations		79	121	121	121	123	123	121
LR chi2		51.43***	66.34***	56.28***	67.55***	71.91***	112.74***	83.17***
/lnalpha		.48	.45	.51	.44	.43	.43	.35
		(.13)	(.11)	(11)	(.11)	(.11)	(.11)	(.11)
alpha		1.61	1.57	1.67	1.56	1.53	1.53	1.42
		(.22)	(.17)	(.18)	(.17)	(.17)	(.17)	(.16)
Likelihood-Ratio Test		1.2e+06***	1.5e+06***	1.6e+06***	1.6e+06***	1.2e+06***	5.9e+06***	1.1e+06***

Notes: coefficients are unstandardized negative Binomialcoefficients
Standard errors in parantheses; DV in Model 6: Sum of Battle Related Deaths
** p< 0.09, ** p < 0.05, *** p < 0.01*

Table 25: Negative Binomial Model – Battle Related Deaths (best estimates)

		Negative Binomial Model						
Battle Related Deaths (best estimates)		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
PMSCs		1.73***	2.15***	1.54***	1.57***	1.68***	1.89***	2.01***
		(.58)	(.46)	(.41)	(.48)	(.36)	(.40)	(.56)
Natural Resources								
	Gemstones	1.19**	.75**					1.01**
		(.43)	(.34)					(.41)
	Drugs			-.29				-.04
				(.38)				(.58)
	Hydrocarbons				-.22	.12	.15	-.48
					(.42)	(51)	(52)	(.49)
	All Types							-.29
								(.74)
Interaction Term								
	PMSC x G	-.47	-1.01*					-1.28*
		(.69)	(.55)					(.69)
	PMSC x D			.21				.22
				(.62)				(1.00)
	PMSC x H				-.02			.54
					(.60)			(.85)
	PMSC x GDH					-.31	-.51	-.14
						(.65)	(.70)	(1.17)
GDP (log)		-.38*	-.40**	-.37**	-.31	-.36**	-.35*	-.27
		(.21)	(.16)	(.17)	(.20)	(.17)	(.19)	(.20)
Population (log)		-.06	.03	.07	.10	.06	.09	.14
		(.15)	(.11)	(.11)	(.12)	(.12)	(.13)	(.13)
Political Regime		-.07*	-.06**	-.05	-.05*	-.05*	-.04	-.06*
		(.04)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)
Ethnic Fractionalization		-.18	-1.20	-.78	-.69	-.88	-1.45*	-1.02
		(1.05)	(.72)	(.76)	(.74)	(.71)	(.78)	(.86)
Ethnic Polarization		-.73	-.12	-.08	-.07	-.07	-.01	.04
		(.63)	(.43)	(.42)	(.43)	(.43)	(.46)	(.44)
Cold War		.63	-.08	-.13	-.11	-.04	-.13	-.17
		(.53)	(.32)	(.33)	(.32)	(.33)	(.34)	(.34)
Insurgency		.00	.00	.00	.00	-.01	.00	.03
		(.07)	(.05)	(.05)	(.05)	(.05)	(.05)	(.06)
Conflict Duration		.01						.02
		(.03)						(.02)
Conflict Duration (log)			.26	.33**	.32**	.33**	1.24***	
			(.16)	(.15)	(.15)	(.16)	(.16)	
Inequality		.00						
		(.00)						
_cons		9.55***	8.75***	7.97***	7.18***	7.94***	7.67***	6.40**
		(3.14)	(2.21)	(2.18)	(2.71)	(2.38)	(2.52)	(2.77)
Observations		66	99	99	99	100	100	99
LR chi2		45.94***	62.61***	57.63***	57.41***	57.84***	108.82***	62.89***
/lnalpha		.32	.38	.42	.42	.42	.54	.38
		(.15)	(.12)	(.12)	(.12)	(.12)	(.12)	(.12)
alpha		1.37	1.46	1.51	1.52	1.54	1.72	1.46
		(20)	(.18)	(.18)	(.18)	(.18)	(.20)	(.18)
Likelihood-Ratio Test		1.4e+05***	2.6e+05***	2.6e+05***	2.7e+05***	2.6e+05 ***	2.1e+06***	2.4e+05***

Notes: coefficients are unstandardized negative Binomialcoefficients
Standard errors in parantheses; DV in Model 6: Sum of Battle Related Deaths
** p < 0.09, ** p < 0.05, *** p < 0.01*

Table 26: Poisson Model

		Poisson Model						
Battle Related Deaths (low estimates)		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
PMSCs		1.69***	1.80***	.78***	1.65***	.97***	.53***	2.33***
		(.01)	(.01)	(.01)	(.01)	(.01)	(.00)	(.01)
Natural Resources								
	Gemstones	1.99***	1.93***					.45***
		(.01)	(.01)					(.01)
	Drugs			1.77***				-.49***
				(.01)				(.02)
	Hydrocarbons				1.79***			.83***
					(.01)			(.01)
	All Types					3.50***	1.41***	3.32***
						(.01)	(.00)	(.02)
Interaction Term								
	PMSC x G	-2.63***	-2.44***	-1.24***				-1.65***
		(.02)	(.01)	(.01)				(.02)
	PMSC x D							.47***
								(.03)
	PMSC x H				-1.96***			-1.44***
					(.01)			(.02)
	PMSC x GDH					-1.68***	-.62***	-.54***
						(.01)	(.01)	(.03)
GDP (log)		-1.16***	-1.10***	-1.00***	-1.06***	-1.04***	.52***	-1.17***
		(.01)	(.01)	(.00)	(.00)	(.00)	(.00)	(.01)
Population (log)		.12***	.19***	.12***	.12***	-.17***	-.14***	-.19***
		(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)
Political Regime		-.04***	-.06***	-.06***	-.01***	-.13***	-.09***	-.11***
		(.00)	(.00)	(.00)	(.00)	(.00)	(.00	(.00)
Ethnic Fractionalization		.20***	-.33***	1.43***	1.09***	1.26***	.94***	1.19***
		(.02)	(.01)	(.01)	(.01)	(.01)	(.00)	(.02)
Ethnic Polarization		-1.15***	-1.23***	-1.73***	-1.43***	-1.85***	-1.64***	-1.65***
		(.01)	(.01)	(.01)	(.01)	(.01)	(.00)	(.01)
Cold War		.93***	.81***	.52***	.39***	.60***	.24***	.43***
		(.01)	(.01)	(.01)	(.01)	(.01)	(.00)	(.01)
Insurgency		-.09***	-.05***	-.07***	-.06***	-.12***	-.08***	-.20***
		(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)
Conflict Duration		-.01***						.03***
		(.00)						(.00)
Conflict Duration (log)			-.26***	-.32***	-.24***	-.04***	1.07***	
			(.00)	(.00)	(.00)	(.00)	(.00)	
Inequality		-.00***						
		(.00)						
_cons		11.16***	10.25***	11.08***	10.97***	15.52***	12.64***	15.88***
		(.06)	(.05)	(.05)	(.05)	(.06)	(.02)	(.06)
Observations		79	121	121	121	123	123	121
LR chi2		233104.12***	259549.95***	250969.01***	241518.80***	323771.46***	2422198.91***	343552.54***

Notes: coefficients are unstandardized Poissoncoefficients
Standard errors in parantheses; DV in Model 6: Sum of Battle Related Deaths
** p < 0.09, ** p < 0.05, *** p < 0.01*

Table 27: Poisson Model with Robust Standard Errors

		Poisson Model						
Battle Related Deaths (low estimates)		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
PMSCs		1.69**	1.80**	.78	1.65**	.97**	.53	2.33***
		(.76)	(.73)	(.55)	(.71)	(.44)	(.36)	(.66)
Natural Resources								
	Gemstones	1.99***	1.93***					.45
		(.70)	(.65)					(.49)
	Drugs			1.77**				-.49
				(.80)				(.68)
	Hydrocarbons				1.79***			.83
					(.62)			(.50)
	All Types					3.50***	1.42*	3.31***
						(.77)	(.72)	(1.13)
Interaction Term								
	PMSC x G	-2.63*	-2.44**					-1.65**
		(1.43)	(.91)					(.86)
	PMSC x D			-1.24*				.47
				(.68)				(.88)
	PMSC x H				-1.96**			-1.44*
					(.81)			(.76)
	PMSC x GDH					-1.68**	-.62	-.54
						(.63)	(.80)	(1.19)
GDP (log)		-1.16*	-1.10**	-1.00**	-1.06***	-1.04***	-.52**	-1.17***
		(.65)	(.51)	(.36)	(.33)	(.28)	(.22)	(.33)
Population (log)		.12	.19	.12	.11	-.17	-.14	-.19*
		(.16)	(.16)	(.11)	(.13)	(.11)	(.09)	(.11)
Political Regime		-.04	-.06	-.06	-.01	-.12***	-.09**	-.11**
		(.04)	(.04)	(.03)	(.04)	(.04)	(.03)	(.05)
Ethnic Fractionalization		.20	-.33	1.43**	1.09	1.26**	.94	1.19
		(.98)	(1.13)	(.69)	(.65)	(.60)	(.63)	(.72)
Ethnic Polarization		-1.15**	-1.23***	-1.73***	-1.43***	-1.85***	-1.64***	-1.65***
		(.49)	(.37)	(.41)	(.27)	(.36)	(.29)	(.32)
Cold War		.93*	.81	.52	.39	.60	.24	.43
		(.52)	(.52)	(.48)	(.43)	(.45)	(.48)	(.44)
Insurgency		-.09	-.05	-.07*	-.06	-.12***	-.08**	-.20**
		(.08)	(.05)	(.04)	(.04)	(.04)	(.03)	(.08)
Conflict Duration		-.01						
		(.04)						
Conflict Duration (log)			-.26	-.32	-.24	-.04	1.07***	.03
			(.45)	(.37)	(.38)	(.22)	(.29)	(.03)
Inequality		-.00						
		(.00)						
_cons		11.16***	10.25***	11.08***	10.97***	15.52***	12.64***	15.89***
		(2.93)	(2.09)	(2.21)	(1.90)	(2.74)	(1.63)	(3.01)
Observations		79	121	121	121	123	123	121
Wald chi2		163.81***	211.10***	84.17***	167.60***	103.75***	225.94***	245.32***

Notes: coefficients are unstandardized Poissoncoefficients

VCE robust standard errors in parantheses; DV in Model 6: Sum of Battle Related Deaths

** p< 0.09, ** p < 0.05, *** p < 0.01*

Table 28: Negative Binomial Model without Outliers and Influential Observations

		Negative Binomial Model						
Battle Related Deaths (low estimates)		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
PMSCs		1.28**	1.06**	.73**	1.05**	.63*	.63*	1.89***
		(.55)	(.41)	(.36)	(.42)	(.32)	(.32)	(.50)
Natural Resources								
	Gemstones	.88**	.53					.53
		(.40)	(.31)					(.36)
	Drugs			-.20				-.51
				(.36)				(.51)
	Hydrocarbons				.70*			.96**
					(.39)			(.44)
	All Types					-.04	-.04	-.39
						(.51)	(.51)	(.70)
Interaction Term								
	PMSC x G	-.84	-.92					-.92
		(.72)	(.55)					(.65)
	PMSC x D			-.40				-.58
				(.60)				(.89)
	PMSC x H				-.71			-1.19
					(.60)			(.74)
	PMSC x GDH					-.08	-.08	1.41
						(.69)	(.69)	(1.11)
GDP (log)		-.33*	-.32*	-.34**	-.48**	-.31*	-.31*	-.55***
		(.18)	(.16)	(.17)	(.19)	(.17)	(.17)	(.18)
Population (log)		-.15	-.12	-.08	-.17	-.12	-.12	-.10
		(.12)	(.10)	(.10)	(.12)	(.13)	(.13)	(.13)
Political Regime		-.09**	-.06**	-.04	-.05*	-.05*	-.05*	-.03
		(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)
Ethnic Fractionalization		-.78	-.51	-.45	-.46	-.36	-.36	-.32
		(.93)	(.73)	(.74)	(.74)	(.75)	(.75)	(.75)
Ethnic Polarization		-1.54***	-1.44***	-1.62***	-1.47***	-1.60***	-1.60***	-1.37***
		(.48)	(.36)	(.36)	(.37)	(.36)	(.36)	(.37)
Cold War		.16	-.21	-.19	-.09	-.15	-.15	-.28
		(.46)	(.29)	(.29)	(.28)	(.29)	(.29)	(.30)
Insurgency		-.03	-.05	-.04	-.08	-.05	-.05	-.05
		(.07)	(.05)	(.06)	(.06)	(.06)	(.06)	(.06)
Conflict Duration		.06**						
		(.02)						
Conflict Duration (log)			.50***	.51***	.54***	.51***	1.51***	.07***
			(.14)	(.14)	(.15)	(.14)	(.14)	(.02)
Inequality		-.00						
		(.00)						
_cons		11.50***	10.97***	10.84***	12.47***	10.99***	10.99***	11.64***
		(2.61)	(2.07)	(2.07)	(2.47)	(2.36)	(2.36)	(2.51)
Observations		77	118	118	118	120	120	118
LR chi2		49.46***	59.08***	56.76***	58.86***	55.44***	121.73***	63.25***
/lnalpha		.37	.47	.48	.47	.51	.51	.44
		(.14)	(.11)	(.11)	(.11)	(.11)	(.11)	(.11)
alpha		1.45	1.60	1.62	1.60	1.66	1.66	1.56
		(.20)	(.18)	(.18)	(.18)	(.18)	(.18)	(.17)
Likelihood-Ratio Test		7.3e+04***	1.1e+05***	1.2e+05***	1.2e+05***	1.2e+05***	9.8e+05***	1.1e+05***

Notes: coefficients are unstandardized negative Binomialcoefficients
Standard errors in parantheses; DV in Model 6: Sum of Battle Related Deaths
** p < 0.09, ** p < 0.05, *** p < 0.01*
without outliers and influential observations

Panel Analysis – Robustness Tests

Table 29: Fixed-Effects Model – Battle Related Deaths (high estimates)

	Panel Model							
Battle Related Deaths (high estimates)		**Model1**	**Model2**	**Model3**	**Model4**	**Model5**	**Model6**	**Model 7**	**Model 8**
PMSCs		.19		-.42		-.06		-.58	
		(.22)		(.55)		(.51)		(.49)	
	Lagged		.70**		-.32		.15		
			(.26)		(.46)		(.28)		
PMSCs (Number)								.17**	
								(.09)	
	DV = 1								-.42
									(.45)
	DV > 1								.36
									(.25)
Natural Resources									
	Drugs	.25*	.19			.52**	.44**		
		(.14)	(.15)			(.19)	(.20)		
	Hydrocarbons			2.39**	2.25**	2.29**	2.09**		
				(.93)	(.94)	(.87)	(.92)		
Interaction Term									
	PMSC x D	-2.87***				-2.11***			
		(.44)				(.73)			
	PMSC x H			.74		.31			
				(.54)		(.51)			
	PMSC(lag) x D		-3.30***				-2.17***		
			(.41)				(.56)		
	PMSC(lag) x H				1.23**		.69		
					(.57)		(.46)		
GDP (lag)		.09	.19	.21	.33**	.17	.29*	.14	.14
		(.16)	(.16)	(.15)	(.16)	(.15)	(.17)	(.16)	(.16)
Population (lag)		-.91	-1.43*	-3.61**	-4.15**	-3.40**	-3.82**	-1.13	-1.06
		(.73)	(.73)	(1.51)	(1.51)	(1.43)	(1.44)	(.79)	(.77)
Political Regime		.08**	.07**	.07**	.06	.06**	.06**	.09**	.09**
		(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)
Cold War		.16	.14	.17	.15	.06	.06	.23	.24
		(.29)	(.31)	(.35)	(.35)	(.31)	(.32)	(.33)	(.33)
Conflict Duration (log)		.07	.21	.54	.67*	.44	.56*	.07	.05
		(.27)	(.28)	(.38)	(.38)	(.33)	(.32)	(.29)	(.29)
Observations		243	243	243	243	243	243	246	246
Wald chi2 (robuste version)		1.7e+15***	1.4e+12***	3.0e+11***	1.2e+11***	1.1e+14***	3.7e+15***	102.38***	111.77***

Notes: coefficients are Poissoncoefficients (fixed-effects model)

Robust standard errors as reommended by Wooldridge (1999) in parentheses

** p < 0.09, ** p < 0.05, *** p < 0.01*

Table 30: Fixed-Effects Model – Battle Related Deaths (best estimates)

	Panel Model							
Battle Related Deaths (best estimates)		**Model1**	**Model2**	**Model3**	**Model4**	**Model5**	**Model6**	**Model 7**	**Model 8**
PMSCs		-.12		-.77		-.25		-.42	
		(.34)		(.56)		(.61)		(.46)	
	Lagged		.91**		-.32		.19		
			(.45)		(.41)		(33)		
PMSCs (Number)								-.01	
								(.10)	
	DV = 1								-.71
									(.46)
	DV > 1								-.18
									(.39)
Natural Resources									
	Drugs	.18	-.12			.40**	.16		
		(.21)	(.38)			(.19)	(.32)		
	Hydrocarbons			3.25**	3.80***	2.88***	3.38***		
				(1.04)	(.87)	(.85)	(.73)		
Interaction Term									
	PMSC x D	-2.98***				-2.21**			
		(.45)				(.79)			
	PMSC x H			.86		.27			
				(.62)		(.71)			
	PMSC(lag) x D		-3.65***				-2.09***		
			(.68)				(.51)		
	PMSC(lag) x H				1.57***		.97*		
					(.48)		(56)		
GDP (lag)		.19	.46	.31	.63**	.26	.59*	.14	.20
		(.17)	(.27)	(.18)	(.31)	(.18)	(.32)	(19)	(.18)
Population (lag)		1.51	.65	-1.78	-3.47**	-1.27	-2.85	1.27	1.23
		(1.00)	(1.01)	(1.66)	(1.67)	(1.41)	(1.48)	(1.09)	(1.07)
Political Regime		.10**	.07	.09**	.06	.08**	.05	.12***	.12***
		(.04)	(.05)	(.04)	(.04)	(.04)	(.04)	(.04)	(.03)
Cold War		-.06	.09	.00	.08	-.15	-.01	.03	.02
		(.14)	(.22)	(.22)	(.17)	(.18)	(.14)	(.21)	(.20)
Conflict Duration (log)		-.42	-.11	.11	.53	.01	.43	-.48	-.46
		(.39)	(.36)	(.51)	(.56)	(.47)	(.53)	(.39)	(.39)
Observations		137	137	137	137	137	137	137	137
Wald chi2 (robuste version)		2.8e+17***	-2.1e+15	1.6e+15***	1.2e+14***	1.3e+14***	-1.1e+17	41.81***	144.60***

Notes: coefficients are Poisson coefficients (fixed-effects model)

Robust standard errors as reommended by Wooldridge (1999) in parentheses

** p < 0.09, ** p < 0.05, *** p < 0.01*

3. Appendix to Chapter 6

Table 31: Sample Selection Criteria – Afghanistan

Afghanistan		
25 biggest cities	***PRT locations****	***Transport routes*** **
Kabul (Kabul)	Kabul (Kabul)	Meydan Shahr (Wardak)
Kandahar (Kandahar)	Kandahar (Kandahar)	Ring Road: Kabul-Kandahar Baraki (Lowgar)
Herat (Herat)	Herat (Herat)	Ring Road: Kabul-Kandahar Muqur (Zabul)
Mazar-e Sharif (Balkh)	Mazar-e Sharif (Balkh)	Ring Road: Kabul-Kandahar Delaram (Nimruz)
Jalalabad (Nangarhar)	Jalalabad (Nangarhar)	Ring Road: Kandahar-Herat Shindand (Herat)
Kunduz (Kunduz)	Kunduz (Kunduz)	Ring Road: Kandahar-Herat Dowshi (Baghlan)
Balkh (Balkh)	Feyzabad (Badakhshan)	Ring Road: Kabul-Sheberghan Spin Buldak (Kandahar)
Baghlan (Baghlan)	Qal'eh-ye Now (Badghis)	International Link: Pakistan Islam Qal'ah (Herat)
Meymaneh (Faryab)	Meymaneh (Faryab)	International Link: Iran
Ghazni (Ghazni)	Ghazni (Ghazni)	
Ghowrian (Herat)	Chaghcharan (Ghowr)	
Khanabad (Kunduz)	Lashkar-Gah (Helmand)	
Taloqan (Takhar)	Tarin Kot (Uruzgan)	
Paghman (Kabul)	Qalat / Qalat District (Zabul)	
Sheberghan (Jowzjan)	Sheberghan (Jowzjan)	
Pol-e Khomri (Baghlan)	Pol-e Khomri (Baghlan)	
Charikar (Parwan)	Nuristan (Nuristan)	
Aqchah (Jowzjan)	Khost (Khost)	
Andkhvoy (Faryab)	Sharan (Paktika)	
Farah (Farah)	Farah (Farah)	
Bagram (Parvanl)	Bagram (Parvanl)	
Gardiz (Paktia)	Asadabad (Kunar)	
Towraghondi (Herat)	Mehtar Lam (Laghman)	

Notes: Provinces in parentheses

Database: Population Statistics World Gazetteer 2011, BBC News Iraq Key Maps 2011, ISAF NATO Placemats 2011, AIB: Afghanistan Transport Routes 2003

** There were 28 Provincial Reconstruction Teams (PRTs) in Afghanistan. Four PRT locations (Bamyan,Panjshir, Wardak, and Logar) are missing in the dataset*

*** The Road Transport Infrastructure comprises four „Ring Roads" and seven „International Links": Ring Roads: 1) Kabul-Kandahar, 2) Kandahar-Herat, 3) Herat-Sheberghan, 4) Kabul-Sheberghan International Links: 1) Pakistan: Kabul-Torkham, 2) Pakistan: Kandahar-Spin Buldak, 3) Tajikistan: Pol-e Khomri-Shir Khan, 4) Usbekistan: Naibabad-Hairatan, 5) Iran: Herat-Islam Qal'ah, 6) Turkmenistan: Herat-Torghundi, 7) Turkmenistan: Andkhoy-Aquina. Only cities available in the WITS dataset, were included in the analysis.*

Table 32: Sample Selection Criteria - Iraq

Iraq	
25 biggest cities	***Refinerey locations******
Baghdad (Baghdad)	Bayii (Salah ad Din)
Mosul (Ninawa)	Mosul (Ninawa)
Al Basrah (Al Basrah)	Al Basrah (Al Basrah)
Arbil (Arbil)	Hadithah (Al Anbar)
Kirkuk (At Tamim)	Kirkuk (At Tamim)
An Najaf (An Najaf)	An Nasiriyah (Di Qar)
As Sulaymaniyah (As Sulaymaniyah)	As Samawah (Al Mutanna)
Al Hillah (Babil)	
Karbala (Karbala)	
Al'Amarah (Maysan)	
Ad Diwaniyah (Al Qadisiyah)	
Ba'qubah (Diyala)	
Al Fallujah (Al Anbar)	
Ar Ramadi (Al Anbar)	
Al Kut (Wasit)	
An Nasiriyah (Di Qar)	
Dahuk (Dahuk)	
Tall'Afar (Ninawa)	
As Samawah (Al Mutanna)	
Tikrit (Salah ad Din)	
Samarra (Salah ad Din)	
Ar Rashidiyah (Baghdad)	
Al Mahmudiyah (Baghdad)	

Notes: Provinces in parentheses

Database: Population Statistics World Gazetteer 2011, BBC News Iraq Key Maps 2011, ISAF NATO Placemats 2011, AIB: Afghanistan Transport Routes 2003

** There are eight refineries in Iraq. Only locations available in the WITS dataset were included*

Missing location: Al Dawarah

Table 33: Insecurity Events Afghanistan

Afghanistan

Event	***Date***	***Fatalitites***	***Location(s)***
Event 1	June 1, 2005	21	Kandahar
Event 2	August 28, 2006	22	Lashkar Gah
Event 3	February 27, 2007	23	Kandahar, Bagram
Event 4	June 30, 2007	44	Lashkar Gah
Event 5	[June 29, 2007]		
Event 6	November 6, 2007	79	Pol-e Khomri
Event 7	February 17, 2008	100	Kandahar
Event 8	[February 15, 2008]		
Event 9	February 18, 2008	37	Spin Buldak
Event 10	February 2, 2009	25	Tarin Kot District
Event 11	September 2, 2009	24	Mehtar Lam, Sheberghan
Event 12	November 20, 2009	25	Farah
Event 13	March 13, 2010	35	Kandahar
Event 14	[March 12, 2010]		

Control Sample

Event	***Date***	***Fatalitites***	***Location(s)***
Event 1	August 28, 2004	20	Naikaam, Zormat
Event 2	June 1, 2006	32	Sangin
Event 3	August 3, 2006	21	Panjva'i
Event 4	December 18, 2006	26	Panjva'i
Event 5	October 16, 2008	40	Maywand
Event 6	August 6, 2009	27	Garmsir, Qarghahi
Event 7	August 11, 2009	22	Emam Saheb, Chaparhar, Maywand, Panjva'i
Event 8	September 11, 2009	23	Chowreh, Maywand, Sabari
Event 9	September 29, 2009	30	Maywand
Event 10	January 14, 2010	20	Deh Rawud District
Event 11	June 7, 2010	22	Naveh-ye Barkaza'i, Tarin Kot District, Yosuf Khel, Mata Khan, Kher Kot, Garmsir, Orgun, Nawar
Event 12	June 10, 2010	54	Nagahan , Chahardah-ye Ghorband
Event 13	July 4, 2010	22	Nawbahar, Andar District, Teyvareh, Musa Qal'eh, Shinkay, Dahaneh-ye Ghowri
Event 14	[July 2, 2010]		
Event 15	September 18, 2010	21	Marjah, Asmar, Ajrestan, Nur Gal, Aliabad, Bughawo, Sherzad, Waghaz, Sori, Khugiani, Narkh
Event 16	[September 17, 2010]		
Event 17	October 20, 2010	24	Khash Rod District, Ab Band, Zaranj, Moqor

Notes: Database: Worldwide Incidents Tracking System

Table 34: Insecurity Events Iraq

Iraq

Event	*Date*	*Fatalitites*	*Location(s)*
Event 1	April 21, 2004	74	Al Basrah
Event 2	June 24, 2004	82	Mosul, Ba‘qubah
Event 3	February 28, 2005	126	Baghdad, Al Hillah
Event 4	August 17, 2005	79	Baghdad, Samarra‘, Mosul
Event 5	November 24, 2005	50	Baghdad, Mahmudiyah
Event 6	December 6, 2005	55	Baghdad, Tikrit, Ar Ramadi
Event 7	January 5, 2006	66	Ba’qubah, An Najaf, Ar Ramadi, Baghdad
Event 8	May 9, 2006	64	Tikrit, Baghdad, Ar Ramadi, Tall ‘Afar, Al Basrah
Event 9	July 1, 2006	85	Mosul, Baghdad, Kirkuk, Al Fallujah
Event 10	[June 30, 2006]		
Event 11	July 9, 2006	92	Baghdad, Samarra', Kirkuk, Mosul, Ba'qubah, Karbala'
Event 12	[July 7, 2006]		
Event 13	July 17, 2006	74	Al Mahmudiyah, Ba'qubah, Baghdad, Samarra'
Event 14	July 23, 2006	67	Baghdad, Kirkuk, Ar Ramadi
Event 15	[July 21, 2006]		
Event 16	August 13, 2006	73	Baghdad, Tikrit
Event 17	[August 11, 2006]		
Event 18	September 17, 2006	52	Kirkuk, Al Fallujah, Mosul, Baghdad, Ba'qubah
Event 19	[September 15, 2006]		
Event 20	December 12, 2006	86	Kirkuk, Baghdad, Ba'qubah, Mosul
Event 21	February 1, 2007	77	Al Hillah, Mosul
Event 22	February 3, 2007	147	Baghdad, Samarra', Kirkuk
Event 23	[February 2, 2007]		
Event 24	February 25, 2007	52	Baghdad, Ba'qubah, Mosul
Event 25	[February 23, 2007]		
Event 26	March 24, 2007	59	Mosul, Baghdad, Tall 'Afar, Kirkuk
Event 27	[March 23, 2007]		
Event 28	April 18, 2007	52	Al Mahmudiyah, Bayji, Mosul, Baghdad
Event 29	June 19, 2007	100	Baghdad, An Nasiriyah
Event 30	July 16, 2007	93	Baghdad, Al Fallujah, Kirkuk
Event 31	July 25, 2007	56	Karbala', Baghdad
Event 32	August 28, 2007	54	Mosul, Karbala', Baghdad
Event 33	March 6, 2008	70	Baghdad
Event 34	April 15, 2008	67	Ar Ramadi, Baghdad, Al Basrah, Ba'qubah
Event 35	December 11, 2008	55	Kirkuk
Event 36	October 25, 2009	155	Baghdad
Event 37	December 8, 2009	129	Baghdad, Al Fallujah, Mosul
Event 38	May 10, 2010	69	Al Fallujah, Baghdad, Al Hillah
Event 39	July 26, 2010	56	Baghdad, Karbala'
Event 40	August 17, 2010	64	Al Fallujah, Baghdad, Kirkuk, Mosul
Event 41	August 25, 2010	68	Baghdad, Al Kut, Ar Ramadi, Mosul, Al Fallujah, Kirkuk, Karbala'
Event 42	October 31, 2010	65	Baghdad
Event 43	[October 29, 2010]		

Notes: Database: Worldwide Incidents Tracking System

Table 35: Insecurity Events Iraq (Counter Sample)

Iraq Control Sample

Event	*Date*	*Fatalities*	*Location*
Event 1	February 10, 2004	53	Al Iskandariyah
Event 2	July 16, 2005	91	Ad Dulu'iyah, Al Musayyib
Event 3	[July 15, 2005]		
Event 4	July 29, 2005	52	Rabi'ah
Event 5	November 18, 2005	78	Khanaqin, Kan'an
Event 6	November 19, 2005	54	Abu Saydah, Al Mahawil
Event 7	[November 18, 2005]		
Event 8	July 18, 2006	59	Al Kufah
Event 9	February 24, 2007	52	Al Habbaniyah
Event 10	[February 23, 2007]		
Event 11	July 7, 2007	157	Amurli, Balad
Event 12	[July 6, 2007]		
Event 13	August 14, 2007	443	At Taji, As Suwayrah, Sinjar
Event 14	February 24, 2008	63	Al Iskandariyah
Event 15	[February 22, 2008]		
Event 16	April 17, 2008	55	Adhaim
Event 17	April 23, 2009	57	Khanaqin, Imam Ways
Event 18	June 20, 2009	82	Taza Khurmatu
Event 19	[June 19, 2009]		
Event 20	March 26, 2010	59	Al Khalis

Notes: Database: Worldwide Incidents Tracking System

Table 36: Sample Companies' Contracts in Afghanistan and Iraq (2004 – 2010)

Parent Company	ArmorGroup International Inc. / G4S Risk Management (London-based) Listed December 9, 2004 and delisted June 6, 2008; acquired by G4S Anglo-Danish Logistics and Service Concern G4S (since 2008)
	Afghanistan
Contracts	
2007	Contract to guard the US embassy as well as providing catering and laundry facilities for 1,000 diplomats/staff in Kabul Potential revenue: 189m annually Duration: until July 2010; renewed in August 2009 Contracting Partner: US State Department Background: EOD Technology, Inc. (EODT) was selected to take over. ArmorGroup continued to guard the Embassy through the end of 2010. Employees: Australian, South Africas, Americans, Gurkhas, Afghans(450 at the Embassy)
	Morning Star September 4, 2009 Washington Independent September 4, 2009 The Age, Melbourne Australia, September 2009 DocuTickerNovember 3, 2010 Controlled Greed.com April 3, 2007 The Independent (London) April 3, 2007

	The Associated Press April 2, 2007
2007, January	Contract to provide security services to the UK Government (Foreign Office Diplomats) in Afghanistan Potential revenue: $38.5 million per annum Duration: January 2007 - May 2009 Contracting Partner: UK Foreign Office Background: protection of the British embassy and premises of the British Council in Kabul and various otherlocations across Afghanistan, including Kandahar and Helmand provinces; officials from theDepartment for International Development as they travel in the country. Static guard services, mobile security services and police mentoring and consultancy The initial contract, which the Group announced on 29 November 2006, was worth around $30 million per annum, but due to additional requirements agreed during the transitional process this contract has now been increased to $38.5 million per annum. Further $1 million contract to provide police mentorsand advisers in Helmand Province for at least eight months
	Morning Star December 24, 2009 Daily Post (Liverpool) April 11, 2007 Intelligence Online December 8, 2006 Daily Post (Liverpool) November 30, 2006 London Stock Exchange Aggregated Regulatory News Service (ARNS) November 29, 2006
2006	Contract to protect the premises of the World Bank
	Intelligence Online November 3, 2006
2007	(G4S) Contract to provide training to British Army units heading for Iraq and Afghanistan Contracting partner: UK Ministry of Defence
	Mail on Sunday (London) January 11, 2009
	Iraq
Contracts	
2003	Contract to guard construction sites and deal with unexploded ordnance across Iraq Contracting Partner: Bechtel
	The Guardian (London) - Final Edition September 28, 2004 International Oil Daily December 10, 2003 Scotland on Sunday September 7, 2003 Middle East Economic Digest May 9, 2003 Engineering News-Record May 5, 2003 The Business May 4, 2003
2007	(G4S) Contract to provide training to British Army units heading for Iraq and Afghanistan

	Contracting partner: UK Ministry of Defence
	Mail on Sunday (London) January 11, 2009
2009	Contract to lay on security at Baghdad airport Potential revenue: $22.5 million Background: The contract had previously been held for several years by Sabre International
	Intelligence Online November 12, 2009 Agence France Presse – English November 3, 2009
2010	Contract to clear the mines from West Qurna Phase 2 oil field (Iraq) Potential revenue: $23 million Contracting partner: Lukoil Mideast
	The Star September 20, 2010 Nefte Compass September 2, 2010 DAILY MAIL (London) August 27, 2010 The Evening Standard (London) August 26, 2010
	DYNCORP INTERNATIONAL INC. (Fort Worth, Texas-based) Listed May 4, 2006 and delisted July 7, 2010
Parent Company	Computer Sciences Corporation (until 2004) Equity fund Veritas Capital (2004-2010) Acquired by private-equity firm Cerberus Capital Management in a deal valued at $1.5 billion (since 2010)
	Afghanistan
Contracts	
2002, November	Contract to provide armed bodyguards and other security for President Karzai (starting November 2002)
	U.S. News & World Report November 4, 2002 Duluth News-Tribune April 20, 2003
2004	Contract to provide 30 senior-level police advisers directly to the Ministry of Interior. They assist with organizational reform and advise the command staff countrywide (DOS CIVPOL) Potential revenue: $1.36 billion (2010); an indefinite delivery/indefinite quantity contract managed by INL Duration: July 2004-February 2010 Contracting Partner: U.S. State Department's Bureau for International Narcotics and Law Enforcement Affairs Background: provision of basic training and update courses for all police in Afghanistan, including national police, border police and highway police at the central training center in Kabul, as well as six regional training centers. The U.S. supports Germany, which is the lead nation in this international effort. They all work with the Afghan Ministry of Interior.

This initial contract was replaced by a series of related contracts beginning on Aug. 15, 2005, under which DynCorptoday (2010) employs some 782 retired U.S. police officers and an additional 1,500 support staff. The contracts expired Jan.31, 2010 but have temporarily been extended till the end of March 2010.

Workforce Management June 1, 2005
UPI February 7, 2007
AFGHAN POLICE TRAINING CONTRACTS; COMMITTEE: SENATE HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS; SUBCOMMITTEE: CONTRACTING OVERSIGHT CQ Congressional Testimony April 15, 2010
IPS - Inter Press Service February 27, 2010
Business Wire December 15, 2009

2005, September

Contract to train, equip, and build the capacity of the police forces in Afghanistan

Potential revenue: $117,236,158 for the first year and $85,275,734 and $87,487,630, respectively, for two option years

Contracting partner: United States Department of State

Background: This is a follow-on award for DynCorp International, which has been training police in Afghanistan since 2003.

The training is aimed at increasing the overall ability of the National Police, Border Police, and Highway Patrol in Afghanistan to provide police presence, improve public security, and support the rule of law. The U.S. program focuses on basic-skills training for existing police and basic training for new and lower-ranked police. It also provides equipment and assistance with administrative reform. The training, to be held in centers throughout the country, consists of basic policing skills, policing in a democracy, and developing trainers among experienced Afghan police officers. Subjects include first aid, human rights, establishing and protecting crime scenes, traffic control, evidence chain-of-custody, investigations, interviewing techniques, treatment of suspects, applicable laws, and defensive tactics. The contract also calls for the development and repair of facilities and provision of equipment and supplies for the Afghan police.

Business Wire September 7, 2005

2007, August

Contract for general construction in Afghanistan. One of five indefinite delivery-indefinite quantity (IDIQ) contracts

Potential revenue: $1.8 billion for all awardees over the contract's lifetime, not to exceed $600 million per year

Duration: one base year and two option years

Contracting Partner: U.S. Army Corps of Engineers, Transatlantic Command

Business Wire August 15, 2007

2007, November 24	Contract for the design and construction of an Afghan National Army Garrison (Jalalabad) Potential Revenue: $49,222,081 firm-fixed-price Expected to be completed by Oct. 13, 2009 Contracting Partner: The U.S. Army Corps of Engineers (W917PM-08-C-0009)
	Defense Department Documents and Publications December 5, 2007
2008, March	Contract to build facilities in Afghanistan Potential revenue: $30.3 million Duration: work will begin this month and take about 300 days to complete Contracting partner: U.S. Army Corps of Engineers Background: The project will include a range of facilities to accommodate up to 4,000 Afghan National Army troops, including barracks, dining halls, classrooms, wastewater systems, a road network and maintenance facilities
	The Associated Press March 6, 2008 Business Wire March 6, 2008 FinancialWireMarch 6
2008, May	Contract to construct a police facility in eastern Afghanistan. Contract partner: U.S. Army Corps of Engineers Potential revenue: $13.1 million Expected to be completed in under a year Background: DynCorp will design and build the Bermel border police facility near Afghanistan's border with Pakistan. The announced contract is part of an Army Corps of Engineers Afghanistan general construction deal. The $13.1 million award adds to the approximately $120 million in general construction contracts DynCorp is currently working on in Afghanistan
	UPI May 28, 2008
2008, July	Construction project in Kunduz, Afghanistan (Kunduz II project) Contracting partner: U.S. Army Corps of Engineers, Afghanistan Engineering District Potential revenue: $23.2 million.If all contract options are exercised, the Kunduz II project has a potential value of more than $43 million. Background: It is the second phase of work already under way in Kunduz to support the Afghan National Army. Kunduz II will enhance support capabilities of the garrison facilities that DynCorp International is designing and building under the first contract award.

	Once completed, the two projects will provide a full range of facilities to accommodate ANA troops, including infantry barracks, dining areas, classroom/training areas, power, water, wastewater systems, a road network, maintenance facilities, and fuel storage/handling. This follows previous U.S. Army Corps of Engineers awards to DynCorp International for construction in Jalalabad,Bermel, and the first phase of work in Kunduz.
	Business Wire July 16, 2008 UPI July 17, 2008
2008, August 7	Contract for construction of Afghanistan National Army Gamberi Brigade Garrison, phase two Potential revenue: $40,007,184 firm fixed price Expected to be completed by Jun. 8, 2009 Contracting partner: Corpsof Engineers, Afghanistan District, Kabul, Afghanistan (W917PM-08-C-0076)
	Defense Department Documents and Publications August 8, 2008
2008, August 17	Construction project supporting the Afghanistan National Civil Order Police in Garmser, Partika/Helmand ? Potential revenue: $18.1 million firm fixed price Expected to be completed in a period of 360 days / Aug 15, 2009 Contracting partner: U.S. Army Corps of Engineers, Afghan Engineering District (W917PM-07-D-0014) Background: The project will provide offices, living and operational facilities, motor pool, guard towers and a perimeter wall for 305 police personnel with the Patrol Unit Brigade Headquarters and Patrol Battalion in Garmser, Helmand Province, Afghanistan. This firm, fixed-price task order is the second to DynCorp International under the U.S. Army Corps of Engineers indefinite delivery/indefinite quantity contract for general construction in Afghanistan. The award is the latest in a series of construction projects in Afghanistan managed by DynCorp International thatinclude the Afghanistan National Army garrisons in Jalalabad and Kunduz.
	Defense Department Documents and Publications August 26, 2008 Business Wire August 26, 2008 FinancialWireAugust 26, 2008
2008, April	Contract to provide food, shelter and other services to U.S. troops overseas, including in Iraq and Afghanistan Potential Revenue: $150 billion Duration: 10 years Contracting partner: U.S. Army

	Background: Contract awarded to KBR Inc., DynCorp International Inc. and Fluor Corp.
2009, July	The Associated Press April 17, 2008 US Fed News April 17, 2008 Defense Department Documents and Publications April 18, 2008 Contract to provide a wide range of support services to U.S. troops in Afghanistan. Potential revenue: $3 billion Estimated completion date July 1, 2010 Contracting partner: US Army (W52P1J-07-D-0007) Background: The task orders, worth $1.5 billion each, were awarded as part of the next phase of the Army's Logistics Civil Augmentation Program, or Logcap IV. Combined, the two contracts could ultimately be worth up to $15 billion, or $7.5 billion each, if the Army opts to extend each pact for another four years.
2010, February	TendersInfoJuly 18, 2009 States News Service July 14, 2009 Targeted News Service July 14, 2009 Defense Department Documents and Publications July 9, 2009 Associated Press The Washington Post July 9, 2009U Contract to assist the Combined Security Transition Command-Afghanistan (CSTC-A) and NATO Training Mission (NTM) by providing mentors and trainers to develop the Afghanistan Ministry of Defense (MOD.) Contracting Partner: U.S. Army Research, Development and Engineering Command (RDECOM) (W91CRB-10-C-0030). Potential revenue: $232.4 million cost-plus-fixed fee if the one year option period is exercised. Duration: a 2-year base period valued at $157.8 million, including a 60-day Phase-In period to full performance. Estimated completion date of Apr. 13, 2013. Background: Under this Afghanistan Ministry of Defense Program Support contract, DynCorp International will provide dedicatedin-depth mentoring, training, subject matter expertise, and programmatic support to CSTC-A staff and the Afghanistan MOD. The program supports development of organizational capacity and capability to assist Afghanistan MOD andAfghan National Army (ANA) forces in assuming full responsibility for their own security needs. DynCorp International will provide an estimated 275 qualified personnel to support the CSTC-A staff across numerous functionalareas.
	Defense Department Documents and Publications February 19, 2010 Business Wire February 17, 2010

	UPI February 18, 2010 Iraq
Contracts	
2004	Contract to establish and staff training centers for Iraqi police officers in Baghdad and Jordan Potential revenue: $50 million Contracting Partner: State Department / U.S. Justice Department
	Copley News Service July 18, 2004 Policy Papers May 28, 2004
2004, February 18	Contract to provide training services for international police liaison in Iraq Potential revenue: $1.8 billion Duration: for a base year and four one-year options Background: As part of this contract, DoS issued task order number 0338, with a not-to-exceed value of $188.7 million in June 2004, to DynCorp for an initial 3-month period to provide: training services for international police liaison officers; training support equipment; construction of a residential camp on the Adrian Palace grounds in Baghdad to house training personnel; and construction of five regional camps at selected locations in Iraq. As of October 14, 2006, INL authorized, and DoS paid DynCorp $150.8 million for work performed through May 2006 under Task Order 0338.
	CONTRACTING OUT BY DEPARTMENT OF DEFENSE CQ Congressional Testimony May 10, 2007
2007, March	Contract to provide translation and interpretation services Duration: five-year Potential revenue: $4.65 billion Contracting partner: U.S. Army, Intelligence and Security Command (INSCOM) Background: DynCorp will handle the contract through a joint venture formed with McNeil Technologies called Global Linguistic. They will employ up to 6,000 locally-hired translators and up to 1,000 United States citizens with security clearances who are native speakers of languages spoken in Iraq
	The Associated Press December 18, 2006 M2 PresswireDecember 18, 2006 MarketWatchDecember 18, 2006 Defense Daily December 19, 2006 The Associated Press December 7, 2007 Business Wire December 7, 2007 FinancialWireDecember 7, 2007
2007/2008	Logistics services contract to provide field service representatives (FSRs) and

	operator/trainers for and the initial deployment of Mine Resistant and Ambush Protected (MRAP) vehicles to Iraq and the continuing testing of MRAP vehicles in the continental United States Potential Revenue: $18 million for one year / 60 million / $500 million overfive years Contracting Partner: International Military and Government (IMG) LLC, a division of Navistar International Background: DynCorp International will provide an initial increment of 69 FSRs under this funding.
2008, April	Business Wire December 5, 2007 UPI May 30, 2008 Contract to provide food, shelter and other services to US troops overseas, including in Iraq and Afghanistan Potential Revenue: $150 billion Duration: 10 years Contracting partner: U.S. Army Background: Contract awarded to KBR Inc., DynCorp International Inc. and Fluor Corp.
2008, November 1	The Associated Press April 17, 2008 US Fed News April 17, 2008 Defense Department Documents and Publications April 18, 2008 Contract for education and training services; up to 128 Senior Level positions for Mentors and Advisors Potential revenue: $99 million Duration: Basic indefinite delivery/indefinite quantity (IDIQ) contract, includes a base period plus one option year Contracting partner: US Department of Defense / U.S. Army's Joint Contracting Command, Baghdad Background: DynCorp will assist the Multi-National Security Transition Command-Iraq (MNSTC-I). MNSTC-I is responsible for providing advisors and mentors to the Iraqi Ministries of Defense and Interior. These Ministries control the Iraqi military and police forces.
2009, June 15 / September 4	Business Wire November 5, 2008 Targeted News Service October 30, 2008 US Fed News October 29, 2008 Contract to provide aviation and aviation support services Potential revenue: $915 million if all options are exercised Duration: task order is awarded for a base year plus four one-year options

Contracting partner: U.S. Department of State / Bureau of Diplomatic Security's Worldwide Personal Protective Services

Background: This task order is under the Worldwide Personal Protective Services (WPPS) contract with the U.S. Department of State Bureau of Diplomatic Security to provide protective security for U.S. diplomatic personnel. Under the task order, DynCorp International will provide personnel, ground and flight operations, basing and maintenance of rotary wing and fixed air assets.

UPI June 16, 2009
The Washington Post June 16, 2009
Business Wire June 15, 2009
RTT News (United States) June 15, 2009

Garda World Security Corporation (Montreal-based)

Relevant purchases

November 2005

Virginia-based Vance International Investigations and Bodyguard Services from holding SPX Corp. (NYSE:SPW)

Price: $67.25-million

Annual sales: $155-million

December 2006

London-based Kroll Security International from holding Marsh & McLennan Companies, Inc. (NYSE: MMC)

Price (estimated): $17-million range

Annual sales: $42-million.

February 2007

GSS Global, a British investigation and security company

Ottawa Citizen June 4, 2007
The Toronto Star December 8, 2007
Canadian Press NewsWire November 28, 2005
The Globe and Mail (Canada) November 29, 2005
Canadian Press NewsWire September 21, 2006
The Gazette (Montreal) September 12, 2006
The Globe and Mail (Canada) November 29, 2005
Globeandmail.com December 7, 2006
The Associated Press December 7, 2006

Afghanistan

Contracts

2005

Contract to provide security advice and logistical support during the 2005

	Afghan parliamentary elections. Contracting partner: United Nations
	The Gazette (Montreal) November 22, 2007
	Iraq
Contracts	
2009, December	Contract to provide security for British diplomats in Iraq Potential revenue: US$100-million Duration: three-year contract Contracting partner: United Kingdom's Foreign Commonwealth Office
	National Post's Financial Post & FP Investing (Canada) December 12, 2009 Canwest News Service December 11, 2009 Friday National Post's Financial Post & FP Investing (Canada) October 23, 2010 Canwest News Service October 22, 2010 Intelligence Online September 23, 2010 The Gazette (Montreal) May 29, 2010
	Military Professional Resources Incorporated (MPRI)
Parent Company	L-3 Services, Inc (since July 2003)
	Afghanistan
Contracts	
2002/2005	Support of the US military for the training of the Afghan National Security Forces
	Testimony of Richard C. Nickerson (Program Manager MPRI) before the Commission on Wartime Contracting in Iraq and Afghanistan. Hearing on Afghan National Security Forces Training Contracts. Friday, December 18, 2009
2010	Contract for the extension of mentoring and training support services for the reformation of the Afghanistan Ministry of Interior and Afghan National Police Potential revenue: $32,241,459 / $53,003,000 / $7,400,000 time-and-material contract Estimated completion date Oct. 31, 2010 Contracting partner: Research Development and Engineering Command Contracting Center, Aberdeen Proving Ground (W91CRB-05-D-0014).
	Targeted News Service May 5, 2010 Defense Department Documents and Publications May 3, 2010 IPR Strategic Business Information Database May 4, 2010 Defense Department Documents and Publications September 9, 2010
2010, December 9	Potential revenue: $156,051,487 cost-plus-fixed-fee contract Estimated completion date Dec. 10, 2011. Contracting partner: U.S. Army Research, Development and

Engineering Command Contracting Center, Aberdeen Proving Ground (W91CRB-08-D-0049)

Background: This award will embed former law-enforcement professionals into corps, division, brigade, regimental and battalion headquarters to assist commanders with enhanced expertise to penetrate and suppress criminal networks and their employment of improvised explosive devices throughout Operation New Dawn, Operation Enduring Freedom, and other overseas contingency operations. Work is to be performed in Afghanistan, Iraq, and Alexandria, Va.

IPR Strategic Business Information Database December 14, 2010
Defense Department Documents and Publications December 13 2010

Iraq

Contracts

2003, June 25

Contract to train a new Iraqi army. Provide basic training at locations across Iraq to form the nucleus of a new Iraqi army

Potential revenue: $ 48 million (cost-plus-fixed-fee contract).

Expected completion date June30, 2004

Contracting partner: U.S. Army Contracting Agency Southern Region Contracting Center

Background: The contractor is required to provide eight-week basic training courses to teach basic infantry skills to selected non-commissioned officers (NCOs) and officer candidates at the company or lower level. Vinnell will use five US subcontractors on the contract: MPRI, Eagle Group International Corporation, SAIC, Omega Training Group and Worldwide Language Resources

Middle East Economic Digest July 4, 2003
PR Newswire July 2, 2003

2005, March 8

Contract to operate and maintain a military artillery range

Potential revenue: $7.4 million (firm-fixed-price contract for non-personal service, equipment, transportation, and personnel)

Expected to be completed by Dec. 31, 2005

Contracting partner: US Army's Victory Contracting Office in Baghdad

The Washington Post March 14, 2005
M2 Presswire March 11, 2005
US Department of Defense Information March 10, 2005

2005, December 13

Contract for operation and maintenance of the Butler Military Artillery Range in Baghdad

Potential revenue: $8.8 million (modification to a firm-fixed-price contract)

	Expected to be completed by Dec. 31, 2006 Contracting partner: US Army's Victory Contracting Office, Baghdad, Iraq (W27P4C-05-C-0796)
	The Washington Post December 26, 2005 US Fed News December 23, 2005 IPR Strategic Business Information Database December 22, 2005 M2 Presswire December 22, 2005
2006, October	Contract for law enforcement personnel embedded with units deploying to Iraq and Afghanistan Potential revenue $15 million Contracting partner: US Army Research, Development and Engineering Command Background: MPRI also won a $42.8 million order from the Army Contracting Agency for program development and analytical Support
	TechNews October 9, 2006 The Washington Post October 9, 2006 AFX International Focus October 3, 2006 The Associated Press October 3, 2006
2007, March 27	Contract for the Counterinsurgency Center for Excellence in Baghdad, Iraq Potential revenue: $15,313,655 firm-fixed-price contract Expected to be completed by June 15, 2010
	IPR Strategic Business Information Database April 1, 2007 US Fed News March 31, 2007
2007, April	Contract for education and training services at the Counterinsurgency Center for Excellence Potential revenue: $5 million Contracting partner: Army's Joint Contracting Command in Iraq
	The Washington Post April 16, 2007
2007, April 29	Contract for the M16/M4/M203 and the AK-47 refurbishment program in Baghdad and Taji Potential revenue: $8,153,970 firm-fixed-price contract Expected to be completed by Dec. 31, 2007 Contracting partner: The Joint Contracting Command, Baghdad, Iraq (W91GY0-07-C-0035)
	Presswire May 4, 2007 US Fed News May 4, 2007
2010, December 9	Potential revenue: $156,051,487 cost-plus-fixed-fee contract Estimated completion date Dec. 10, 2011 Contracting partner: U.S. Army Research, Development and

Engineering Command Contracting Center, Aberdeen Proving Ground (W91CRB-08-D-0049).

Background: This award will embed former law-enforcement professionals into corps, division, brigade, regimental and battalion headquarters to assist commanders with enhanced expertise to penetrate and suppress criminal networks and their employment of improvised explosive devices throughout Operation New Dawn, Operation Enduring Freedom, and other overseas contingency operations. Work is to be performed in Afghanistan, Iraq, and Alexandria, Va.

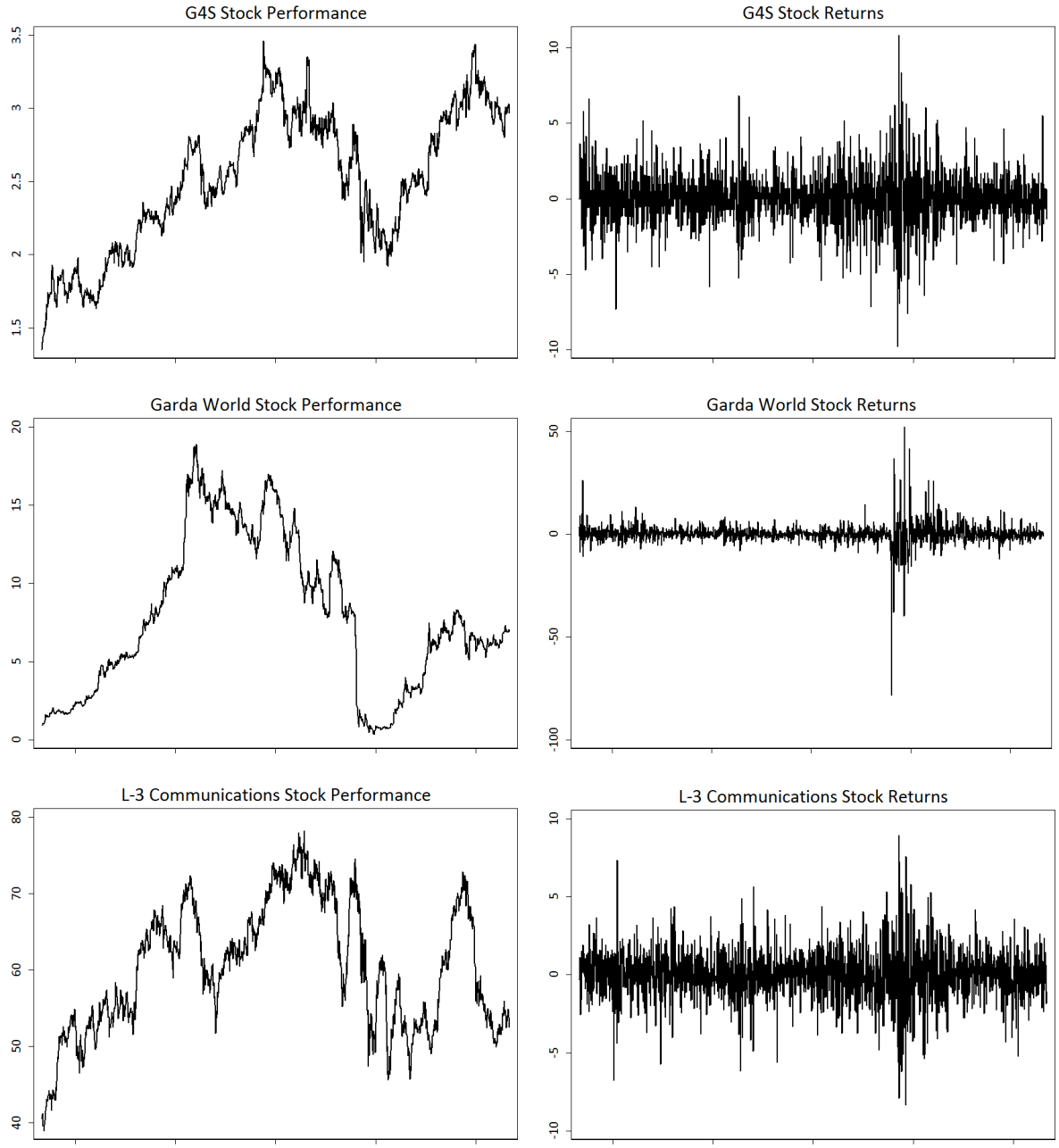
IPR Strategic Business Information Database December 14, 2010
Defense Department Documents and Publications December 13 2010

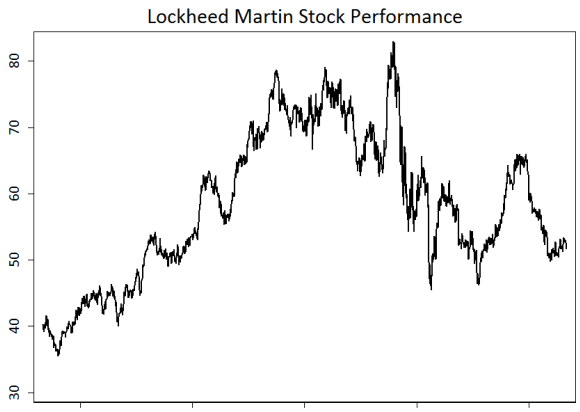
	PAE Government Services
Parent Company	Lockheed Martin
	Afghanistan
Contracts	
2006	In 2006, PAE began its support of the Afghanistan Corrections System Support Program (CSSP), on behalf of the U.S Department of State. The mission for the CSSP is to assist the Afghanistan Ministry of Justice Prison Administration in expanding Afghan capacity for the effective care, custody, treatment and rehabilitation of persons detained and incarcerated within the Afghanistan criminal justice system. PAE provides corrections training, which includes subjects such as corrections management, budgeting, records maintenance, disturbance control, prisoner transportation, inmate services, facilities design and maintenance, and probation and parole. Through the work performed on CSSP, PAE is helping to create the first professional, accountable and centralized corrections system in Afghanistan. (http://www.paegroup.com/capabilities-operations-training#civil)
2008, December 28	Contract to support the maintenance of the Afghan National Army for class IX parts Potential revenue: $60,000,000 (firm/fixed/price contract) Estimated completion date Dec. 31, 2010 Contracting Partner: Joint Contracting Command-Iraq/Afghanistan, Kabul Regional Contracting Center, Kabul (W91B4M-08-C-0009)
	IPR Strategic Business Information Database January 1, 2009 US Fed News January 20, 2009
	Iraq
Contracts	
2004, May 25	Contract for 4,000 basic firefighters to be trained in Iraq Potential revenue: delivery order amount of $ 1,676,520 as part of a $ 27,354,000 firm-fixed-price

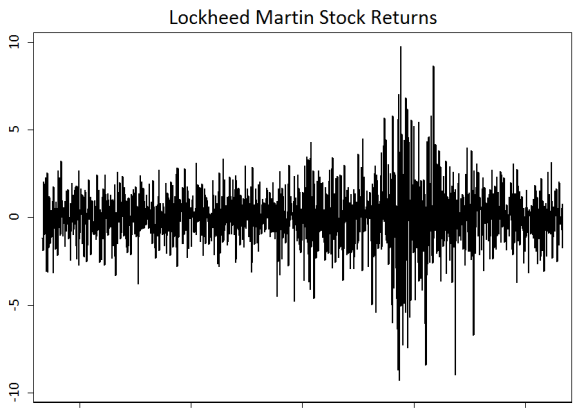
	Expected to be completed by May 24, 2006
	Contracting partner: US DoD. The Coalition Provisional Authority Contracting Activity, Baghdad (W914NS-04-D-0133)
	IPR Strategic Business Information Database May 31, 2004 M2 PRESSWIRE May 28, 2004 US Department of Defense Information May 27, 2004

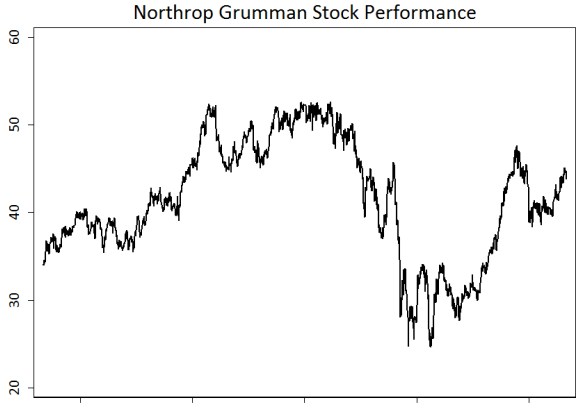
Notes: A LexisNexis search has been conducted with the keywords "name of company AND Iraq! OR Afghan!" within the time period 2004-2010 in order to get the broadest set of results (Database: LexisNexis).

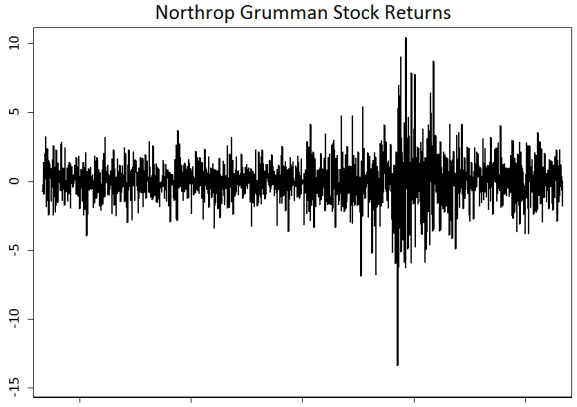
Figure 15: Stock Market and Index Performances and Returns (2004 – 2010)

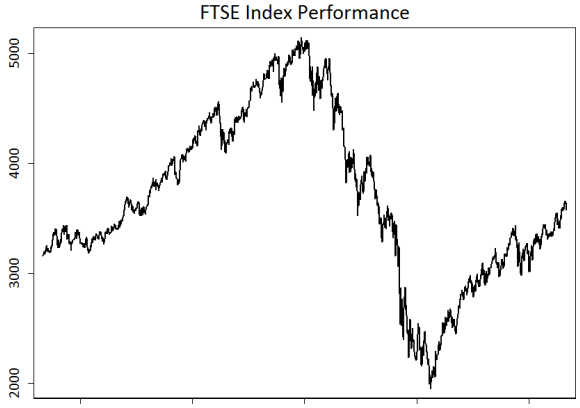


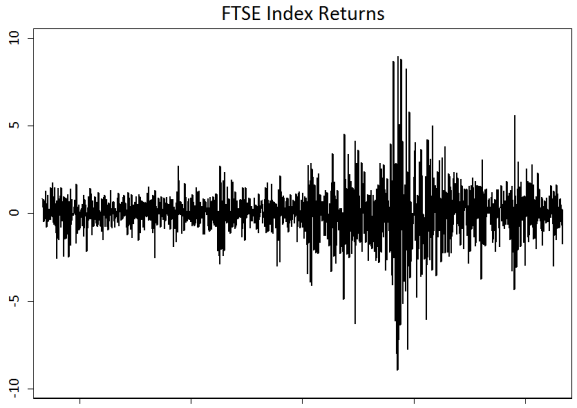

Lockheed Martin Stock Performance
30
40
50
60
70
80

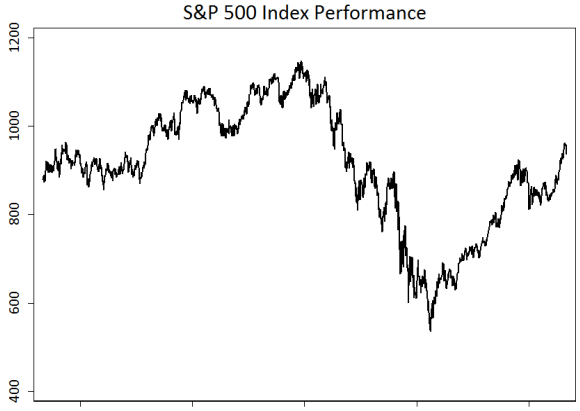

Lockheed Martin Stock Returns
-10
-5
0
5
10

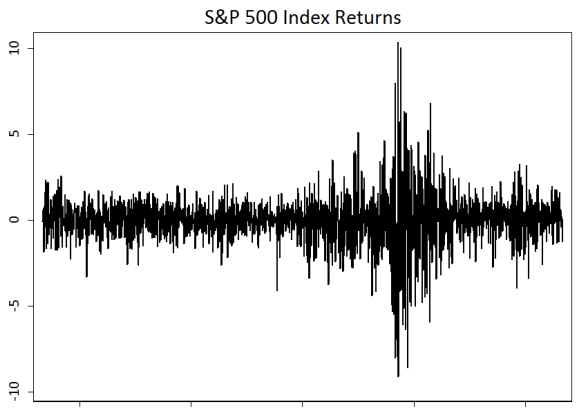

Northrop Grumman Stock Performance
20
30
40
50
60


Northrop Grumman Stock Returns
-15
-10
-5
0
5
10


FTSE Index Performance
2000
3000
4000
5000


FTSE Index Returns
-10
-5
0
5
10


S&P 500 Index Performance
400
600
800
1000
1200


S&P 500 Index Returns
-10
-5
0
5
10

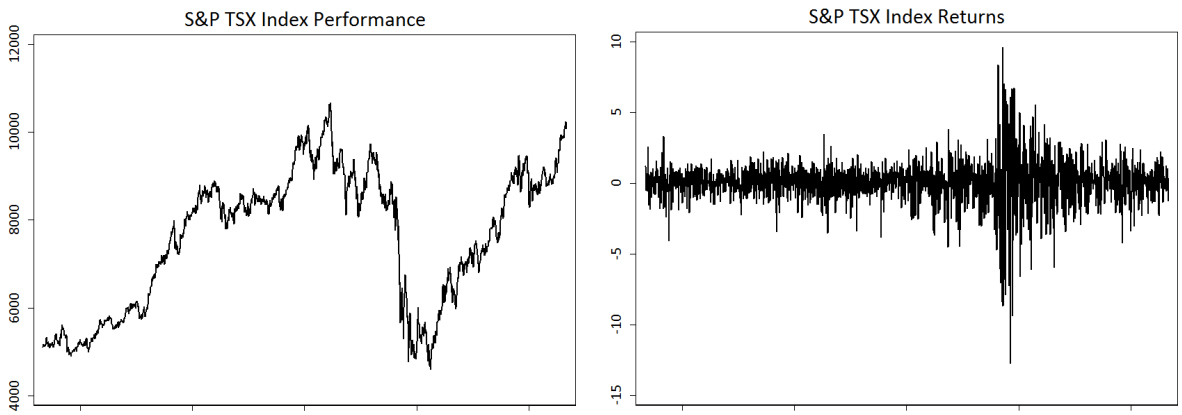
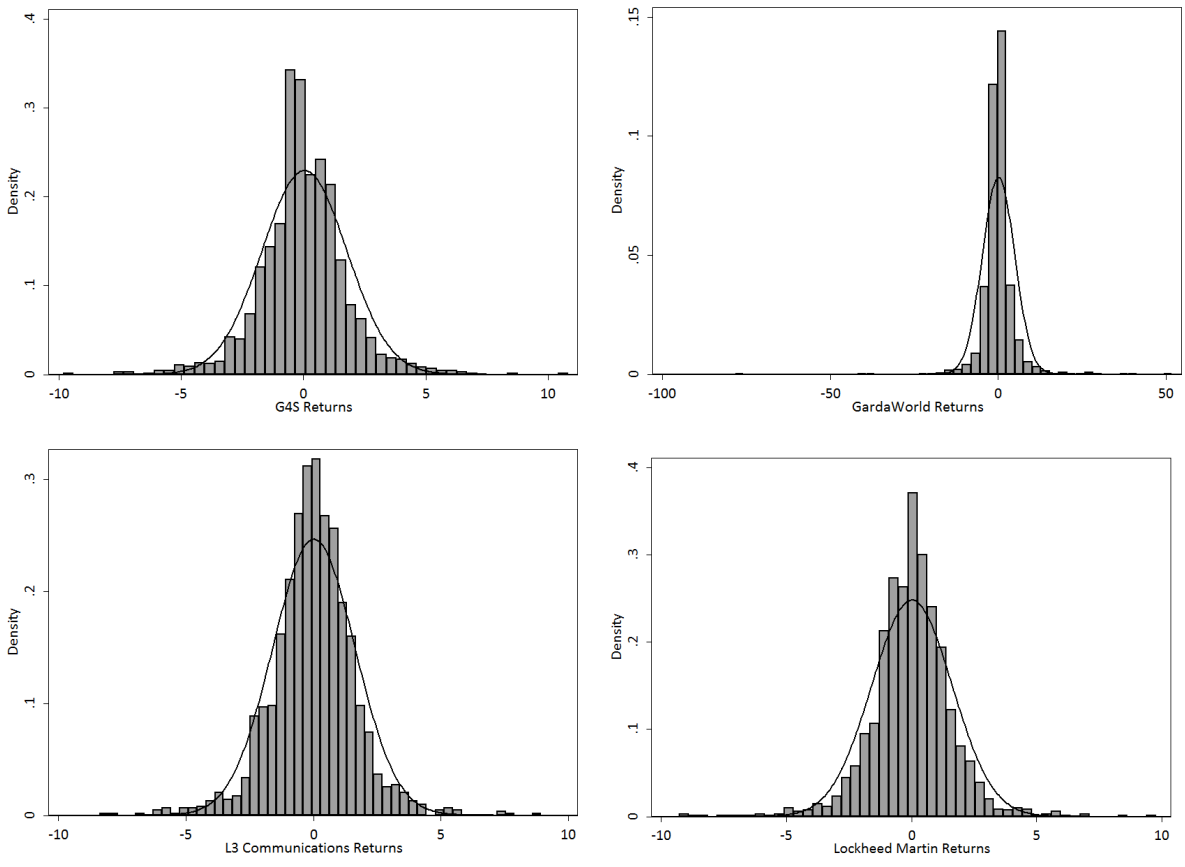


Figure 16: Distributional Characteristics of Single Stock Returns and Market Indexes Returns



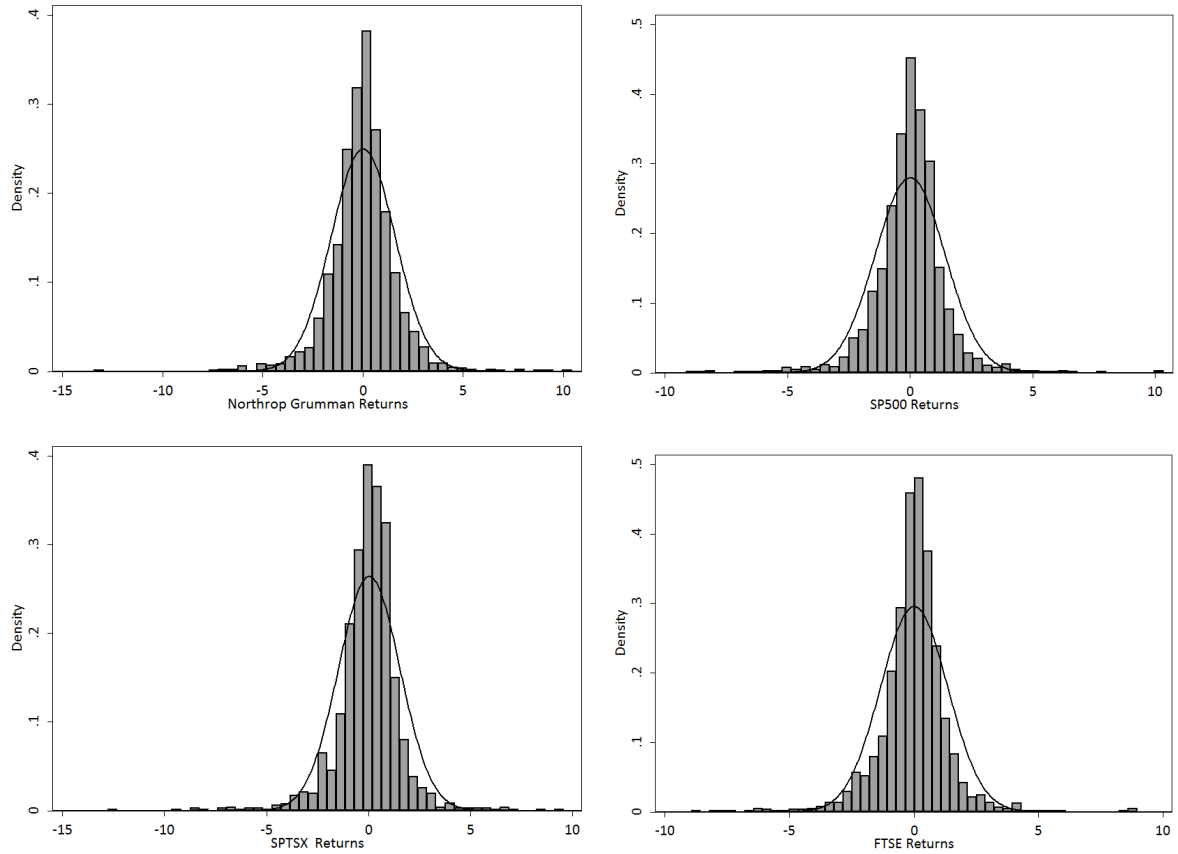


Table 37: Confounding Events Corresponding to Statistically Significant Events

Afghanistan		
Event 3: February 27, 2007	MPRI / L-3	L-3 Communications Wins $2.28 Million Contract L-3 Communications Wins $16.77 Million Contract Modification L-3 Communications Titan Wins $152,000 Contract JP Morgan downgrades Lockheed, upgrades Boeing and L-3 Communications US Fed News, February 28, 2007 M2 Presswire, February 28, 2007 Associated Press Financial Wire, February 28, 2007 AFX – Asia, February 28, 2007
	ArmorGroup	Niger Delta a Gold Mine for Private Security Firms Africa Energy Intelligence, February 28, 2007
	PAE / LM	Lockheed Martin Team Qualifies To Bid On First FAA Nextgen Program Lockheed Martin Awarded $979 Million for Aegis Ballistic Missile Defense

		U.S. Equity News: Lockheed Martin Wins UK Contract
		Space Daily, February 27, 2007 PR Newswire US, February 27, 2007 MarketWatch, February 27, 2007 M2 Presswire, February 27, 2007 Defense Daily, February 27, 2007 The Associated Press, February 27, 2007
Event 8: February 2, 2009	DynCorp	None
Event 9: September 2, 2009	Garda World	None
Event 11: March 12, 2010	G4S	Anglo-Danish G4S profit, turnover up in 2009
		SeeNews Nordic, March 16, 2010 RTT News (United States), March 16, 2010 PA Newswire: Corporate Finance News, March 16, 2010
Afghanistan Counter Sample		
Event 5: October 16, 2008	Garda World	None
	MPRI / L-3	None
Event 6: August 6, 2009	ArmorGroup	British, Australian security contractors shot dead in Iraq
		Agence France Presse – English, August 9, 2009 The Associated Press, August 9, 2009 Guardian Unlimited, August 9, 2009
Event 8: September 11, 2009	Garda World	Garda Announces Strong Second Quarter Results
		Canwest News Service, September 15, 2009 Canadian Corporate Newswire, September 15, 2009 RTT News (United States), September 15, 2009
Event 11: June 7, 2010	G4S	UK G4S enters Brazil with acquisition of Instalarme
		M&A Navigator, June 8, 2010 Nordic Business Report, June 8, 2010 SeeNews Nordic, June 8, 2010
Event 12: June 10, 2010	MPRI / L- 3	United States : Equatorial Guinea awards maritime security contract to MPRI L3 COMMUNICATIONS AWARDED CONTRACT FOR LOGISTICAL SUPPORT MILITARY $5.19 Million Federal Contract Awarded to L-3 Communications Holdings

			MILITARY $33.55 Million Federal Contract Awarded to L-3 Communications MILITARY $9.25 Million Federal Contract Awarded to L3 Communications Aerospace L-3 Unit Suspended by Air Force Over E-mail Misuse Allegations MILITARY $49,490 Federal Contract Awarded to L-3 Communications Cyterra MILITARY $98,370 Federal Contract Awarded to L-3 Communications MILITARY $100,000 Federal Contract Awarded to L-3 Communications
			TendersInfo, June 11, 2010 Professional Services Close-Up, June 12, 2010 IPR Strategic Business Information Database, June 10, 2010 Targeted News Service, June 10, 2010 Defense Daily, June 11, 2010 TendersInfo, June 11, 2010 Targeted News Service, June 11, 2010
Iraq			
Event 7: January 5, 2006	PAE / LM		Lockheed Martin Wins $99.92 Million Contract Lockheed Martin Missiles & Fire Control Wins $7.3 Million Contract Lockheed Martin Systems Integration Wins $18.72 Million Contract Modification Navy Awards Lockheed Martin $10 Million To Integrate Sensor Array Into UUV
			US Fed News, January 5, 2006 Defense Daily, January 6, 2006
Event 13: August 11, 2006	DynCorp	None	
	MPRI / L-3		L-3 Communications CyTerra Wins $34.6 Million Delivery Order L-3 Communications Titan Wins $22.71 Million Contract L-3 Communications Wins $26,230 Contract

		L-3 Communications Buying Nova Engineering For $45 Mln Cash, Plus Possible $10 Mln On Performance
		US Fed News, August 11, 2006 US Fed News, August 12, 2006 US Fed News, August 12, 2006 IPR Strategic Business Information Database, August 13, 2006 Space Daily, August 14, 2006 Midnight Trader, August 14, 2006 MarketWatch, August 14, 2006
Event 15: December 12, 2006	Garda World	Garda Reports Record Earnings for an Eleventh Consecutive Quarter Sale of Kroll Security International to Garda
		Market Wire, December 12, 2006 Market News Publishing, December 12, 2006 Canadian Corporate Newswire, December 12, 2006
Event 16: February 1, 2007	MPRI / L- 3	L-3 Communications Wins $44.6 Million Contract L-3 Communications Vertex Aerospace Wins $240,375 Contract Navy awards $15.6 million contract to L-3 Communications, worth up to $82.2M with options L-3 Communications Wins $311,697 Contract
		US Fed News, February 2, 2007 AFX International Focus, February 2, 2007 The Associated Press, February 2, 2007 US Fed News, February 3, 2007
Event 18: February 23, 2007	MPRI / L-3	L-3 Communications downgraded by Banc of America Securities
		MarketWatch, February 23, 2007 AFX International Focus, February 23, 2007
Event 19: March 23, 2007	DynCorp	DynCorp International Names New Senior Vice President DynCorp International Names Four VP-General Managers
		Business Wire, March 26, 2007 Business Wire, March 27, 2007
	Garda World	None
Event 23: July 25, 2007	ArmorGroup	None
	MPRI / L- 3	L-3 Communications Titan Wins $44,469 Contract

		L-3 Communications Q2 EPS $1.49 vs 40c L-3 Communications Wins $31,170 Contract
		US Fed News, July 26, 2007 MarketWatch, July 26, 2007 The Associated Press, July 26, 2007 US Fed News, July 27, 2007
Event 24: August 28, 2007	Garda World	None
Event 25: March 6, 2008	ArmorGroup	Takeover Panel Disclosure Table: OFFEREE: ArmorGroup International Plc, 1p ordinary ISIN: GB00B049FG32 NSI: 53,41 6,509, OFFEROR: No named offeror
		London Stock Exchange Aggregated Regulatory News Service (ARNS), March 6, 2008 London Stock Exchange Aggregated Regulatory News Service (ARNS), March 7, 2008 London Stock Exchange Aggregated Regulatory News Service (ARNS), March 10,
Event 27: December 11, 2008	Garda World	Garda Reports Strong Operational Results for the Third Quarter
		Marketwire, December 15, 2008 Market News Publishing, December 15, 2008 Canadian Corporate Newswire, December 15, 2008
Event 28: October 23, 2009	Garda World	None
Event 29: December 8, 2009	Garda World	GardaWorld Awarded $100+ Million Diplomatic Security Contract Garda World Security Turns To Profit In Q3
		Market News Publishing, December 8, 2009 Marketwire, December 8, 2009 Carleton Place, December 8, 2009 RTT News (United States), December 10, 2009 Market News Publishing, December 10, 2009 Carleton Place, December 10, 2009
Event 30: May 10, 2010	G4S	G4S MAY NEED TO LIFT DEFENCES
		DAILY MAIL (London), May 10, 2010
Event 34: October 29, 2010	G4S	SECURITY FIRM LOSES DEPORTATION CONTRACT Business - G4S wins £6m airport contract
		Press Association Mediapoint, October 29, 2010 Western Daily Press, October 30, 2010 Morning Star, October 30, 2010 The Irish News, October 29, 2010

		TendersInfo, October 30, 2010
	MPRI / L - 3	MILITARY $438,394 Federal Contract Awarded to L-3 Communications Cyterra L-3 Stratis Secures Role in U.S. Department of Transportation's Volpe Center Contract L-3 Reports Higher Operating Earnings On Flat Sales In Third Quarter MILITARY $24.64 Million Federal Contract Awarded to L-3 Communications Flight International MILITARY $100,115 Federal Contract Awarded to L-3 Communications
		Targeted News Service, October 29, 2010 Professional Services Close-Up. October 29, 2010 Defense Daily, October 29, 2010 US Fed News, October 30, 2010 Targeted News Service, October 31, 2010 Sunday Targeted News Service, November 1, 2010
Iraq Counter Sample		
Event 1: February 10, 2004	MPRI / L-3	None
Event 2: July 15, 2005	ArmorGroup	UK smallcap opening - ArmorGroup hit by FY earnings warning
		AFX.COM, July 15, 2005 Friday Citywire, July 15, 2005 The Evening Standard (London), July 15, 2005
	DynCorp	None
Event 4: November 18, 2005	PAE / LM	LOCKHEED TO BUILD MORE RAPTORS; 24 TO BE ADDED FOR $2.9 BILLION US Financial Network: Lockheed Martin Awarded Nearly $15 Million for U.S. Marine Corps Missile Defense Radar Upgrades
		The Daily News of Los Angeles, November 22, 2005 M2 Presswire, November 22, 2005
Event 6: February 23, 2007	MPRI	Niger Delta a Gold Mine for Private Security Firms STOCKWATCH L-3 Communications slides on Bank of America downgrade to 'neutral' L-3 Communications downgraded by Banc of

		America Securities JP Morgan downgrades Lockheed, upgrades Boeing and L-3 Communications	
			Africa Energy Intelligence, February 28, 2007 AFX International Focus, February 23, 2007 MarketWatch, February 23, 2007 Midnight Trader, February 23, 2007 The Associated Press, February 28, 2007 The Associated Press, February 28, 2007
Event 8: August 14, 2007	MPRI / L.3	L-3 COMMUNICATIONS HAS NAMED TWO NEW VICE PRESIDENTS. L-3 Communications Westwood Wins $53,650 Contract L-3 director Alan H. Washkowitz sells 5,000 shares L-3 Communications Holdings Inc. Loses 0.44% On Higher Volume L-3 SELECTED FOR UNITED KINGDOM PROJECT L-3 Appoints Charles F. Wald Vice President - International	
			States News Service, August 17, 2007 US Fed News, August 17, 2007 The Associated Press, August 16, 2007 FinancialWire, August 16, 2007 States News Service, August 16, 2007 Business Wire, August 14, 2007 Washington Technology, August 14, 2007
Event 9: February 22, 2008	ArmorGroup	None	
	MPRI / L-3	L-3 Communications division wins $326.3 million Navy deal for video capture Systems L-3 Communications Wins $34,350 Contract L-3 Communications Avionics Systems Wins $99,990 Contract	
			The Associated Press, February 22, 2008 US Fed News, February 22, 2008 US Fed News. February 23, 2008 FinancialWire, February 24, 2008
Event 11: April 23, 2009	G4S	None	

Notes: A LexisNexis search has been conducted with the keyword "name of company" in order to get the broadest set of results. The time period was time same time period as the event windows, withal controlling for weekends (Database: LexisNexis).