Corruption Risk in the Defence Industry Around the World: Country Level and Firm Level Antecedents

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Abstract

Anecdotal evidence indicates that corruption is rampant in the defence sector globally. Using a unique database on firm level corruption risk in the defence industry, we examine the role of country level and firm level antecedents. Among the country level factors we study are several measures of institutional quality, governance systems and legislative oversight, explicit mechanisms to control corruption and cultural factors such as power distance and uncertainty avoidance. Our empirical results confirm that these factors indeed influence firm level corruption risk. We also find that at the firm level, factors such as visibility, governance and shareholding play a significant role in affecting a firm's corruption risk. The results of our study also show that the disclosure of corruption risk is associated with the mitigation of information asymmetry and consequent increase in firm level market liquidity.

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1.0 Introduction

Corruption stories in the defence industry make regular headlines. The CEO of Italian defence company Finmeccanica was recently arrested for alleged corruption relating to the sale of helicopters to India worth €560 million.[1] According to Transparency International, the leading global organization monitoring corruption globally, the international arms trade is believed to be one of the three most corrupt businesses in the world. Stockholm International Peace Research Institute (SIPRI), the think tank committed to global security, estimates that corruption in arms trade contributes approximately 40 per cent to all corruption in global transactions. Professor Robert Neild of Cambridge University has written extensively on corruption and writes:

> "The leading arms firms in virtually every major arms-producing country have been implicated, including reputable firms from the most respectable countries."

Further, he opines that[2]:

> "Bribery in the arms trade has not subsided since the end of cold war. On the contrary, as military spending has been cut back the arms firms have been seeking markets abroad more fiercely than before… One recent estimate reckons that in the international arms trade roughly $2.5 billion a year is paid in bribes, nearly a tenth of turnover."

Companies and their managers in the defence industry face serious financial, legal, reputational consequences due to corruption. Yet, there is no comprehensive study on this important issue. We contribute to the literature by examining the determinants and consequences of firm level defence industry corruption risk using a cross-country sample drawn from 25 countries.

In this paper, we use a unique data set on defence industry anti-corruption index provided by Transparency International UK to address the following research issues. First,

[1] Source: http://www.bloomberg.com/news/2013-02-12/finmeccanica-chief-orsi-said-to-be-held-in-bribery-probe.html accessed on November 15, 2013.
[2] See Shah (2013).

we examine the impact of several crucial country level variables on firm level corruption risk in the defence industry. We include a comprehensive set of economic, political and institutional factors such as investor protection, rule of law, legal infrastructure, leadership and governance, culture, corruption level and mechanisms for control of corruption at the country level. Second, we study the effect of several firm level factors that are expected to influence corruption risk at the firm level. Among the variables we study are the size of a firm, profitability, age, managerial share ownership, block holdings, corporate governance quality, and listing status. Third, we examine the stock price reaction to the disclosure of the anti-corruption risk index by Transparency International UK. Finally, we compare the impact of disclosure of corruption risk on changes in stock market liquidity for firms with low and high anti-corruption risk.

Defence companies are in a unique situation to provide a conducive environment for sustaining corrupt practices. First, there is considerable secrecy in defence spending in many countries and this lack of transparency encourages corruption in the defence sector. Second, there is a serious agency problem in the defence industry. The senior government officials of several countries seem to act on behalf of their largest defence companies and try to push the sales of military equipment to foreign governments.[3] This implicit nexus between senior government leaders and defence firms implicitly weakens governmental oversight especially in the context of arms trade. A case in point is the British arms manufacturer BAE which was being investigated for bribing Saudi officials to buy fighter planes.[4] The *Guardian* reported that BAE gave a Saudi prince a £75 million airliner with flying expenses included as part of a British arms deal. Furthermore, the British government citing national interests scuttled the

[3] Yahoo world news quoted (February 22, 2002), Praful Bidwai, an Indian journalist who specializes on defence issues who commented on British Prime Minister, Tony Blair, "It's disgraceful that Blair should have spent more than half his time in India [during his last visit] urging India to buy the jets." (The sale of jets Bidwai is referring to is 66 British-made hawk jets, at a cost equivalent to US$1.4 billion.)

[4] http://www.theguardian.com/baefiles/page/0,,2095831,00.html

investigations undertaken by the Serious Fraud Office into BAE's alleged corruption. In the words of attorney general Lord Goldsmith, "**the rule of law** has been outweighed by a **wider public interest"[5].** Finally, the technical complexity, inherent in many arms transactions, prevents civil society and institutional watchdogs from effective oversight of transactions in the defence sector.

As a consequence of these serious impediments to effective oversight, accountability and enforcement, defence industry firms are able to engage in financial market misconduct with impunity that is often uncharacteristic in other industry sectors. These firms are often able to erect barriers to transparent oversight, avoid accountability and prevent enforcement of anti-corruption laws in force. Based on these factors we are led to believe that the effect of quality of country level institutions on firm level corruption risk will be weak in the defence industry. Our empirical tests are designed to check if in fact country level institutions are less important in checking defence industry corruption.

There is a growing interest in financial market misconduct as evidenced by a series of publications on reputational losses owing to corporate frauds (Alexander, 1999; Gande and Lewis, 2009; Karpoff and Lott, 1993; Karpoff et al., 2008, 2012; Johnson et al., 2014), misrepresentation of earnings (DuCharme et al., 2004; Chou et al., 2006, Gong et al., 2008; Cornett et al., 2008; Lee and Masulis, 2009, 2011). We extend the literature by examining a unique form of corporate misconduct – corruption – which is largely viewed as an issue plaguing developing countries with weak institutions. Our focus is on the defence industry with major players from developed countries.

We describe our contribution to the literature by outlining some of the unique aspects of our study. First, we examine corruption risk while prior studies have used corruption perceptions garnered from survey data. Corruption risk is different from actual or perceived

[5] http://www.theguardian.com/baefiles/page/0,,2098531,00.html

corruption. It represents the systems and processes in place at the firm level and signifies firm-level defences against potential occurrences of corrupt deals. Second, we use a unique database in which corruption risk is objectively measured using public disclosure of defence industry firms by a highly credible source (Transparency International) and thereby avoid perceptional biases implicit in prior studies. Third, our database includes both developed and developing countries. Prior firm level studies generally overweight developing countries where corruption is seen to be a bigger problem. Fourth, we study both country level and firm level factors to provide valuable insights into the antecedents of firm level corruption risk. Fifth, we focus on a specific industry (defence) and therefore our findings are not likely to be contaminated by factors which vary across industries. Finally, we study the impact of corruption risk disclosure on stock prices and liquidity. Prior studies have not studied the impact of corruption disclosure on liquidity.

Our empirical results which are based on 106 defence firms from 25 countries provide several valuable insights. We first examine various dimensions of country level antecedents of firm level corruption. In particular, we investigate the role of factors such as institutional quality, effectiveness of governance, explicit mechanisms to control corruption, and culture. Firms in countries with higher regulatory quality, rule of law, better law enforcement, and anti-self-dealing protection have lower firm level corruption risk. Overall, these results indicate that country level institutional quality mitigates firm level corruption risk.

Furthermore, we critically examine various aspects of country level governance that include important aspects of a country's governance such as legislative oversight. Our results show that countries with effective governments are associated with lower levels of firm level corruption risk. In particular, countries with higher levels of budget transparency have lower levels of corruption risk at the firm level. Moreover, countries with better quality oversight of intelligence services have lower levels of firm level corruption risk. Similarly, countries with

better procurement oversight face lower levels of firm level corruption risk. Our evidence is consistent with the view that countries with effective governments with strong legislative oversight are associated with lower levels of defence industry firm level corruption.

We continue our investigations by studying the role of explicit country level mechanisms to control corruption. Generally, countries with lower levels of corruption risk also have lower levels of firm level corruption risk in the defence industry. Countries with low parliamentary levels of corruption risk also face low levels of firm level corruption risk. Finally, countries with higher quality of external audit have lower levels of firm level corruption risk in the defence industry.

To conclude our country level analysis, we examine the role played by cultural factors. Our empirical results indicate that countries with high power distance have higher firm level corruption risk in the defence industry. Also, countries which score high on uncertainty avoidance also have higher firm level corruption risk in the defence industry. Furthermore, country level individualism is associated with lower levels of corruption risk. Overall, our results are consistent with the view that country level factors play a crucial role influencing firm level corruption risk in the defence industry.

We conduct firm level analysis to impart further insights into factors that are associated with corruption risk in the defence sector. Larger firms have lower levels of firm level corruption risk. Firms that are more profitable also have lower levels of firm level corruption risk. Managerial shareholding and block holding are both associated with higher levels of corruption risk. Firms that voluntarily disclose more information regarding their corruption control systems tend to have lower levels of corruption risk. Firms from major arms exporting countries also have lower levels of firm level corruption risk. Listed firms also have lower levels of firm level corruption risk. Firms with higher quality internal corporate governance features also have lower levels of firm level corruption risk. Summing

up, our results provide consistent evidence that more visible firms are likely to have reduced corruption risk.

Transparency International UK disclosed publicly the anti-corruption risk scores of firms in the defence industry on October 4, 2012. We examine the impact of this disclosure on stock prices and market liquidity. Generally, we find positive abnormal returns both for firms with high and low corruption risk. We also observe that firms experienced significant abnormal returns in the pre-event period. Firms with high corruption risk suffer negative abnormal returns while low risk firms experience positive returns. This finding points to leakage of corruption information prior to the public disclosure. Our study on changes in market liquidity shows that disclosure of anti-corruption risk reduces information asymmetry. Firms that score higher on the anti-corruption risk have higher liquidity than firms with lower scores. Furthermore, in the one-year period post disclosure, firms with higher scores experience sharper increases in liquidity compared to other firms. Taken as a whole, our results are consistent with the view that corruption risk disclosures are informative to market participants.

The rest of the paper is organized as follows. In the next section, we review the relevant literature and describe the theoretical underpinnings that guide our empirical tests. In section 3, we describe the data and our sample selection. Our empirical results are contained in section 4. The final section concludes.

2.0 Theoretical Underpinnings and Testable Implications

The principal variable of interest in our study is firm level corruption risk. We believe that firm level corruption should be affected by country level and firm level factors. There exists a

rich literature on cross-country determinants of corruption.[6] Overall country level factors such as economic development, political institutions, civil society, and culture appear to impart significant influence on corruption measured at the country level. We extend the literature by examining the impact of these country level factors to firm level corruption risk. Although, there are a few studies on firm level corruption, the literature is quite limited as there are no comprehensive cross-country studies. We believe that national corruption outcomes are largely determined through formal and informal institutions acting on individuals and firms. The ethical behaviour of individuals and firms is shaped by societal norms, which in turn is shaped by formal and informal institutions. In order to derive testable implications, we survey the literature focussing first on country level factors followed by firm level factors.

Economists cite the level of economic development as an important contributor to corruption. Corruption occurs because the government has a monopoly over certain resources required by private citizens. The extent of corruption decreases due to the availability of countervailing actions to private citizens being exhorted by government officials. Factors that increase the availability of countervailing actions include secular increases in wages, education, urbanization, growth of mass media, advances in transportation and communication technology, improvements in managerial skills, growth of capitalist classes, and an urban labour force. These factors are highly correlated with the economic development of a country. Triesman (2000, 2007) provides empirical confirmation that economic development reduces corruption – ostensibly through the rationalization of private and public roles and the spread of education which makes it difficult to conceal abuses. Paldam (2002) also provides empirical support highlighting the importance of economic factors. He finds that economic growth and economic freedom are both associated with

[6] See for instance Husted (1999), Triesman (2000), Gerring and Thacker (2004), Lederman et al. (2005) and Freille et al. (2007).

reduced levels of corruption. Overall, we posit that economic development should reduce firm level corruption risk.

Researchers are of the view that the effectiveness of a country's legal system is a key factor in determining the level of corruption obtaining in a country. Corrupt officials face the risk of getting caught and punished in regimes which have effective legal systems. Triesman (2000) provides empirical support for the impact of effective legal systems on corruption. In particular, he finds that countries which pursue common law system have lower levels of corruption. In our empirical tests, we include a number of indicators of institutional quality such as regulatory quality, rule of law, law enforcement index, investor protection index, anti-self-dealing index, and public enforcement index (La Porta et al. 2006). We hypothesize that the level of institutional quality should diminish firm level corruption risk.

In addition to the institutional quality variables discussed above, cross-country studies on corruption also emphasize political institutions. In particular, democracy, freedom, and the pervasiveness of civil society groups in a nation seem to influence corruption levels (Triesman, 2000; Gerring and Thacker, 2004; Sung, 2004; Lederman et al, 2005). Political accountability generates good governance and reduces corruption. Three key characteristics have been identified by past research (Persson et al, 1997; Rose-Ackerman, 1999; Djankov et al, 2003). The first feature is political competition. Free and fair elections force politicians to face the electorate and therefore enforce good governance. The second feature is the existence of checks and balances across different branches of government which help prevent abuses of authority, with different government bodies disciplining each other in support of citizens. The monitoring of executives by legislature and the judiciary and oversight by parliamentary committees are examples of an effective system of checks and balances. Transparency is the third feature of political accountability. Freedom of press and expression constitutes an essential element of transparency and has been shown to reduce country level

corruption (Brunetti and Weder, 2003; Chowdhury, 2004; Méndez and Sepúlveda, 2006; and Freille et al, 2007). Based on these insights, we postulate that the level of political accountability in a country should diminish firm level corruption risk.

Another strand of research emphasizes the role of culture on the level of corruption in a country (Husted, 1999; Paldam, 2002 and Barr and Selda, 2010). Hofstede (1997) proposed five unique work-related values which characterize different cultures around the world. These are power distance, individualism, uncertainty avoidance, masculinity and Confucian dynamism. Following the work of Husted (1999), we explore the relation between each of power distance, individualism, uncertainty avoidance and corruption. Hofstede (1997) defines power distance as "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally". In high power distance countries there is considerable paternalism. Typically, superiors provide favors to subordinates in return for their loyalty. Decisions are generally made on the basis of loyalty and balance of favors and not on merit. There is therefore considerable room for corruption in the form of nepotism and favouritism. Corruption by superiors is usually covered up by subordinates. Therefore, people from high power distance countries would tolerate corrupt practices more than would people from low power distance countries. Thus we hypothesize that the level of power distance in a country should be positively related to firm level corruption risk.

The individualism dimension of culture refers to the extent to which decisions about a person's life are determined by the individual as opposed to a person's circle of friends, family or peers. Typically, collectivistic societies view nepotism and favouritism much more positively than individualistic societies. We thus believe that the more individualistic a country is the less likely that corruption will be tolerated. Accordingly, we posit that individualism should be negatively related to firm level corruption risk.

Finally, we consider the impact of the cultural dimension of uncertainty avoidance on corruption risk. Hofstede (1997) describes uncertainty avoidance as "the extent to which members of a culture feel threatened by uncertainty or unknown situations". This characteristic reflects a certain intolerance for ambiguity in a given culture. In this cultural setting, corruption may be perceived as a mechanism to reduce uncertainty. In situations with uncertain outcomes, corruption may serve to achieve a more certain outcome (Rashid, 1981; Alam, 1995). We therefore postulate that the level of uncertainty avoidance in a country should be positively related to firm level corruption risk.

In comparison to the large number of cross-country studies on country level corruption, there are few cross-country studies that have examined the determinants of firm level corruption. Aterido et al.(2010) examined 70,000 enterprises across 102 developing and 5 high income economies. They find that smaller firms suffer more than large firms from corruption and that corrupt practices reduce employment in large firms. Asiedu and Freeman (2009) studied firm level corruption in Latin America, Sub-Saharan Africa, and Transition countries. They document that firm level corruption adversely affects investment growth. There are several single country studies on firm level corruption (Svensson, 2003; Fisman and Svensson, 2007; Fan et al, 2008). They mainly study the consequences of corruption on growth and firm level performance. They do not explore in detail the firm level factors that are associated with firm level corruption. We extend this literature by examining specific firm level factors that are related to firm level corruption. In our analysis, we include visibility, profitability, governance and shareholding.

We posit that visible firms will be less corruption prone and therefore have less corruption risk. This is because the loss of reputation will be larger for more visible firms as compared to less visible firms. Johnson et al. (2014) report results showing that reputational losses following financial misconduct is especially severe for firms with several large

customers. We therefore expect large firms and those listed on a stock exchange to have lower levels of corruption risk. We also hypothesize that firms which are more profitable would have lower corruption risk, especially in the defence industry context. This is because firms which are more profitable are not in desperate need of fresh orders to survive and therefore do not need to resort to bribery. We also propose that mangers and block holders act in their self-interest. When their shareholdings are large, they would not be averse to firms resorting to bribery to secure more orders as this will increase the returns on their stockholding. A firm's internal corporate governance is expected to act as a control on its ethical behaviour. We therefore posit that firms with higher quality internal governance will have lower corruption risk.

3.0 Data, Sample Selection, and Measurement

3.1 Sample selection

Our sample is drawn from 129 defence industry firms from 31 countries for which data on firm level corruption risk is available from Transparency International - UK (TI-UK) global survey on defence firms around the world. Each firm was scored on 34 questions in relation to the companies' ethics and anti-corruption systems[7]. The results and corresponding anti-corruption indexes were published by TI-UK on 4th October 2012[8].

We start the initial sample of 129 defence firms and match them with Osiris and Mint Global databases to obtain firm level variables. We then incorporate country level variables for the matched subsample. Finally we excluded firms that had missing data. This process resulted in a final sample of 106 firms from 25 countries.

[7] Please see TI (2012). The full report is freely downloadable from Transparency International's website.
[8] Please see http://www.transparency.org/news/feature/defence_companies_and_disclosure_how_are_they_doing for details.

3.2. Country level data sources

3.2.1 Country level corruption Indexes

In addition to the Transparency International's Anti-corruption Index, we also used scores on parliamentary level of corruption risk (again using lower and upper band scores) sourced from TI (2013). The bands range from very low to critical risk. In this case, we used coding of bands to represent different degrees of risk. On the seven specific dimensions of risk identified by Transparency International, countries were allocated scores from 0 to 100%. These seven dimensions included: Budget Oversight and Debate, Budget Transparency, External Audit, Policy oversight and Debate, Secret Budgets Oversight, Intelligence Services Oversight, and Procurement Oversight.

We supplemented Transparency International's country level data on corruption risk with the Worldwide Governance Indicators (2012 update)[9], obtained from www.govindicators.org. The Worldwide Governance Indicators (WGI) are composite governance indicators covering over 200 countries and territories and measuring six dimensions of governance (ranging from approximately -2.5 (weak) to 2.5 (strong) governance performance): Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. The aggregate indicators are based on several hundred individual underlying variables, taken from a wide variety of data sources including surveys of households and firms, commercial business information providers, non-government organisations and public sector organisations. We use the Corruption Perceptions Index (CPI), also sourced from Transparency International, which ranks countries/territories based on how corrupt their public sector is perceived to be. A country/territory's score indicates the

[9] See http://data.worldbank.org/data-catalog/worldwide-governance-indicators
Also, see Kaufmann et al.(2009).

perceived level of public sector corruption on a scale of 0 - 10, where 0 means that a country is perceived as highly corrupt and 10 means that a country is perceived as very clean.

3.2.2 Measures of Economic and Institutional factors

We use a range of economic and institutional factors to study the relationship with the defence firms anti-corruption risk index. They are GDP, deficit/surplus, voice and accountability, political stability, regulatory quality, rules of law, and investor protection index, from La Porta et al. (2006), the law enforcement index, from La Porta et al. (1998), anti-self-dealing index, from Djankov et al. (2008), and public enforcement index also from La Porta et al. (2006). The detailed description of these variables and the sources from which the data were collected are listed in appendix A.

3.2.3 Measures of Leadership and Governance

We use various country level leadership and governance variables. These include head of government salary, government effectiveness, secret budgets oversight, intelligence services oversight, procurement oversight, head of government whether president, prime minister or others.

3.2.4 Measures of Cultural factors

We use various factors such as power distance and uncertainty avoidance, adopted from Hofstede (1980) and individualism, adopted from Li et al. (2013). Power distance (PWD) articulates the degree to which the less powerful members of a society accept and expect that power is distributed unequally. Uncertainty avoidance (UAV) dimension states the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. Individualism refers to the strengths of the ties people have to others within the community.

3.3 Firm level data

The main variable of interest is the average score of transparency of anti-corruption index sourced from TI (2012). Firm level scoring was done by Transparency International and was based on 34 questions belonging to five sub-categories namely: i) leadership, governance, and organization, ii) risk assessment, iii) company codes and policies, iv) training, and v) personnel and helplines, with defence firms ultimately placed into one of six bands ranging from A (very low level of corruption risk) to F (critical level of corruption risk) based on their final scores. The range of scores for each band is presented in Appendix B. For our analysis, we used the average anti-corruption risk score for the sample firms. The score obtained by a firm was thus objectively determined based on the above mentioned criteria. TI used publicly available sources for each firm to assess its anti-corruption risk.

We also use various firm level factors such as firm size, firm age, managerial share ownership and proportion of shareholdings by block holders as well as stock liquidity measures. Data used to construct our firm level variables come from DataStream, Osiris and Mint Global databases. Firm size is measured as the book value of total assets in USD while firm profitability is measured by return on assets. Firm age is calculated from its incorporation and managerial share ownership is the proportion of ordinary shares held by all executives. Blockholder (BLO) is the proportion of shareholding held by blockholders who hold greater than 5% of a firm's equity.

3.3.1 Stock liquidity measures

We use Amihud's (2002) illiquidity (which takes into account the impact of trade order on returns)[10], and Corwin and Schultz High_Low (HL) price spread (2012). Data was downloaded using DataStream for the period around the announcement of anti-corruption

[10] Prior studies such as Kale and Shahrur (2011) use Amihud's illiquidity measure to assess stock market liquidity.

risk index, which was on 4th October 2012. For constructing the above stock liquidity measures we use daily data from one year prior to the announcement to one year after.

To estimate Amihud's illiquidity measure, we construct the ratio of absolute stock return to dollar volume using following formula:

Amihud illiquidity = $1/Di,y \sum_{t=1}^{i,y} |Returns_{i,y,d}| / [VO_{i,y,d} * P_{i,y,d}]$

Where, $D_{i,y}$ is the number of days for which data is available for stock I in any year y. The absolute return on stock i on day of the year y equals to $|Return_{i,y,d}|$. Trading volume and closing price on stock i on day of the year y is indicated by $VO_{i,y,d}$ and $P_{i,y,d}$ respectively. These two variables $VO_{i,y,d}$ and $P_{i,y,d}$ are multiplied to get dollar value of trading volume. The absolute return on stock i on day d of the year y is divided by the calculated dollar value of trading volume to get daily illiquidity measure. The yearly average of the measure is calculated before and after announcement and is multiplied by 1,000,000.

DataStream daily data (DataStream variables ph and pl) is used to construct the high-low price spread. The Corwin-Schultz high and low price spread (CS) is defined as follow:

$$CS = \frac{2(e^{\propto} - 1)}{1 + e^{\propto}}$$

Where $\alpha = \frac{\sqrt{2\beta} - \sqrt{\beta}}{3 - 2\sqrt{2}} - \sqrt{\frac{\gamma}{3 - 2\sqrt{2}}}$, β is $\left\{ \sum_{j=1}^{1} \left[ln \left(\frac{H_{t+1}^{0}}{L_{t+1}^{0}} \right) \right]^2 \right\}$, which is sum of expected squared ratio of high and low prices ratio for two consecutive days. Γ equals to $\left[\left(\frac{H_{t,t+1}}{L_{t,t+1}} \right) \right]^2$ a squared ratio of high and low prices over a range of two days. We follow the methodology outlined in Corwin and Schultz (2012) to construct the spread measure.

3.3.2 Market model

We use the following formula for the market model:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt}$$

where R_{jt} is observed return for the event j on time t, αj is the constant for company j, β_j is the beta of security j, R_{mt} is observed returns on the market index on time t, and ε_{jt} is residual error term. We use the most widely used share index of each country (all ordinaries index) as the market index. The estimation period is 260 days prior to the announcement day to 61days before the announcement day (-260 to -61).

3.4 Descriptive Statistics and Correlation Matrix

A summary of descriptive statistics for our 106 sample defence firms by each of the 25 countries in our sample is shown in Table 1. Despite being one of the major arms exporting nations, China's Gross domestic product (GDP) dollar estimates derived from purchasing power parity (PPP) calculations per capita was the third lowest amongst our sample at USD 8,387 while its mean country budget expenditures (2011) at USD 80,000 million is only below six (6) countries: namely the US (which significantly dominates all other countries with USD1,296,000 million), Japan, UK, France, Russia and Italy[11]. Mean salaries of head of Government vary quite substantially in our sample from a reported USD 10,633 in China to USD 400,000 in the US although these figures do not necessarily reflect "total remuneration" of heads of governments as many countries only report "official" salaries and not total remuneration (which can include substantial non-salaried benefits, perks, payments etc.). The CPI shows a large range in mean scores from 2.3 (Ukraine) to 9.4 (Finland). Russia and China as two of the major arms exporting nations (2.4 and 3.6) are demonstrably at the low end of the scale compared to the other major arms exporting nations which typically ranged from 7.0 to 8.0. When examining the PWD, both China and Russia are ranked amongst the highest 4 countries at 80 and 93 respectively (together with Malaysia

[11] Source: Stockholm International Peace Research Institute Year book 2013.

and UAE at 104 and 80 respectively) signifying an acceptance by members of that society of a hierarchical order in which everybody has their place/role and which needs no further justification. Yet when examining the UAV dimension (which expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity) the results are markedly different at 30 for China and 95 for Russia. In comparison the US and UK (at 46 and 35 respectively) are closer in nature to China than to Russia in attitudes on this dimension. Overall, when examining the country level corruption Indexes, the scores range from extreme or critical corruption risk (0) to very low corruption risk (100) across categories with countries tending to score consistently across each dimension although some interesting anomalies do arise such as Italy which scores reasonably consistently on dimensions such as intelligent services oversight (INS), procurement oversight (PRO), and external audit (EXA) (70 – 100) yet performs very poorly on secret budgets oversight index (25).Table 2 splits our sample of 106 defence firms from 25 countries by anti-corruption risk index classification (ACI) as reported by Transparency International (TI) comprising categories into either Low anti-corruption risk index score (Low = less than median score) or High anti-corruption risk index (High = median score or more). This table presents descriptive statistics (means and medians) by country level factors (Panel A) and for firm level factors (Panel B) with the firms classified as Low ACI reporting significantly lower mean and median ACI scores than firms classified as High ACI (23.18 and 24.95 compared to 62.88 and 58.30 respectively).

When examining Panel A of Table 2 we find that all country level variables are statistically different at either the 5% (INS and COC) or 1% level of difference (remainder of variables) between the Low and High ACI classification groups along the dimensions of economic and institutional factors, leadership and governance factors, cultural and corruption factors. From Panel B, we find that firms classified as "Low" had lower comparable mean and median scores than firms classified as "High" on firm variables such as firm size (SIZ),

Return on Assets (ROA), firm age (AGE), proportion of shareholding held by block holders that are greater than 5% of a firm's equity (BLO), and firm level corporate governance quality index (CGQ) with SIZ, ROA and BLO being statistically different between groups using the Mann Whitney rank sum (MW) test. Managerial Share ownership (MSO) was the sole firm variable which had a higher mean score between Low and High ACI groups (23.70 compared to 21.66) while the median was demonstrably lower (4.09 compared to 11.48) but the difference is not statistically significant.

In Table 3, we report correlation between variables used in the study. In Panel A, we provide correlations across country level variables. In Panel B, we correlations across fir level variables. Overall, we find that ACI is strongly correlated with several country level variables such as GDP, Regulatory Quality, Procurement Oversight, and Rule of Law. ACI is negatively correlated with level of corruption, parliamentary level of corruption risk, and power distance. Between the country level variables some correlations are very high and exceed 0.8. Clearly, we are not able to include all country level variables in the same regression due to potential multicollinearity. The level of correlation between firm level variables is not that high compared to country level variables. An exception is 0.90 between blockholding and managerial share ownership. ACI has a 0.51 correlation with firm size indicating that large firms tend to have lower level of corruption risk. Most other correlations are low and do not indicate any serious problems of multicollinearity.

4.0 Empirical Results

4.1 Analysis of Country Level Factors

We begin our country level analysis by first examining the impact of economic variables and proxies for country level institutional quality and report the results in Table 4. The dependent variable is the firm level anti-corruption score (ACI). The economic variables natural log of GDP and natural log of country level budget deficit/surplus (LN_DAS),

measured as revenues – expenditures, both have positive impact on ACI suggesting that countries with large economies and those with budget surpluses tend to have lower firm level corruption risk in the defence industry. The voice and accountability (VAC) variable, which captures perceptions regarding the extent to a which a country's citizens are able to participate in choosing their government, freedom of expression, freedom of association and free media, has a positive and statistically significant impact on ACI. This finding suggests that a country with a well-functioning democracy and civil society is able to control firm level corruption risk better than countries which lack democracy and freedoms of expression, association and media. Regulatory quality and rule of law both influence firm level anti-corruption score positively. Figure 1 visually portrays the impact of regulatory quality on anti-corruption risk. The law enforcement index which is the average of scores on rule of law, judicial efficiency, corruption, risk of expropriation, and contract repudiation indexes also imparts a positive impact on ACI. Anti-self-dealing index which represents investor protection also has positive impact on ACI. Overall, these results imply that the level of institutional quality in a country influences firm level corruption risk in the defence industry.

We progress with our country level analysis by examining the impact of country level leadership and governance on firm level anti-corruption risk and report them in Table 5. The natural log of the country's head of government salary has a weakly positive effect on ACI suggesting that countries which pay their government leaders more have better measures to control corruption. Government effectiveness has a highly significant positive impact on ACI indicating that effective governments prevent firm level corruption by instituting suitable anti-corruption mechanisms. The secret budgets oversight (SBO) variable is significantly positively associated with ACI. Countries with high scores on SBO possess parliamentary committees that are provided extensive information on all spending on secret items including essential details and audit reports relating to security sector and secret programs. Other

parliamentary mechanisms to control corruption are intelligent services oversight (INS) and procurement oversight (PRO). Countries with high scores on these variables also have high ACI. Thus it appears that parliamentary scrutiny is an effective mechanism to curb corruption risk in the defence industry.

In Table 6, we consider the impact of explicit corruption control mechanisms on ACI. Countries with high levels of corruption (LOC) have lower ACI. We get similar results with corruption perception index (CPI).[12] We also get similar results when we use parliamentary level of corruption Risk (PLC). Finally, external audit scores (EXA) are positively related to ACI indicating that countries that produce independent audit reports that are fully transparent and publicly available have lower levels of firm level corruption risk. Summing up, it appears that the overall level of corruption in a country influences the firm level corruption risk and that suitable parliamentary and audit processes help to curb this risk.

In table 7, we study the role of national culture on firm level corruption risk. We find that national cultural variables are significantly statistically associated with firm level corruption risk. Power distance (PWD) has a strong negative relationship with ACI. Figure 2 shows visually that countries with high national power distance also have low ACI scores (high corruption risk). This finding implies that in countries with high power distance have very weak explicit corruption control mechanisms at the firm level in the defence industry. Countries which score high on uncertainty avoidance also have higher corruption risk. This finding is consistent with the view that firms in uncertainty avoidant countries tend to use corrupt practices as a mechanism to reduce uncertain outcomes. Countries which rate high on individualism have low levels of corruption risk. Since individualistic societies stress on individual freedom, autonomy and self-interested competition, firms may be motivated to protect the rights of competing parties by instituting formal mechanisms to control corruption

[12] Please note that CPI is coded such that high scores represent very clean and low scores imply highly corrupt countries.

risk. In summary, we find that national cultural factors influence firm level corruption risk. While power distance and uncertainty avoidance dimensions of culture are associated with increased levels of corruption risk, individualism is associated with lower levels of corruption risk.

4.2 Analysis of Firm Level Factors

We continue our analysis on determinants of firm level corruption risk in the defence sector by including firm level variables in our analysis. Our results are reported in Table 8. We find that larger firms have lower levels of firm level corruption risk. Further, firms that are more profitable also have lower levels of firm level corruption risk. Listed firms also have lower levels of firm level corruption risk. Figure 3 demonstrates graphically the association between listing status and anti-corruption scores. These results imply that more visible firms are likely to have reduced corruption risk. Perhaps, they institute mechanisms to limit corruption risk, as corruption related scandals are likely to tarnish their reputation and destroy form value.

Firms with higher managerial shareholding and block holding are both associated with higher levels of corruption risk. Since one form of corruption, viz., the paying of bribes, is associated with increased profitability due to additional orders received, our findings suggest that managers and block holders exhibit self-interest by not setting up corruption control processes in their firms. We find that firms that voluntarily disclose more information regarding their corruption control systems tend to have lower levels of corruption risk. Also, firms from major arms exporting countries also have lower levels of firm level corruption risk. Firms with higher quality internal corporate governance features also have lower levels of firm level corruption risk. This finding implies that a firm's overall corporate governance environment influences its corruption ostensibly through systems and procedures to control corruption risk.

Transparency International UK disclosed publicly the anti-corruption risk scores of firms in the defence industry on October 4, 2012. We conduct an event study centred on this event and provide our results in Table 10. We show subsample results based on sample splits such as disclosing-non-disclosing, low versus high anti-corruption score, exporting versus non-exporting countries, and country level corruption perceptions. In general, we find positive abnormal returns both for firms with high and low corruption risk. We do not find significant differences between subsamples. We also observe that firms experienced significant abnormal returns in the pre-event period. Firms with high corruption risk suffer negative abnormal returns while low risk firms experience positive returns. This finding is consistent with leakage of corruption risk information prior to the public disclosure by Transparency International. Alternately, the evidence is also consistent with market participants assessing corruption risk in the defence sector somewhat accurately.

Figures 4 graphically depicts the stock price reaction around the announcement of the arrest of the CEO of Finmeccanica on corruption charges on February 12, 2013. Consistent with the work of Johnson et al. (2014), we find that the stock market effect of reputational loss for the firm is clearly seen in the negative abnormal returns for several days after the event.

Finally, we examine the impact of corruption risk disclosure on market liquidity. First, in Table 11, we display univariate results comparing liquidity measures before and after disclosure of corruption risk scores by Transparency International for the overall sample and the subsamples based on ACI. Overall, illiquidity as measured by Amihud's illiquidity measure decreases after disclosure. On closer examination it appears that the decrease is largely due to firms with high ACI scores. We get similar results when we use Corwin and Schultz's high–low spread measure. Summing up, it appears that liquidity improves post-disclosure mostly driven by firms with low corruption risk.

We examine cross-sectional determinants of improvements in liquidity in the one-year after the TI disclosure event. Our results are reported in Table 12. We find that disclosure of anti-corruption risk reduces information asymmetry for firms that score high on the anti-corruption risk. In the one-year period post disclosure, firms with higher scores experience sharper increases in liquidity compared to other firms. Figure 5 pictorially depicts the relationship between liquidity improvement and ACI score. Our results are robust to using an alternate measure of illiquidity viz., the Corwin-Schultz high–low spread. Overall, our results are consistent with the view that corruption risk disclosures are informative to market participants.

Summing up, our empirical results show that both country and firm level factors influence the corruption risk faced by defence industry firms. Interesting studies on how social norms and values prevailing in the societies influence the ethical behaviour of individuals is presented by Barr and Serra (2010) and Fisman and Miguel (2007). We extend this framework using firms as the unit of analysis. We find compelling evidence that socio-political institutions and value systems influence a firm's corruption control behaviour. We provide persuasive evidence that country level factors have profound influence on firm level corruption control behaviour. The adjusted R^2 of our country level models explain between 20 and 35 per cent of the variation in anti-corruption scores. Thus, we find no support for the argument that country level institutional quality variables are not important in controlling firm level corruption risk. Our firm level regressions explain between 52 and 54 per cent of the variation in anti-corruption scores. We interpret these findings to imply that both firm level and country level factors are equally important in influencing firm level corruption control strategies.

4.3 Robustness Checks

We try various forms of our empirical models to check for the robustness of results. We find qualitatively similar results. For the sake of brevity, we do not report these results. An exception is Table 10. In Table 10, we report results of logistic regression in the place of OLS regression used in Table 9. Firms scoring in the top three bands (A, B & C) are coded as 1 and the others as 0. Our results are qualitatively similar to the ones reported in Table 9.

4.4 Discussion of Results

Our study is the first one to examine the antecedents of firm level corruption risk in the defence industry. We study 106 defence firms from 25 countries. Collectively our sample firms account for over USD 500 billion and USD 11 trillion of total revenue.[13] Overall we gain several insights from our empirical tests which use both country and firm level variables as explanatory variables to explain the cross-sectional variation in the level of firm level anti-corruption risk in the defence industry. First, we find that country level institutional quality variables such as regulatory quality, rule of law, law enforcement, voice and accountability, and parliamentary oversight influence firm level corruption risk. Second, our empirical results indicate that national culture plays a key role in affecting firm level corruption risk in the defence industry. Countries with high power distance and uncertainty avoidance have higher levels of corruption risk.

Third, several firm level factors are associated with corruption risk in the defence sector. We find that larger firms have lower levels of corruption risk. Also, firms that are more profitable have lower levels of corruption risk. Higher managerial shareholding and block holding are both associated with higher levels of corruption risk. Firms that voluntarily disclose more information regarding their corruption control systems generally have lower levels of corruption risk. Further, firms from major arms exporting countries have lower

[13] Source TI (2012).

levels of firm level corruption risk. As compared to unlisted firms, listed firms have lower levels of firm level corruption risk. Also, firms with better quality internal corporate governance have lower levels of firm level corruption risk.

Fourth, when we examine the impact of disclosure of anti-corruption scores on stock prices, we find positive abnormal returns both for firms with high and low corruption risk. On further study, we notice that firms with high corruption risk suffer negative abnormal returns in the pre-event period while firms with low risk experience positive returns. This evidence points to leakage of corruption risk information prior to the public disclosure. Finally, our examination of changes in market liquidity shows that disclosure of anti-corruption risk decreases information asymmetry for low risk firms while the opposite is true for high risk firms. In the post disclosure period, firms that score higher on the anti-corruption risk show increases in liquidity. In summary, our findings indicate that corruption risk disclosures are informative to market participants.

We do not conduct a horse race to see whether country level or firm level factors are more important. The reason behind our decision is that the relation between several critical variables is highly complex. We do not have a simple methodology for disentangling the impacts of several crucial factors. Further, data limitations preclude a clear partition of country level and firm level factors. Besides, the high correlation between several variables poses statistical issues. In untabulated results, we confirm that both firm level and country level factors remain important when used in the same equation.

5.0 Conclusion

Our study examines the antecedents of an objectively measured corruption risk index using firms as the basic unit of measurement in the defence industry. We use a unique dataset on

firm level corruption risk in the defence industry to assess the role of country level legal and political institutions and firm level factors such as ownership structure, visibility, profitability and corporate governance. Overall, we find that country level institutional quality mitigates firm level corruption risk. Our analyses of firm level factors indicate that visibility, governance and ownership by managers and block holders are associated with corruption risk in the defence sector.

While prior studies have used actual or perceived corruption at firm and / or country level, our study is the first one to focus on the risk of corruption. Our emphasis is on the defence industry which is regarded as being more susceptible to corruption by several influential commentators. Corruption risk is not the same as corruption. While related cases of corruption result in reputational losses for the concerned firm, corruption risk indicates the potential for corruption in the future with the possibility of future reputational loss. As such, we expect firms which score highly on the corruption risk measure to experience episodes of corruption in the future.

Our results show that disclosure of corruption risk is informative to market participants. The liquidity of low risk firms improves subsequent to the disclosure while other firms generally show a decrease in liquidity. There could be other consequences of corruption risk disclosure. One potential impact of the disclosure could be an attempt by firms rated as high on corruption risk to set up processes to mitigate corruption risk. Another possible consequence of the disclosure is the response by capital market participants. It is possible that suppliers of capital may restrict access to capital market of firms deemed as high corruption entities. Alternately, they could increase the cost at which new capital can be raised. We leave these issues for future research.

References

Aidt, T., Dutta, J., & Sena, V. (2008). Governance regimes, corruption and growth: Theory and evidence. *Journal of Comparative Economics, 36*(2), 195-220.

Alam, M.S. 1995. A theory of limits on corruption and some applications. Kyklos, 48: 419-35.

Alexander, C.R., 1999. On the nature of the reputational penalty for corporate crime: evidence. J. Law Econ. 42, 489–526.

Amihud, Y. (2002). Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets, 5*(1), 31-56.

Anand, V., Ashforth, B. E., & Joshi, M. (2004). Business as usual: The acceptance and perpetuation of corruption in organizations. *The Academy of Management Executive, 18*(2), 39-53.

Asiedu, E. and J. Freeman. (2009). The effect of corruption on investment growth: Evidence on firms from Latin America, Sub-Saharan Africa and Transition Countries. Review of Development Economics 13 (2) 200-214.

Aterido, R., M. Hallward-Dreimeier and C. Pages. (2007). Investment climate and employment growth: The impact of access to finance, corruption and regulations across firms.IZA Discussion paper No. 3138.

Barr, A., & Serra, D. (2010). Corruption and culture: An experimental analysis. *Journal of Public economics, 94*(11), 862-869.

Brown, S. J., & Warner, J. B. (1985). Using daily stock returns: The case of event studies. *Journal of financial economics, 14*(1), 3-31.

Brunetti, A., & Weder, B. (2003). A free press is bad news for corruption. *Journal of Public economics, 87*(7), 1801-1824.

Chen, K. C., Chen, Z., & Wei, K.-C. (2009). Legal protection of investors, corporate governance, and the cost of equity capital. *Journal of Corporate Finance, 15*(3), 273-289.

Cho, S.-S., El Ghoul, S., Guedhami, O., & Suh, J. (2014). Creditor rights and capital structure: Evidence from international data. *Journal of Corporate Finance, 25*, 40-60.

Chou, D., Gombola, M.J., Liu, F., 2006. Earnings management and stock performance of reverse leveraged buyouts. J. Financ. Quant. Anal. 41, 407–438.

Chowdhury, S. K. (2004). The effect of democracy and press freedom on corruption: an empirical test. *Economics letters, 85*(1), 93-101.

Cornett, M.M., Marcus, A.J., Tehranian, H., 2008. Corporate governance and pay-for-performance: the impact earnings management. J. Financ. Econ. 87, 357–373.

Corwin, S. A., & Schultz, P. (2012). A Simple Way to Estimate Bid-Ask Spreads from Daily High and Low Prices. *Journal of Finance, 67*(2), 719-760

Djankov, S., C. McLiesh, T. Nenova, and A. Shleifer, 2003, Who owns the media? Journal of Law and Economics, 46, 341-381.

Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2008). The law and economics of self-dealing. *Journal of financial economics, 88*(3), 430-465.

DuCharme, Larry L., Malatesta, P.H., Sefcik, S.E., 2004. Earnings management, stock issues, and shareholder lawsuits. J. Financ. Econ. 71, 27–49.

Durnev, A., & Kim, E. (2005). To steal or not to steal: Firm attributes, legal environment, and valuation. *The Journal of Finance, 60*(3), 1461-1493.

Dyck, A., & Zingales, L. (2004). Private benefits of control: An international comparison. *The Journal of Finance, 59*(2), 537-600.

Fan, J. P., Rui, O. M., & Zhao, M. (2008). Public governance and corporate finance: Evidence from corruption cases. *Journal of Comparative Economics, 36*(3), 343-364.

Fisman, R., & Miguel, E. (2007). Corruption, norms, and legal enforcement: Evidence from diplomatic parking tickets. *Journal of Political economy, 115*(6), 1020-1048.
Fisman, R., & Svensson, J. (2007). Are corruption and taxation really harmful to growth? Firm level evidence. *Journal of Development Economics, 83*(1), 63-75.
Freille, S., Haque, M. E., & Kneller, R. (2007). A contribution to the empirics of press freedom and corruption. *European Journal of Political Economy, 23*(4), 838-862.
Gande, A., Lewis, C.M., 2009. Shareholder initiated class action lawsuits: shareholder wealth effects and industry spillovers. J. Financ. Quant. Anal. 44, 823–850.
Gerring, J., & Thacker, S. C. (2004). Political institutions and corruption: The role of unitarism and parliamentarism. *British Journal of Political Science, 34*(2), 295-330.
Goldman, E., So, J., & Rocholl, J. (2012). Politically connected boards of directors and the allocation of procurement contracts. *Forthcoming Review of Finance*.
Gong, G., Louis, H., Sun, A.X., 2008. Earnings management and firm performance following open-market repurchases. J. Finance 63 (2), 947–986.
Gupta, S., De Mello, L., & Sharan, R. (2001). Corruption and military spending. *European Journal of Political Economy, 17*(4), 749-777.
Hofstede, Geert H., 1980. Culture's Consequences: International Differences in Work-Related Values. Sage, Thousand Oaks, CA.
Hofstede, G. (1984). *Culture's consequences: International differences in work-related values* (Vol. 5): sage.
Hofstede, G., Hofstede, G. J., & Minkov, M. (1991). *Cultures and organizations: Software of the mind* (Vol. 2): McGraw-Hill London.
Hofstede, Geert. 1997. Cultures and organizations: Software of the mind. New York, NY: McGraw Hill.
Husted, B. W., & Estudios, I. T. y. d. (1999). Wealth, culture, and corruption. *Journal of International Business Studies*, 339-359.
Johnson, W., Xie, W., & Yi, S. (2014). Corporate Fraud and the Value of Reputations in the Product Market. *Journal of Corporate Finance, 25*, 16-39.
Kale,.R.,Shahrur,H.,2011. Product market power and stock market liquidity. Journal of Financial Markets 14, 376–410.
Karpoff, J.M., Lott, J.R., 1993. The reputational penalty firms bear for committing criminal fraud. J. Law Econ. 36, 757–802.
Karpoff, J.M., Lee, D.S., Martin, G.S., 2008. The consequences to managers for financial misrepresentation. J. Financ. Econ. 88, 193–215.
Karpoff, J.M., Lee, D.S., Martin, G.S., 2012. The legal penalties for fraudulent disclosure. Working Paper. University of Washington.
Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, Governance Matters VIII: Aggregate and Individual Governance Indicators, 1996-2008 (June 29, 2009). World Bank Policy Research Working Paper No. 4978. Available at SSRN: http://ssrn.com/abstract=1424591
La Porta, R., Lopez, -de Silanes, F., Shleifer, A., Vishny, R., 1998. Law and Finance. Journal of Political Economy 106, 1113-1155.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (2000). Investor protection and corporate governance. *Journal of financial economics, 58*(1), 3-27.
La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2006). What works in securities laws? *The Journal of Finance, 61*(1), 1-32.
Lalountas, D. A., Manolas, G. A., & Vavouras, I. S. (2011). Corruption, globalization and development: How are these three phenomena related? *Journal of Policy Modeling, 33*(4), 636-648.

Lederman, D., Loayza, N. V., & Soares, R. R. (2005). Accountability and corruption: Political institutions matter. *Economics & Politics, 17*(1), 1-35.
Lee, G., Masulis, R.W., 2009. Seasoned equity offerings: quality of accounting information and expected flotation costs. J. Financ. Econ. 92, 443–469.
Lee, G., Masulis, R.W., 2011. Do more reputable financial institutions reduce earnings management by IPO issuers? *Journal of Corporate Finance, 17*, 982-1000.
Li, K., Griffin, D., Yue, H., & Zhao, L. (2013). How Does Culture Influence Corporate Risk-Taking? *Journal of Corporate Finance, 23*, 1-22.
López de Silanes, F., La Porta, R., Shleifer, A., & Vishny, R. (1998). Law and finance. *Journal of Political economy, 106*, 1113-1155.
Méndez, F., & Sepúlveda, F. (2006). Corruption, growth and political regimes: cross country evidence. *European Journal of Political Economy, 22*(1), 82-98.
Mendoza, R. U., Lim, R., & Ong Lopez, A. (2013). Grease or Sand in the Wheels of Commerce? Firm Level Evidence on Corruption and SMEs. *Firm Level Evidence on Corruption and SMEs (October 25, 2013)*.
Méon, P.-G., & Sekkat, K. (2005). Does corruption grease or sand the wheels of growth? *Public choice, 122*(1-2), 69-97.
Mocan, N. (2008). What determines corruption? International evidence from microdata. *Economic Inquiry, 46*(4), 493-510.
Paldam, M. (2002). The cross-country pattern of corruption: economics, culture and the seesaw dynamics. *European Journal of Political Economy, 18*(2), 215-240.
Persson, T., G. Roland, and G. Tabellini, 1997, Separation of powers and political accountability. Quarterly Journal of Economics 112, 1163–1202.
Pryor, F. L. (2008). Culture rules: A note on economic systems and values. *Journal of Comparative Economics, 36*(3), 510-515.
Rashid, Salim. 1981. Public utilities in egalitarian LDC's: The role of bribery in achieving Pareto efficiency. Kyklos, 34: 448-60.
Rose-Ackerman, S., 1999, Corruption and Government: Causes, Consequences, and Reform (Cambridge University Press, Cambridge, UK).
Shah, A. (2013). The arms trade is big business. Accessed from http://www.globalissues.org/article/74/the-arms-trade-is-big-business on November 15, 2013.
Shleifer, A., & Vishny, R. W. (1993). Corruption. *The Quarterly Journal of Economics, 108*(3), 599-617.
Smarzynska, B. K., & Wei, S.-J. (2000). Corruption and composition of foreign direct investment: Firm-level evidence: National Bureau of Economic Research.
Sung, H.-E. (2004). Democracy and political corruption: A cross-national comparison. *Crime, Law and Social Change, 41*(2), 179-193.
Svensson, J. (2003). Who must pay bribes and how much? Evidence from a cross section of firms. *The Quarterly Journal of Economics, 118*(1), 207-230.
TI (2012). Defence companies anti-corruption index 2012, Transparency International UK Report.
TI (2013). Watchdogs? The quality of legislative oversight of defence in 82 countries, Transparency International UK Report.
Treisman, D. (2000). The causes of corruption: a cross-national study. *Journal of Public economics, 76*(3), 399-457.
Treisman, D. (2007). What have we learned about the causes of corruption from ten years of cross-national empirical research? *Annu. Rev. Polit. Sci., 10*, 211-244.

Appendix A: Variable Definitions and Sources

Variable name	Abbreviation	Classification Level	Description of variable	Source
Anti-corruption risk index	ACI	Firm level	Average score of transparency of anti-corruption scores	http://government.defenceindex.org/sites/default/files/documents/GI-exec-summary-english.pdf
Firm size	SIZ	Firm level	Firm size measured as total assets	Osiris Bureau van Dijk and Mint Global
Firm age	AGE	Firm level	The age of the firm calculate its incorporation year to 2012	Osiris Bureau van Dijk and Mint Global
Profitability	ROA	Firm level	Firms' profitability calculated as return on assets	Osiris Bureau van Dijk and Mint Global
Listing status	D_LIS	Firm level	An indicator variable that equals to 1 if a firm is listed a stock exchange and 0 otherwise	Osiris Bureau van Dijk and Mint Global
Exporting Firms	D_EXP	Firm level	An indicator variable that equals to 1 if a firm belongs to one of the major arms exporting nations: USA, Russia, France, Germany, the UK, and China, and 0 otherwise	http://government.defenceindex.org/sites/default/files/documents/GI-exec-summary-english.pdf
Disclosing Firms	D_DIS	Firm Level	An indicator variable that equals to 1 if a firm is disclosing anti-corruption information publicly and 0 otherwise.	http://government.defenceindex.org/sites/default/files/documents/GI-exec-summary-english.pdf
Index CGQ	CGQ	Firm level	Firm level corporate governance quality index	
Managerial share ownership	MSO	Firm level	Proportion of shareholding held by accompany management	Osiris Bureau van Dijk

Blockholders	BLO	Firm level	Blockholder is measured as proportion of shareholding held by blockholders that are greater than 5% of a firm's equity	Osiris Bureau van Dijk
Idiosyncratic risks	IDR	Firm level	The idiosyncratic risks are calculated as the standard error of the market model regression of daily stock returns over the period from day -260 to day -62 for each anti-corruption index firm	Calculated using DataStream
Amihud's (2002) illiquidity	ILI	Firm level	The ratio of Amihud's (2002) illiquidity for a year post to the year prior to anti-corruption index announcement date.	Calculated using DataStream
Corwin and Schultz High_Low price spread	HLS	Firm level	The ratio of high and low price spread for a year post to the year prior to anti-corruption index announcement date	Calculated using DataStream
Market Model Abnormal Returns	-1 + MM +1	Firm level	The 3-day abnormal returns from the day before the announcement to the day after announcement date of the anti-corruption index announcements.	
GDP (PPP)	GDP	Country level	Gross domestic product (GDP) dollar estimates derived from purchasing power parity (PPP) calculations, per capita.	International Monetary Fund and World Bank
Deficit/Surplus	DAS	Country level	Country budget expenditures (2011) based on data from CIA World Fact book. Total budget figures.	CIA World Factbook
Salary	SAL	Country level	Salaries as reported by at least two verified sources of Heads of Government Missing in Descriptive Stats table	Multiple sources (available on demand)
Head of the country	D_PRE	Country level	An indicator variable that equals to 1 if the head of the country is president and 0 otherwise.	
CPI	CPI	Country level	Corruption Perceptions Index (CPI) which ranks countries/territories based on how corrupt their public sector is perceived to be. A country/territory's score indicates the perceived level of public sector corruption on a scale of 0 - 10, where 0 means that a country is perceived as highly corrupt and 10 means that a country is perceived as very clean.	http://www.transparency.org/cpi2011/results/

Voice and Accountability	VAC	Country level	One of the dimensions of the Worldwide governance Indicators (WGI). The WGI cover over 200 countries and territories, measuring six dimensions of governance. The Voice and accountability Index reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Estimate of governance ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.	www.govindicators.org
Political Stability	POS	Country level	Political Stability index reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. Estimate of governance (ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance)	www.govindicators.org
Government Effectiveness	GVE	Country level	Government Effectiveness reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation. Estimate of governance (ranges from approximately -2.5 (weak) to 2.5 (strong)	www.govindicators.org
Regulatory Quality	REQ	Country level	Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Estimate of governance (ranges from approximately -2.5 (weak) to 2.5 (strong)	www.govindicators.org
Rule of Law	RUL	Country level	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate of governance (ranges from approximately -2.5 (weak) to 2.5 (strong)	www.govindicators.org
Control of Corruption	COC	Country level	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private	www.govindicators.org

			interests. Estimate of governance (ranges from approximately -2.5 (weak) to 2.5 (strong)	
Level of Corruption Risk	LOC	Country level	Overall Gov't defence anti-corruption index (GI) representing aggregation of scores for 77 questions across 82 countries. Countries were classified and coded into one of seven bands from very low corruption risk (code 1 = Band A) to Critical corruption risk (code 7 = Band F)	Govt Defence Anti-Corruption Index (GI) 2013 www.defenceindex.org
Parliamentary level of corruption risk	PLC	Country level	Countries were classified into one of six bands from Very Low risk band (code 1) to Critical risk band (code 6)	Govt Defence Anti-Corruption Index (GI) 2013 www.defenceindex.org
External Audit	EXA	Country level	Countries were categorised as Low risk (scores ranged from 50-100%) or High risk (scores ranged from 0-25%) Low risk countries produce independent audit reports that are fully transparent and publicly available. Reports provided to parliament which aids scrutiny of defence spending High Risk countries fail to conduct any external audit of defence spending. Any auditing that does occur is fully undermined by the government and therefore not independent or reliable	Govt Defence Anti-Corruption Index (GI) 2013 www.defenceindex.org
Secret Budgets oversight	SBO	Country level	Countries were categorised as Low risk (scores ranged from 50-88%) or High risk (scores ranged from 0-44%) Countries in the Low risk group possess parliamentary committees that are provided with extensive information on all spending on secret items, including detailed, line-item descriptions of all expenditures. They provide parliamentarians with detailed audit reports relating to the security sector and secret programs. These audits are subject to parliamentary consideration and debate. These countries regulate the classification of information	Govt Defence Anti-Corruption Index (GI) 2013 www.defenceindex.org

			through transparent legal requirements that are subject to Parliamentary scrutiny. Countries in the High risk group withhold all secret spending information from parliaments and legislatures, or any information that is disclosed is either limited or aggregated. They do not provide parliaments and legislatures with audit reports relating to the security sector and secret programs, or only provide very basic audit reports with considerable omissions. These countries fail to legally regulate information classification, with the result that information is classified at the discretion of individuals, parties, or groups in power.	
Intelligence services oversight	INS	Country level	Countries were categorised as Low risk (scores ranged from 50-100%) or High risk (scores ranged from 0-25%) Countries in the Low risk group have independent parliaments or legislatures with formal powers to oversee the intelligence services. They provide parliaments and legislatures with the necessary resources and access to sensitive information to properly scrutinise all aspects of the intelligence services—including policy, budgets and administration. Countries in the High Risk group lack parliaments or legislatures with formal powers to oversee the intelligence services. Even where formal powers exist, these are not utilised in practice, possibly due to inadequate political will and/or resources.	Govt Defence Anti-Corruption Index (GI) 2013 www.defenceindex.org
Procurement oversight	PRO	Country level	Countries were categorised as Low risk (scores ranged from 50-95%) or High risk (scores ranged from 0-45%) Countries in the Low risk group have long-standing and well-tried legislation covering defence and security procurement. No items are exempt from these laws, and they include specific anticorruption	Govt Defence Anti-Corruption Index (GI) 2013 www.defenceindex.org

			clauses. They have formalised procurement oversight processes in place that are transparent and highly active. They disclose past and future purchases, which tightly match audits of procurement expenditure Countries in the High risk group lack legislation covering defence and security procurement, or any legislation that is present is frequently by-passed. They do not have formal oversight mechanisms for defence procurement in place. Even when oversight mechanisms do exist, they are either highly inactive and/or lack transparency.	
Power Distance	PWD	Country level	This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue here is how a society handles inequalities among people. People in societies exhibiting a large degree of power distance accept a hierarchical order in which everybody has a place and which needs no further justification. In societies with low power distance, people strive to equalise the distribution of power and demand justification for inequalities of power.	http://geert-hofstede.com/dimensions.html
Uncertainty avoidance	UAV	Country level	The uncertainty avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behaviour and are intolerant of unorthodox behaviour and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles.	http://geert-hofstede.com/dimensions.html
Individualism	IND	Country level	Individualism refers to the strengths of the ties people have to others within the community.	Li et al. (2013)

Investor protection index	IPR	Country level	IPR is the principal component of disclosure, liability standards, and Anti-director rights. Scale from 0 to 10.	La Porta et al. (2006)
Law enforcement index	LWE	Country level	LWE is the law enforcement index, which is the average of scores on rule of law, judicial efficiency, corruption, risk of expropriation, and the contract repudiation indexes	La Porta et al. (1998)
Anti-self-dealing index	ASD	Country level	ASD is the anti-self-dealing index	Djankov, La Porta, Lopez-de-Silanes and Shleifer (2008)
Public enforcement index	PBE	Country level	The index of public enforcement equals the arithmetic mean of: (1) Supervisor characteristics index; (2) Rule-making power index; (3) Investigative powers index; (4) Orders index; and (5) Criminal index.	La Porta et al. (2006)

Appendix B: Average transparency anti-corruption scores (ACI) by firm level obtained from Transparency International UK website

Band	Upper Score %	Lower Scores %	Average Scores %
A	100	83.3	91.65
B	83.2	66.7	74.95
C	66.6	50.0	58.30
D	49.1	33.3	41.20
E	33.2	16.7	24.95
F	16.6	0.0	8.30

Figure 1: Anti-corruption Index and Regulatory Quality

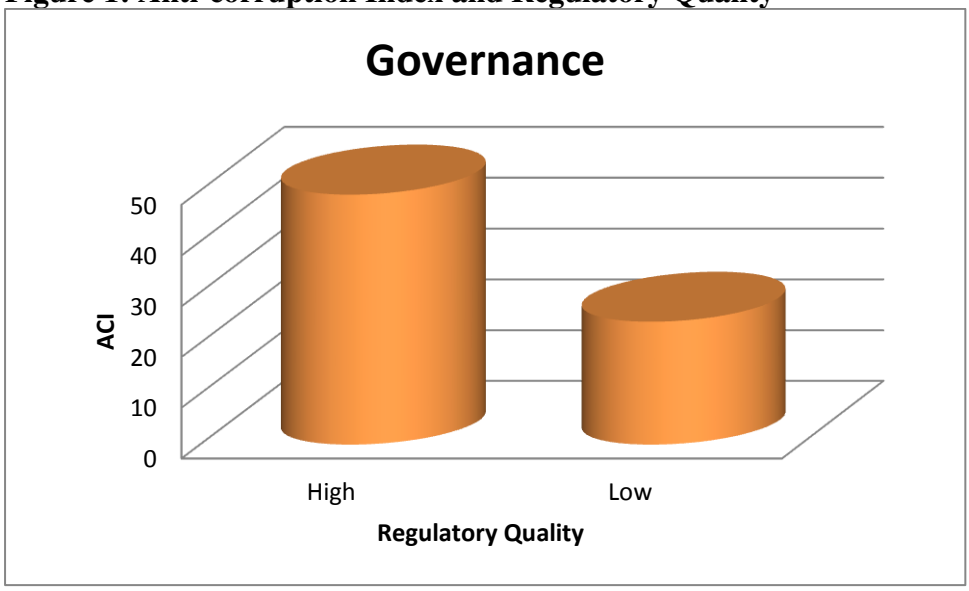

Figure 2: Anti-corruption Index and Culture

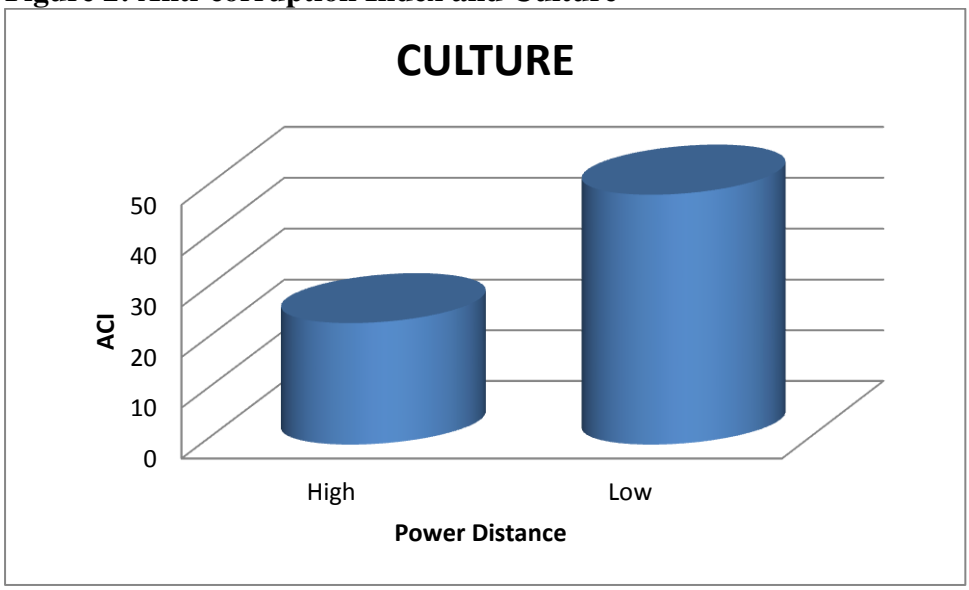

Figure 3: Anti-corruption index and listing status

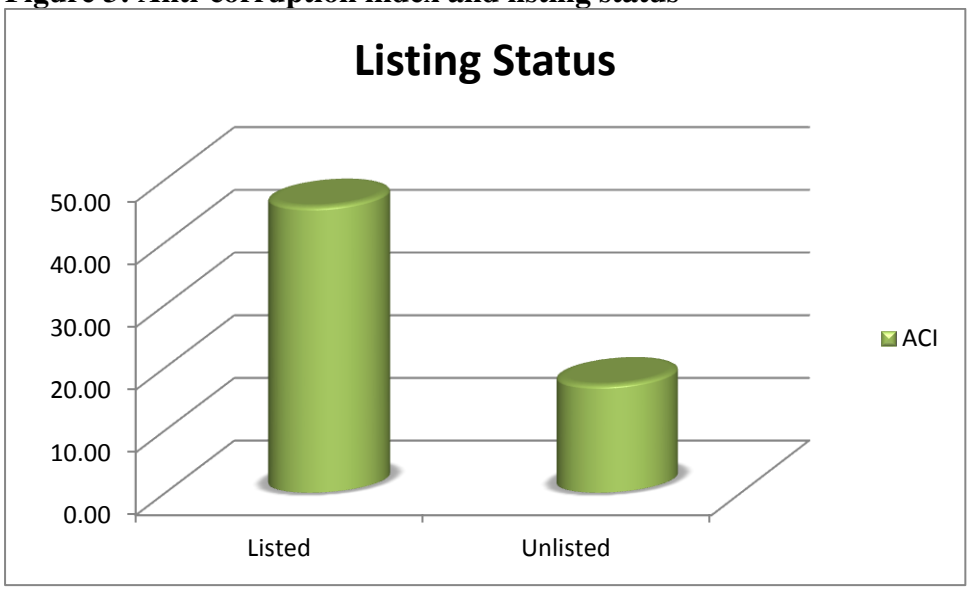

Figure: 4: Stock Price Reaction to Finmeccanica's CEO's arrest on February 12, 2013

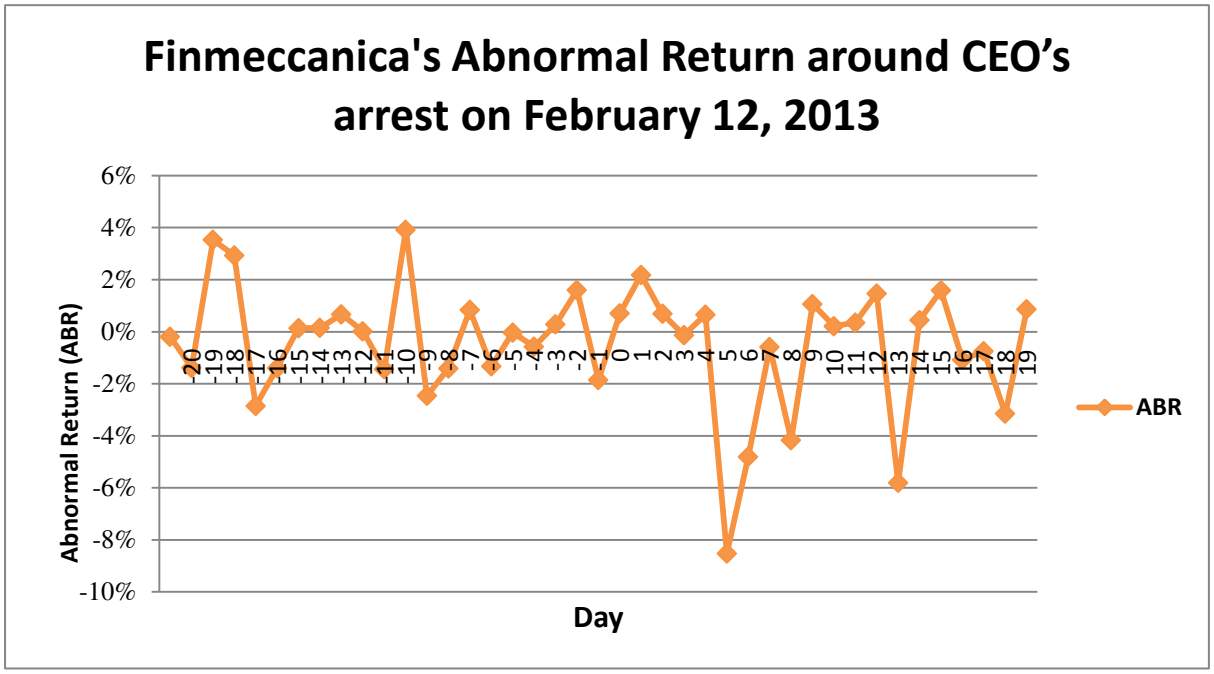

Figure 5: Anti-corruption Index and Illiquidity

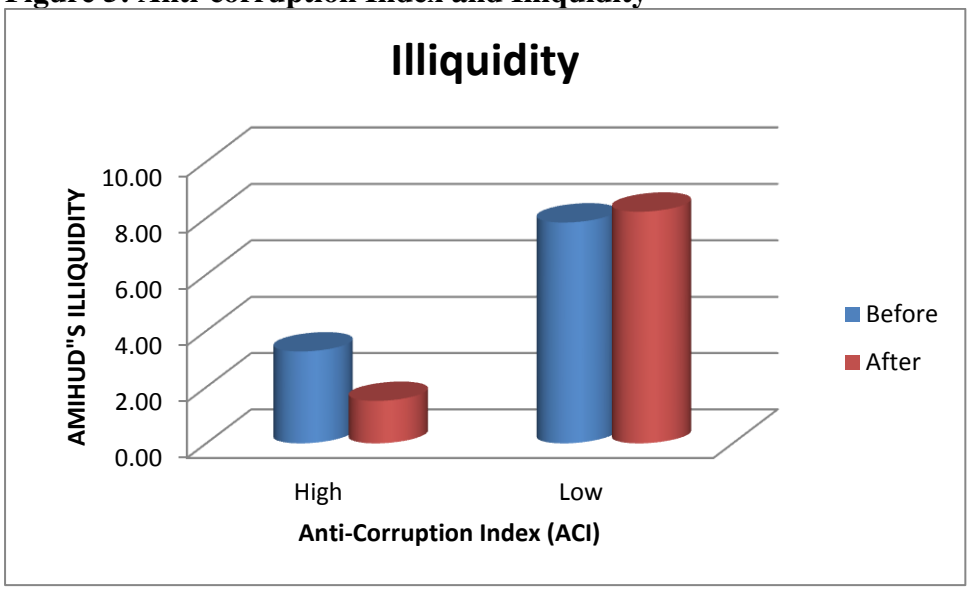

Table 1: Country level Summary Statistics

From the initial 129 defence industry firms from 31 countries in Transparency Internationals-UK (TI-UK) survey analysing anti-corruption of major global defence firms (published by TI-UK on 4th October 2012) we reconciled 106 defence firms from 25 countries using Osiris and Mint Global databases. We report summary statistics for defence firms within each of the 25 countries listed.

Country	N	GDP	DAS	VAC	POS	REQ	RUL	IPR	LWE	ASD	PBE	SAL	GVE	SBO	INS	PRO	COC	LOC	CPI	PLC	EXA	PWD	UAV	IND
Brazil	2	11,769	77,300	0.50	0.04	0.17	0.01	0.44	6.46	0.27	0.58	78,000	0.01	25	100	75	0.17	3	3.8	2	100	69	76	0.38
Bulgaria	1	13,789	5,800	0.47	0.30	0.56	0.09	-	-	-	-	26,929	0.01	88	75	80	0.17	3	3.3	2	50	70	85	-
China	2	8,387	83,000	1.64	0.70	0.20	0.46	-	-	0.76	-	10,633	0.12	6	25	25	0.67	5	3.6	5	0	80	30	-
Finland	1	35,981	1,400	1.54	1.38	1.77	1.96	0.47	9.76	0.46	0.32	180,513	2.25	-	-	-	2.19	-	9.4	-	-	33	59	0.63
France	7	35,068	149,000	1.20	0.61	1.11	1.50	0.47	8.97	0.38	0.77	327,699	1.36	63	75	90	1.51	3	7.0	2	75	68	86.	0.71
Germany	6	38,077	37,000	1.31	0.86	1.51	1.62	0.00	9.37	0.28	0.22	296,112	1.53	88	100	85	1.69	1	8.0	1	75	35	65	0.67
India	3	3,663	6,600	0.41	1.20	0.34	0.08	0.77	6.12	0.58	0.67	4,106	0.03	50	50	45	0.56	4	3.1	4	50	77	40	-
Ireland	1	40,838	22,000	1.32	1.00	1.65	1.77	0.48	8.74	0.79	0.37	246,000	1.42	-	-	-	1.50	-	7.5	-	-	-	-	-
Israel	3	31,467	8,100	0.65	1.30	1.35	0.98	0.59	7.79	0.73	0.63	350,000	1.20	38	50	50	0.68	4	5.8	4	25	-	-	0.54
Italy	3	30,464	86,900	0.94	0.59	0.75	0.41	0.20	7.95	0.42	0.48	-	0.45	25	100	70	0.01	3	3.9	3	75	50	75	0.76
Japan	6	34,748	524,000	1.02	0.97	0.90	1.27	0.42	9.37	0.5	0.00	273,676	1.35	81	75	80	1.50	3	8.0	2	100	54	92	0.46
Malaysia	1	16,240	14,000	0.44	0.16	0.66	0.52	0.73	7.71	1.0	0.77	89,481	1.00	13	0	25	0.00	5	4.3	5	50	104	36	0.26
Netherlands	1	42,023	39,100	1.52	1.12	1.84	1.82	0.54	9.87	0.2	0.47	190,740	1.79	-	-	-	2.17	-	8.9	-	-	38	53	0.80
Norway	2	53,396	500	1.63	1.35	1.41	1.89	0.44	9.92	0.42	0.32	211,000	1.76	69	100	90	2.17	2	9.0	1	100	31	50	0.69
Russian	4	16,736	112,400	0.94	0.88	0.35	0.78	-	-	-	0.44	80,000	0.40	25	25	45	1.09	5	2.4	4	50	93	95	-
South Africa	1	10,970	15,500	0.57	0.02	0.44	0.10	0.66	6.70	0.81	0.78	313,222	0.37	56	50	55	0.03	4	4.1	3	50	49	49	0.65
South Korea	5	31,220	25,900	0.71	0.23	0.95	1.01	0.24	6.71	0.47	0.60	136,669	1.23	56	75	69	0.45	2	5.4	2	50	-	-	0.18
Spain	2	30,478	29,000	1.10	0.13	1.09	1.20	0.81	7.87	0.37	0.83	102,960	1.02	75	50	65	1.06	3	6.2	3	50	57	86	0.51
Sweden	1	40,705	71,000	1.59	1.26	1.84	1.95	0.77	9.80	0.33	0.87	256,649	1.96	63	100	90	2.22	2	9.3	2	75	31	29	0.71
Switzerland	1	44,452	3,400	1.63	1.29	1.64	1.76	0.39	9.99	0.27	0.50	-	1.89	-	-	-	2.02	-	8.8	-	-	-	-	0.68
Turkey	2	14,393	10,400	0.17	0.93	0.42	0.08	0.55	5.46	0.43	0.52	73,500	0.41	13	50	45	0.10	5	4.2	4	50	66	85	0.37
UAE	1	47,729	17,900	0.98	0.96	0.40	0.46	-	-	0.43	-	-	0.95	25	25	30	1.08	4	6.8	5	50	80	68	-
UK	10	36,522	201,500	1.27	0.37	1.62	1.67	0.27	9.40	0.95	0.57	226,627	1.55	81	75	95	1.54	2	7.8	1	100	35	35	0.89
Ukraine	2	7,222	6,400	0.10	0.15	0.56	0.86	-	-	0.08	-	61,254	0.83	38	50	60	0.98	4	2.3	3	50	-	-	-
US	38	48,328	1,296,000	1.13	0.54	1.49	1.59	1.00	9.52	0.65	0.90	400,000	1.41	75	75	85	1.25	2	7.1	2	75	40	46	0.91

This table presents descriptive statistics (means) for 106 firms from 25 countries. All variables are defined in Appendix A.

Table: 2 Descriptive statistics- by anti-corruption risk index

This table presents descriptive statistics by country level factors (Panel A) and for firm level factors (panel B) for total sample of 106 unique defence firms from 25 countries and split by anti-corruption risk index classification as reported by Transparency International (TI) comprising categories of either Low anti-corruption risk index score (less than 50% median score) or High anti-corruption risk index (median score of 50% or more).The reported values are means and medians of the respective variables with Mann Whitney (MW) test statistics indicating where there are significant differences in the rank sums between groups at either the 1%, 5% or 10% level of significance (***, ** and * respectively). All variables are defined in Appendix A.

	ALL		ACI				MW test
			Low		High		
	Mean	Median	Mean	Median	Mean	Median	
Panel A:.Country Level Factors							
Economic and institutional factors							
GDP	36301	36522	31699	34748	43896	48328	4.83***
DAS	539238	201500	356421	84950	840885	1296000	4.57***
VAC	1.06	1.13	0.97	1.12	1.19	1.13	3.01***
POS	0.64	0.54	0.68	0.61	0.57	0.54	2.25***
REQ	1.20	1.49	1.03	1.11	1.47	1.49	4.62***
RUL	1.29	1.59	1.12	1.27	1.58	1.59	4.54***
IPR	0.63	0.59	0.56	0.47	0.74	1.00	2.66***
LWE	8.88	9.40	8.51	9.37	9.39	9.52	3.88***
ASD	0.57	0.65	0.51	0.47	0.67	0.65	3.81***
PBE	0.66	0.77	0.63	0.63	0.75	0.90	2.88***
Leadership and Governance							
SAL	273493	296112	233801	273676	336593	400000	3.83***
GVE	1.21	1.41	1.08	1.35	1.42	1.41	4.46***
SBO	64.03	75.00	57.44	63.00	74.67	75.00	3.43***
INS	71.08	75.00	67.46	75.00	76.92	75.00	2.11**
PRO	76.67	85.00	70.63	80.00	86.41	85.00	4.53***
Cultural factors							
PWD	49.40	40.00	55.96	54.00	40.15	40.00	3.89***
UAV	57.45	46.00	64.24	65.00	47.87	46.00	3.74***
IND	0.74	0.89	0.65	0.69	0.86	0.91	4.43***
Corruption factors							
COC	1.17	1.25	1.07	1.25	1.35	1.25	2.50**
LOC	2.61	2.00	2.94	3.00	2.08	2.00	4.10***
CPI	6.49	7.10	6.01	7.00	7.29	7.10	3.27***
PLC	2.25	2.00	2.54	2.00	1.79	2.00	3.40***
EXA	71.57	75.00	65.87	75.00	80.77	75.00	3.58***

Panel B: Firm Level factors							
Firm level variables							
ACI	38.16	41.60	23.18	24.95	62.88	58.30	8.88***
SIZ	11719834	3814913	5664070	2352152	21711844	9340280	4.82***
ROA	7.39	6.57	6.86	5.62	8.25	8.69	2.40**
AGE	42.99	28.53	38.33	22.85	50.67	41.18	1.44
MSO	22.93	8.42	23.70	4.09	21.66	11.48	0.49
BLO	25.53	15.87	24.63	10.33	27.02	16.88	1.68*
CGQ	61.25	69.20	48.89	45.60	69.12	72.20	2.55

Table 3: Correlation matrix

Panel A: Correlations – Country Level variables

This table shows correlations amongst country level variables derived from 106 firms within 25 countries (reconciled using Osiris and Mint Global databases) from initial 129 defence industry firms within 31 countries in Transparency Internationals-UK (TI-UK) survey analysing anti-corruption of major global defence firms (published by TI-UK on 4th October 2012). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	ACI	GDP	DAS	VAC	POS	REQ	RUL	IPR	LWE	ASD	PBE	SAL	GVE	SBO	INS	PRO	COC	LOC	CPI	PLC	EXA	PWD	UAV	IND
ACI	1																							
GDP	0.50***	1																						
DAS	0.44***	0.53***	1																					
VAC	0.37***	0.63***	0.29***	1																				
POS	-0.11	-0.05	-0.36***	0.20**	1																			
REQ	0.57***	0.81***	0.40***	0.64***	0.02	1																		
RUL	0.51***	0.82***	0.44***	0.75***	0.04	0.92***	1																	
IPR	0.22**	0.22**	0.60***	-0.03	-0.13	0.20	0.17	1																
LWE	0.44***	0.81***	0.54***	0.89***	0.09	0.83***	0.91***	0.25**	1															
ASD	0.38***	0.19**	0.38***	0.18*	-0.23**	0.34***	0.21*	0.28***	0.19*	1														
PBE	0.22**	0.19*	0.48***	-0.03	-0.45***	0.24**	0.14	0.79***	0.10	0.32***	1													
SAL	0.46***	0.92***	0.57***	0.44***	-0.14	0.75***	0.78***	0.21**	0.73***	0.14	0.20*	1												
GVE	0.43***	0.83***	0.29***	0.64***	0.09	0.90***	0.94***	0.02	0.82***	0.17*	-0.01	0.79***	1											
SBO	0.49***	0.63***	0.46***	0.50***	-0.10	0.79***	0.79***	0.11	0.78***	0.22**	-0.03	0.60***	0.76***	1										
INS	0.41***	0.51***	0.19*	0.37***	-0.05	0.54***	0.46***	-0.34***	0.38***	-0.20**	-0.28***	0.52***	0.48***	0.58***	1									
PRO	0.57***	0.71***	0.51***	0.54***	-0.24**	0.79***	0.80***	0.01	0.81***	0.15	0.08	0.71***	0.76***	0.84***	0.79***	1								
COC	0.32***	0.55***	0.18*	0.76***	0.34***	0.68***	0.85***	-0.04	0.82***	-0.02	-0.17*	0.49***	0.79***	0.69***	0.35***	0.65***	1							
LOC	-0.53***	-0.72***	-0.43***	-0.53***	0.23**	-0.83***	-0.76***	0.01	-0.67***	-0.12	-0.08	-0.63***	-0.75***	-0.83***	-0.81***	-0.84***	-0.54***	1						
CPI	0.47***	0.80***	0.31***	0.72***	0.19*	0.85***	0.86***	-0.03	0.87***	0.19*	-0.18*	0.72***	0.92***	0.81***	0.59***	0.78***	0.80***	-0.76***	1					
PLC	-0.49***	-0.61***	-0.33***	-0.50***	0.26***	-0.73***	-0.74***	0.28***	-0.65***	-0.10	0.18*	-0.61***	-0.73***	-0.84***	-0.82***	-0.94***	-0.63***	0.88***	-0.75***	1				
EXA	0.47***	0.49***	0.39***	0.38***	-0.12	0.49***	0.53***	-0.19**	0.58***	0.16	-0.32***	0.50***	0.53***	0.63***	0.65***	0.15***	0.56***	-0.59***	0.65***	-0.79***	1			
PWD	-0.57***	-0.71***	-0.35***	-0.53***	0.11	-0.88***	-0.73***	-0.06	-0.71***	-0.26**	-0.05	-0.65***	-0.75***	-0.76***	-0.73***	-0.79***	-0.51***	0.91***	-0.78***	0.81***	-0.58***	1		
UAV	-0.39***	-0.16	-0.24**	-0.30***	0.23**	-0.52***	-0.34***	-0.39***	-0.28***	-0.71***	-0.51***	-0.05	-0.30***	-0.26*	-0.07	-0.21**	-0.12	0.42***	-0.27***	0.21*	-0.03	0.53***	1	
IND	0.51***	0.66***	0.62***	0.57***	-0.05	0.70***	0.60***	0.53***	0.75***	0.44***	0.53***	0.74***	0.36***	0.48***	0.16	0.63***	0.40***	-0.44***	0.39***	-0.34***	0.33***	-0.66***	-0.73***	1

Panel B: Correlations – Firm Level variables

This table shows correlations amongst firm level variables derived from 106 firms within 25 countries (reconciled using Osiris and Mint Global databases) from initial 129 defence industry firms within 31 countries in Transparency Internationals-UK (TI-UK) survey analysing anti-corruption of major global defence firms (published by TI-UK on 4th October 2012). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	ACI	SIZ	ROA	AGE	D_DIS	D_EXP	MSO	BLO	CGQ	-1+MM+1	ILL	PHL	IDR
ACI	1												
SIZ	0.51***	1											
ROA	0.14	-0.29***	1										
AGE	0.21**	0.26***	-0.04	1									
D_DIS	0.52***	0.33***	0.06	0.15	1								
D_EXP	0.38***	0.11	0.14	0.00	0.18*	1							
MSO	-0.00	0.13	-0.00	0.06	0.03	-0.09	1						
BLO	0.09	0.21**	0.06	0.06	0.02	0.06	0.90***	1					
CGQ	0.32**	0.12	0.20	-0.08	-0.13	0.47***	-0.01	0.13	1				
D_LIS	0.54***	0.51***	0.03	0.31***	0.33***	0.25***	0.47***	0.55***	NC				
-1+MM+1	-0.24**	-0.01	-0.13	0.29**	-0.07	-0.28**	0.18	0.13	-0.14	1			
ILL	-0.36***	-0.27**	0.06	-0.12	-0.12	-0.13	0.19	0.21*	0.15	0.06	1		
PHL	-0.34***	-0.01	-0.17	0.12	0.02	-0.33***	-0.08	-0.14	-0.48***	0.01	0.20*	1	
IDR	-0.16	-0.55***	0.34***	-0.18	-0.20	-0.03	0.18	0.14	-0.16	0.05	0.23	-0.08	1

Table 4: The impact of economic and institutional factors on defence firm average anti-corruption scores

Model	1	2	3	4	5	6	7	8	9
C	-24.3030 (-2.32)**	-19.8891 (-1.82)*	-25.6662 (-0.49)	-39.7098 (-2.51)**	-132.9919 (-3.10)***	-30.2084 (-0.59)	-47.4207 (-0.90)	-76.9083 (-1.42)	-49.1390 (-2.90)***
LN_GDP			0.3823 (0.06)		12.5547 (2.51)**	0.3472 (0.06)	1.2746 (0.22)	4.8020 (0.73)	
LN_DAS	2.8693 (2.56)***	3.0047 (2.78)***	3.0277 (1.76)*	1.8390 (1.25)	1.6449 (1.27)	3.1117 (2.25)**	2.5438 (1.47)		1.2171 (0.73)
VAC	-0.3763 (-0.07)	-0.6049 (-0.09)	23.2876 (2.27)**		4.9890 (0.65)	22.9124 (2.34)**	22.2416 (2.32)**		
POS			-1.6380 (-0.21)	-5.2383 (-0.67)	-0.2387 (-0.03)	0.9689 (0.14)	2.8251 (0.34)	-3.3237 (0.45)	-0.2599 (-0.03)
REQ	23.8867 (5.74)***								
RUL		17.6203 (3.34)***							
IPR			3.6904 (0.46)				0.6718 (0.08)	3.0125 (0.53)	
LWE				6.9923 (3.38)***				5.7897 (2.07)**	6.5025 (3.16)***
ASD					28.4680 (2.74)***		31.7018 (2.87)***	28.7022 (2.37)**	25.9414 (2.17)**
PBE						7.5347 (0.81)			4.5754 (0.47)
F-statistic	20.22	15.55	5.79	9.39	10.02	5.92	6.58	6.92	7.09
N	106	106	96	96	105	96	96	96	96
Adjusted R^2	0.3445	0.2936	0.2014	0.2094	0.3026	0.2056	0.2604	0.2378	0.2427

This table reports multivariate regression results using OLS with sample sizes ranging from 96 to 106 unique defence firms from 25 countries as at Oct 2012. The dependent variable for all models is the e. The independent variables of interest come from country level variables grouped under the classification "economic and institutional factors". Model 1 reports regression results using the natural logarithm of deficit/surplus (LN_DAS), Voice and Accountability index (VAC) and Regulatory quality index (REQ) as independent variables. Model 2 reports regression results using LN_DAS, VAC and Rule of Law index (RUL) as independent variables. Model 3 reports regression results using the natural logarithm of GDP (LN_GDP), LN_DAS, VAC, Political stability index (POS) and Investor protection index (IPR) as independent variables. Model 4 reports regression results using LN_DAS, POS and Law enforcement Index (LWE) as independent variables. Model 5 reports regression results using LN_GDP, LN_DAS, VAC, POS, and Anti-self-dealing index (ASD) as independent variables. Model 6 reports regression results using LN_GDP, LN_DAS, VAC, POS, and Public enforcement index (PBE) as independent variables. Model 7 reports regression results using LN_GDP, LN_DAS, VAC, POS, IPR and ASD as independent variables. Model 8 reports regression results using LN_GDP, POS, IPR, LWE, and ASD as independent variables. Model 9 reports regression results using LN_DAS, POS, LWE, ASD, and PBE as independent variables. Definitions of the independent variables are provided in Appendix A. Reported beneath each coefficient estimate (in parenthesis) are the t-statistics using White heteroskedasticity-consistent standard errors. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table: 5 The Impact of Country level Leadership and Governance on defence firm average anti-corruption scores

Variable	1	2	3	4	5	6	7	8
C	-74.7361 (-2.58)***	-26.4685 (-2.06)**	-27.4554 (-2.12)**	-43.3043 (-3.22)***	-95.3063 (-2.50)**	-72.7790 (-2.05)**	-43.8478 (-3.49)***	-24.6765 (-1.83)*
LN_GDP					6.8589 (1.44)	3.8110 (0.85)		
LN_DAS	2.5540 (1.94)*	3.5389 (3.04)***	2.6531 (2.21)**	3.5628 (3.21)***	2.7676 (2.28)**	1.9792 (1.79)*	2.2939 (2.16)**	3.4433 (2.39)**
VAC	15.1037 (2.20)**	7.3190 (1.01)	13.5742 (1.91)*	14.2558 (2.02)**	9.4774 (1.45)	5.4701 (1.07)	7.4884 (1.41)	20.1839 (2.84)***
POS	-1.2033 (-0.17)	-2.9676 (-0.43)	0.1847 (0.03)	0.6643 (0.10)	0.5760 (0.08)	5.1684 (0.75)	5.7133 (0.85)	-1.5814 (-0.22)
LN_SAL	12.6633 (1.90)*							
GVE		13.6321 (2.78)***						
SBO			0.3089 (2.86)***					
INS				0.3327 (3.51)***	0.2693 (2.82)***			
PRO						0.5095 (4.21)***	0.5663 (6.51)***	
D_PRE								3.2712 (0.58)
F-statistic	9.66	10.85	11.61	12.23	10.25	11.63	14.58	8.74
N	101	106	102	102	102	102	102	106
Adjusted R^2	0.2572	0.2728	0.2959	0.3079	0.3141	0.3447	0.3477	0.2278

This table reports multivariate regression results using OLS with sample sizes ranging from 102 to 106 unique defence firms from 25 countries as at Oct 2012. The dependent variable for all models is the average transparency anti-corruption scores (ACI) by firm level obtained from Transparency International UK website. The independent variables of interest come from country level variables grouped under the classification "country level leadership and governance factors". Model 1 reports regression results using the natural logarithm of Head of government salary (LN_SAL) as the independent variable with the natural logarithm of deficit/surplus (LN_DAS), Voice and Accountability index (VAC) and the Political Stability index (POS) as control variables. Model 2 reports regression results using the Government effectiveness index (GVE) as the independent variable with LN_DAS, VAC and POS as control variables. Model 3 reports regression results using Secret budgets oversight index (SBO) as the independent variable with LN_DAS, VAC and POS as control variables. Model 4 reports regression results using Intelligence services oversight index (INS) as the independent variable with LN_DAS, VAC and POS as control variables. Model 5 reports regression results using Intelligence services oversight index (INS) as the independent variable with the natural logarithm of GDP (LN_GDP), LN_DAS, VAC and POS as control variables. Model 6 reports regression results using Procurement oversight index (PRO) as the independent variable with LN_GDP, LN_DAS, VAC and POS as control variables. Model 7 reports regression results using Procurement oversight index (PRO) as the independent variable with LN_DAS, VAC and POS as control variables. Model 8 reports regression results using as the independent variable D_PRE (an indicator variable that equals to 1 if the head of the country is president and 0 otherwise) with LN_DAS, VAC and POS as control variables. Definitions of the independent variables are provided in Appendix A. Reported beneath each coefficient estimate (in parenthesis) are the t-statistics using White heteroskedasticity-consistent standard errors. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table: 6 The impact of Country level corruption factors on defence firm average anti-corruption scores

Model	1	2	3	4	5	6
C	-113.9164 (-2.74)***	-21.8450 (-0.44)	-31.2369 (-2.47)**	1.6425 (0.12)	-48.5235 (-1.11)	-101.1007 (-2.75)***
LN_GDP	10.8953 (2.23)**	3.7266 (0.75)			5.6874 (1.23)	8.3958 (1.85)*
LN_DAS	2.6697 (2.16)**	2.5543 (2.10)**	3.2491 (2.86)***	3.4987 (3.23)***	2.8492 (2.35)**	1.9120 (1.74)
VAC	4.4089 (0.61)	6.7150 (1.03)	1.6866 (0.23)	8.3761 (1.32)	5.3144 (0.94)	9.0795 (1.67)
POS	-3.8736 (-0.55)	4.9066 (0.70)	-5.6572 (-0.85)	6.9243 (0.94)	5.8789 (0.78)	0.6423 (0.09)
COC	4.2014 (0.84)					
LOC		-7.3114 (-2.91)***				
CPI			4.9902 (4.04)***			
PLC				-8.1024 (-4.37)***	-6.8387 (-3.15)***	
EXA						0.2751 (2.69)***
F-statistic	8.52	10.73	11.89	13.04	10.72	10.62
N	106	102	106	102	102	102
Adjusted R^2	0.2638	0.3251	0.2933	0.3230	0.3248	0.3225

This table reports multivariate regression results using OLS with sample sizes ranging from 102 to 106 unique defence firms from 25 countries as at Oct 2012. The dependent variable for all models is the average transparency anti-corruption scores (ACI) by firm level obtained from Transparency International UK website. The independent variables of interest come from country level variables grouped under the classification "corruption factors". Model 1 reports regression results using Control of corruption index (COC) as the independent variable with the natural logarithm of GDP (LN_GDP), the natural logarithm of deficit/surplus (LN_DAS), Voice and Accountability index (VAC) and Political Stability index (POS) as control variables. Model 2 reports regression results using Level of corruption risk (LOC) as the independent variable with LN_GDP, LN_DAS, VAC and POS as control variables. Model 3 reports regression results using Corruption Perceptions Index (CPI) as the independent variable with LN_DAS, VAC and POS as control variables. Model 4 reports regression results using Parliamentary level of corruption risk index (PLC) as the independent variable with LN_DAS, VAC and POS as control variables. Model 5 reports regression results using Parliamentary level of corruption risk index (PLC) as the independent variable with LN_GDP, LN_DAS, VAC and POS as control variables. Model 6 reports regression results using External Audit index (EXA) as the independent variable with LN_GDP, LN_DAS, VAC and POS as control variables. Definitions of the independent variables are provided in Appendix A. Reported beneath each coefficient estimate (in parenthesis) are the t-statistics using White heteroskedasticity-consistent standard errors. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 7: The impact of Cultural Factors on defence firm average anti-corruption scores

Model	1	2	3	4	5
C	31.3017 (0.57)	43.4721 (2.04)**	-115.6237 (-2.73)***	1.0261 (0.05)	-7.7474 (-0.43)
LN_GDP	1.3418 (0.27)		16.0937 (3.09)***		
LN_DAS	2.3388 (1.74)	2.4825 (1.95)*	1.2530 (0.91)	3.5026 (2.61)***	1.2743 (0.80)
VAC	0.5820 (0.10)	1.4740 (0.21)	-4.8529 (-0.50)	14.1002 (1.70)	5.9556 (0.59)
POS	-7.1597 (-0.85)	-7.1777 (-0.86)	-3.1291 (-0.39)	-5.3277 (-0.63)	-2.4965 (0.32)
PWD	-0.6108 (-4.45)***	-0.6298 (-6.00)***			
UAV			-0.3488 (-3.21)***	-0.2823 (-2.46)**	
IND					39.3058 (2.49)**
Probability	0.0000	0.0000	0.0000	0.0000	0.0000
N	94	94	94	94	91
Adjusted R^2	0.3466	0.3336	0.3187	0.2533	0.2327

This table reports multivariate regression results using OLS with sample sizes ranging from 91 to 94 unique defence firms from 25 countries as at Oct 2012. The dependent variable for all models is the average transparency anti-corruption scores (ACI) by firm level obtained from Transparency International UK website. The independent variables of interest come from country level variables grouped under the classification "cultural factors". Model 1 reports regression results Power dimension (PWD) as the independent variable with the natural logarithm of GDP (LN_GDP), the natural logarithm of deficit/surplus (LN_DAS), Voice and Accountability index (VAC) and Political Stability index (POS) as control variables. Model 2 reports regression results PWD as the independent variable LN_DAS, VAC and POS as control variables. Model 3 reports regression results Uncertainty avoidance index (UAV) as the independent variable with LN_GDP, LN_DAS, VAC and POS as control variables. Model 4 reports regression results UAV as the independent variable with LN_DAS, VAC and POS as control variables. Model 5 reports regression results using Individualism (IND) as the independent variable with LN_DAS, VAC and POS as control variables. Definitions of the independent variables are provided in Appendix A. Reported beneath each coefficient estimate (in parenthesis) are the t-statistics using White heteroskedasticity-consistent standard errors. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 8: The impact of Firm level determinants on defence firm average anti-corruption scores

Model	1	2	3	4
C	15.7044 (0.77)	6.3098 (0.33)	-35.3448 (-1.88)*	-38.5547 (-2.10)**
SIZ	4.3979 (1.67)*	6.0557 (2.39)**	7.7054 (2.90)***	8.1737 (3.16)***
ROA	-0.6340 (-1.43)	-0.4979 (-1.22)	0.6708 (2.21)**	0.7223 (2.44)**
AGE	-3.2120 (-1.25)	-3.7463 (-1.41)	0.0300 (0.02)	-0.0758 (-0.04)
D_DIS	15.3141 (3.50)***	12.6924 (2.91)***	13.6934 (3.76)***	12.9189 (3.55)***
D_EXP	10.5841 (1.88)*	14.4967 (3.02)***	8.1774 (2.16)***	9.3814 (2.59)***
MSO	-0.2415 (-3.86)***		-0.1497 (-2.23)**	
BLO		-0.2731 (-4.10)***		-0.1633 (-2.39)**
CGQ	0.1786 (2.58)***	0.1695 (2.63)***		
D_LIS			17.5335 (3.34)***	18.0021 (3.47)***
F- statistic	9.12	9.46	18.48	18.44
N	54	54	106	106
Adjusted R^2	0.5175	0.5277	0.5381	0.5375

This table reports multivariate regression results using OLS with sample sizes ranging from 54 to 106 unique defence firms from 25 countries as at Oct 2012. The dependent variable for all models is the average transparency anti-corruption scores (ACI) by firm level obtained from Transparency International UK website. The independent variables of interest come from firm level variables. Model 1 reports regression results using as independent variables firm size (SIZ), Return on Assets (ROA), Firm age (AGE), Managerial share ownership (MSO) and corporate governance quality index (CGQ) with control variables comprising D_DIS (An indicator variable that equals to 1 if a firm is disclosing anti-corruption information publicly and 0 otherwise) and D_EXP (an indicator variable that equals to 1 if a firm belongs to one of the major arms exporting nations: USA, Russia, Germany, the UK, and China , and 0 otherwise). Model 2 reports regression results using as independent variables SIZ, ROA, AGE, CGQ and Proportion of shareholding held by blockholders that are greater than 5% of a firm's equity (BLO) with control variables comprising D_DIS and D_EXP. Model 3 reports regression results using as independent variables SIZ, ROA, AGE, MSO with control variables comprising D_DIS, D_EXP and D_LIS (an indicator variable that equals to 1 if a firm is listed a stock exchange and 0 otherwise). Model 4 reports regression results using as independent variables SIZ, ROA, AGE, BLO with control variables comprising D_DIS, D_EXP and D_LIS. Definitions of the independent variables are provided in Appendix A. Reported beneath each coefficient estimate (in parenthesis) are the t-statistics using White heteroskedasticity-consistent standard errors. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively

Table 9: The impact of Firm level determinants on defence firm average anti-corruption bands (robustness check)

Model	1	2	3	4
C	-16.5600 (-2.38)**	-39.6322 (-2.84)***	-15.1062 (-4.04)***	-15.6874 (-4.06)***
SIZ	1.8332 (2.15)**	4.7501 (2.61)***	1.7526 (3.45)***	1.8379 (3.48)***
ROA	-0.1068 (-0.71)	-0.0564 (-0.47)	0.0955 (1.79)*	0.1040 (1.88)*
AGE	-0.0537 (-0.10)	-0.0720 (-0.11)	0.1998 (0.71)	0.2031 (0.72)
D_DIS	3.6564 (4.35)***	5.0731 (3.04)***	1.5851 (2.77)***	1.5487 (2.70)***
D_EXP	1.9356 (1.38)	5.0626 (2.42)**	1.6746 (2.60)***	1.7763 (2.78)***
MSO	-0.0396 (-2.11)**		-0.0061 (-0.65)	
BLO		-0.1178 (-2.00)**		-0.0102 (-0.96)
CGQ	0.0567 (2.72)***	0.0945 (2.07)**		
McFadden R^2	0.4816	0.6129	0.3842	0.3883
LR statistic	34.76	44.24	54.03	54.55
N	54	54	106	106

This table reports multivariate regression results using logistic regression analysis with sample sizes ranging from 54 to 106 unique defence firms from 25 countries as at Oct 2012. The dependent variable for all models is an indicator variable constructed from the six bands that comprise the average transparency anti-corruption scores (ACI) by firm level obtained from Transparency International UK website and equals 1 if the firm is within anti-corruption bands A or B or C, or 0 if firm is within anti-corruption bands D, E or F. The independent variables of interest come from firm level variables. Model 1 reports regression results using as independent variables firm size (SIZ), Return on Assets (ROA), Firm age (AGE), Managerial share ownership (MSO) and corporate governance quality index (CGQ) with control variables comprising D_DIS (An indicator variable that equals to 1 if a firm is disclosing anti-corruption information publicly and 0 otherwise) and D_EXP (an indicator variable that equals to 1 if a firm belongs to one of the major arms exporting nations: USA, Russia, Germany, the UK, and China , and 0 otherwise). Model 2 reports regression results using as independent variables SIZ, ROA, AGE, CGQ and Proportion of shareholding held by blockholders that are greater than 5% of a firm's equity (BLO) with control variables comprising D_DIS and D_EXP. Model 3 reports regression results using as independent variables SIZ, ROA, AGE, MSO with control variables comprising D_DIS and D_EXP. Model 4 reports regression results using as independent variables SIZ, ROA, AGE, BLO with control variables comprising D_DIS and D_EXP. Definitions of the independent variables are provided in Appendix A. Reported beneath each coefficient estimate (in parenthesis) are the t-statistics using White heteroskedasticity-consistent standard errors. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively

Table 10: Price reaction to defence companies' anti-corruption risk index announcement

Annoucement Date (MM)			Disclosing		Anti-corruption Band		Exporting		CPI	
		ALL	**No**	**Yes**	**Low**	**High**	**No**	**Yes**	**Low**	**High**
	Mean%	0.50	0.50	0.53	0.52	0.49	0.95	0.31	0.79	0.39
	Median%	0.53	0.53	0.58	0.52	0.57	1.43	0.47	0.56	0.53
MM + 1	SRT	(3.18)***	(2.44)**	(2.04)**	(2.40)**	(2.17)**	(3.12)***	(1.78)*	(2.55)**	(2.18)**
	Mean%	0.39	0.39	0.11	0.85	-0.04	1.73	-0.16	1.22	0.09
	Median%	0.47	0.47	0.32	0.77	0.32	1.75	0.14	0.91	0.14
-1+ MM +1	SRT	(1.60)	(2.30)**	(-0.37)	(2.98)***	(-0.63)	(5.22)***	(-1.43)	(3.41)***	(-0.17)
	Mean%	0.48	0.48	0.04	0.98	-0.01	2.33	-0.28	1.77	0.02
	Median%	0.22	0.22	0.21	0.92	0.09	2.02	-0.07	1.03	0.04
-1 + MM +2	SRT	(1.45)	(2.52)**	(-0.91)	(3.06)***	(-1.05)	(6.34)***	(-2.32)**	(4.31)***	(-0.88)
		0.56	0.56	0.32	0.95	0.18	2.06	-0.05	1.49	0.23
	Mean%	0.44	0.44	0.48	0.72	0.09	1.67	0.06	0.12	0.56
-2 + MM + 2	Median%	(2.89)***	(3.09)***	(0.72)	(4.30)***	(-0.30)	(6.21)***	(-0.53)	(4.09)***	(0.92)
	Mean%	0.77	-1.35	4.40	-2.48	3.55	-1.68	1.77	-4.10	2.51
	Median%	0.02	-1.59	3.81	-3.17	3.43	-0.94	0.43	-5.17	0.89
-60 + MM + 3	SRT	(1.87)*	(-9.56)***	(15.60)***	(-8.41)***	(8.61)***	(-4.50)***	(5.09)***	(-13.38)***	(10.18)***
N		**76**	**48**	**28**	**37**	**38**	**22**	**54**	**20**	**56**

This table reports mean and median abnormal returns for samples ranging from 20 to 76 companies employing the market model for defence companies anti-corruption index announcements date (MM) for the period 2012: the announcement date to one day after the announcement day (MM+1), day before the announcement date to one day after the announcement day (-1 + MM +1), one day before the announcement date to two days after the announcement day (-1 + MM + 2), two days before the announcement date to two days after the announcement day (-2 + MM + 2), and 60 days before the announcement date to 3 days before the announcement day (-60 + MM + 3). Significance levels of mean abnormal returns are reported using the standardised residual t-tests SRT with *, ** and *** indicating statistical significance at the 10%, 5% and 1% levels, respectively.

Table 11: Stock market liquidity Changes and Anti-corruption Risk Index

			ALL	ACI		MW test
				Low	High	
ILI	Pre 1 year	Mean Median	5.49 0.60	7.84 0.80	3.27 0.35	1.54
	Post 1 year	Mean Median	4.78 0.54	8.23 0.96	1.51 0.33	1.41
WSR test Pre. Vs. post 1 year			3.56***	1.74*	3.72***	
ILI	Pre half a year	Mean Median	4.91 0.60	6.11 0.76	3.76 0.34	1.68*
	Post half a year	Mean Median	5.61 0.56	9.98 0.86	1.47 0.32	1.59
WSR test Pre. Vs. post 1 year			3.49***	1.87*	3.63***	
HLS	Pre 1 year	Mean Median	3.03 2.70	3.35 2.95	2.71 2.57	2.13**
	Post 1 year	Mean Median	2.74 2.37	3.20 3.04	2.30 2.07	2.04**
WSR test Pre. Vs. post 1 year			4.21***	3.12***	4.45***	
HLS	Pre half a year	Mean Median	2.86 2.56	3.15 2.80	2.58 2.47	3.18***
	Post half a year	Mean Median	2.73 2.39	3.18 2.65	2.29 2.00	3.01***
WSR test Pre. Vs. post 1 year			3.00***	2.31**	3.40***	
N			74	36	38	

This table reports means and medians of 74 unique defence firms categorised by anti-corruption risk index classification as reported by Transparency International (TI) as either Low anti-corruption risk band D or E or F or high anti-corruption band A or B or C. This table presents non-parametric Mann_Whitney (MW) test statistics for the difference in median liquidity across the two different groups. This table also provides non-parametric Wilcoxon Signed Ranked (WSR) test for the difference in median liquidity between pre and post anti-corruption announcement.

Table 12: Determinants of improvement in stock liquidity after a year of the announcement of anti-corruption risk index

Dependent Variable	Amihud's illiquidity (ILI)		Corwin and Schultz bid-ask spread (HLS)	
Model	**1**	**2**	**3**	**4**
C	1.1684 (9.97)***	1.4379 (2.49)**	1.0609 (15.79)***	1.1374 (3.35)***
ACI	-0.0048 (-2.34)**	-0.0046 (-2.16)**	-0.0031 (-2.53)**	-0.0038 (-2.77)***
SIZ		-0.0394 (-0.55)		0.0016 (0.04)
ROA		0.0035 (0.51)		0.0009 (0.29)
AGE		-0.0225 (-0.72)		0.0139 (0.53)
D_DIS		0.0425 (0.84)		0.0649 (1.58)
D_EXP		-0.0188 (-0.19)		-0.1003 (-1.63)
MOS		0.0002 (0.18)		-0.0015 (-1.82)*
IDR		1.9401 (0.81)		-0.9530 (-0.74)
F-statistic	10.91	1.87	9.65	2.84
N	74	74	75	75
Adjusted R-squared	0.1195	.0867	0.1046	0.1656

This table reports multivariate regression results using OLS with sample sizes ranging from 74 to 75 unique defence firms from 25 countries as at Oct 2012. Model 1 reports regression results using as dependent variable the ratio of Amihud's (2002) illiquidity for a year post to the year prior to anti-corruption index announcement date (ILI) and as independent variable the average transparency anti-corruption scores (ACI) by firm level obtained from Transparency International UK website. Model 2 reports regression results using as dependent variable ILI and as independent variable ACI with control variables comprising firm size (SIZ), Return on Assets (ROA), Firm age (AGE), Managerial share ownership (MSO) and corporate governance quality index (CGQ), D_DIS (an indicator variable that equals to 1 if a firm is disclosing anti-corruption information publicly and 0 otherwise) and D_EXP (an indicator variable that equals to 1 if a firm belongs to one of the major arms exporting nations: USA, Russia, Germany, the UK, and China , and 0 otherwise). Model 3 reports regression results using as dependent variable the ratio of high and low price spread for a year post to the year prior to anti-corruption index announcement date (Corwin and Schultz bid-ask spread denoted HLS) and ACI as independent variable. Model 4 reports regression results using as dependent variable HLS and ACI as independent variable with control variables comprising SIZ, ROA, AGE, MSO and CGQ, D_DIS and D_EXP (. Definitions of the independent variables are provided in Appendix A. Reported beneath each coefficient estimate (in parenthesis) are the t-statistics using White heteroskedasticity-consistent standard errors. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively