Redefining corruption's measurement: A way for more efficient markets and safer investments

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Most financial experts place corruption second in their decision-making process. However, corruption is a key factor in both economic development and financial markets. It is so crucial that the World Bank regards it as "*The single greatest obstacle to economic and social development*" (Weil 2016). One of the reasons is that corruption remains an elusive yet immensely complicated phenomenon, whose monitoring is difficult owing to its unlawful elements. Corruption, unlike other white collar crimes such as tax fraud or undeclared employment, cannot be assessed directly since it is the outcome of an unrealized profit. Nonetheless, investors must take corruption more seriously. In globalized markets, whomever understands corruption at its finest has a significant edge over his competitors. To do so, we need effective techniques to assess it in order to incorporate it more effectively into financial modeling. That is why we must reconsider its measurement.

As Corruption is not widely taught in business and finance schools, I will first detail why corruption matters and how it manifests itself. Then I will explain why and how we have to redefine its measurement.

Why does it matters for finance?

Lowering the investment and efficiency

Nobody will be surprised if I say that corruption has a detrimental influence on financial stability and lowers the return on investment. As brides are expensive, a higher prevalence of corruption in a specific location diminishes the return on investment.It suffers from asymmetrical information too. If we do not pay enough, the bribe may be insufficient since a rival may make a greater offer. Due to the illegal nature of bribery, a deal reached with a bribe cannot be enforced by a court if one of the participants refuses to obey. In reality, trust is critical in corporate success, but it is even more so when bribes are involved. However, there is no trust in a corrupted deal as the agent (administration) is ready to betray his duty and the general welfare for maximize his individual's short run utility. Such dishonest behavior cannot be trustworthy and creates an asymmetrical information. The bribe occurs like an investment tax whose price is not known before. The resulting insecurity reduces the expected cash flow of the investment making it less appealing. As Wei (1997) demonstrated, the tax effect of corruption on investment can be mathematically interpreted. :

$$\Pi_{investment} = (1-q)f(x) - c(x)$$

Where $\Pi_{investment}$ is the net benefice of an investment, q is the corruption level, $f(x)$ is the the convex production function and $c(x)$ the convex cost of investment. It is clear that $\Pi_{investment}$ is decreasing in q meaning that an higher corruption level reduces the optimal investment of a company. The performance of the stocks are lowered with less investment as less profitability is expected in the future.

Furthermore, as a bribe gives an unfair advantage against competitors, such as monopoly rights, governmental subvention, or hindrance of competitors via excessive bureaucracy, competition is decreased. The reduced economic efficiency diminishes the return on investment of all parties since the market leader stops innovating, lowering growth, and the non-cracked participants suffer from increased insecurity as a result of the administration's unfair behavior. The shareholders invest in the financial market in order to profit from the company's future expansion, which in this case fails. Markets and industries with higher levels of corruption are less appealing to investors because they attract less investment and create more uncertainty. Markets suffer from a lack of capital. It also has a negative impact on the overall welfare.

A threat for financial markets

Markets face not only less investment and lower returns, but they also become riskier and less stable as corruption levels rise. As a result, the globalized economy faces a global threat. A market shock has the potential to spread worldwide. This is even more concerning when we consider that one of the world's fastest growing markets is China, where corruption is rampant.

Corruption has a negative impact on the enforcement of rules and internal regulations. Banks are harmed by inefficient and risky activities. The loans

are subject to bribes, which reduces the chances of efficient projects receiving one. It reduces the bank's profitability. Inefficient loan allocation exacerbates social inequalities (Toader et al. 2018), making the local economy and government less stable and more vulnerable to unrest. Because those projects are less profitable, the bank's stability suffers. The risk of such projects failing is far greater than it should be. Furthermore, during an economic downturn, banks are exposed to a much higher risk of bankruptcy, threatening massively the population's savings as well as the local economy to systemic recession. Economics needs longer time to recover from those shocks.Corruption is also harmful to the market because it reduces positive volatility and raises the risk of a systemic crack (Spyromitros 2020) due to a lack of proper internal and external regulations, as well as for the reasons I have already mentioned.

Figure 1: NASDAQ and Russian index RTS Performance on Daily basis
Source NASDAQ: Yahoofinance, RTS: WallstreetJournal

Corrupted companies are less risk averse and tend to pursue riskier projects, increasing the probability of a stock price crash (Bourbaki et al. 2013).

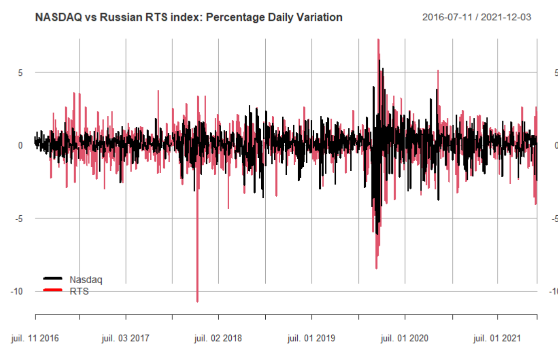

Figure 2: NASDAQ and Russian index RTS Volatility on Daily basis
Source NASDAQ: Yahoofinance, RTS: WallstreetJournal

Corruption lowers employees' ethical standards, allowing them to maximize their short-term utility at the expense of the company. Furthermore, corruption significantly slows economic growth by lowering general efficiency, investment level, and profitability. This is especially important for financial analysts, who use indicators like growth and GDP as a metric in their decision-making. Weak corporate governance and regulatory is a red flag for most financial advisors.It is critical to be able to identify these scourges.

A excellent example of the effect on markets is to compare two equivalent indices. One is in a highly corrupted environment, while the other is in a lowly corrupted environment. Figures 1 and 2 show a comparison of the NASDAQ with its Russian counterpart, the RTS, from 2016 through 2021. Figure 1 shows that the RTS experienced a stronger recession than the NASDAQ following financial shocks such as the one that occurred in March 2020, and it took a longer time to recover from it. Figure 2 depicts the daily returns of both indices.The RTS experienced more negative volatility than the NASDAQ while having less positive volatility on average meaning greater risk for less return. Even if we cannot draw any conclusions from only comparing two indices, it highlights well the impact of corruption on financial markets.

It's clear that corruption is a major threat for financial markets as it reduces the investment and the economic growth. It lowers the stability of financial institutions like banks and weakens the regulatory power of government agencies. However, the actual channel of causalities and the exact causes remain mostly unknown. Even the empirically results are mixed. The main reason is that the topic is well more complex as it looks like at a first glance. That's why a short overview of corruption is helpful to understand the challenges.

Corruption or Corruptions?

In academical terminology, Corruption includes way more concepts that the non-specialist would assume. In fact, there are no unique precise definition and many studies adapt one to their own problematic. Of course, this way of proceeding is particularly problematic for the comparison between studies. The decision in the investing sector is disturbed by it too. That's one of the reason why the debate about the danger of corruption is not totally resolved, because imprecision prevents us from reaching unambiguous conclusions and identifying causation channels.

The need of uniformity

Luckily, it exists a definition that is widely accepted. The corruption is defined as **the misuse of public resources by an official and entrusted power** (Rose-Ackermann and Palifka 2016:9). This definition has the advantage to be clear enough for a lawyer to identify quickly what is corruption from what is not. Nonetheless, it's a true nightmare to whoever wants to use it for empirical research or to detect corruption as a financial analyst would do.

Comparing apples to oranges

This definition accepts under the common term of corruption many illegal practices whose effects are not the same. Embezzlement, nepotism, Cronyism, Kleptocracy, active bribery (the agent asks explicitly a bride for a service he shall already provide without it), passive bribery (giving the agent a bride for unconventional service like an undue advantage), tax evasion and money laundering are some but sadly not exhaustive types of practices we can call corruption. Therefore, it is logic that the theoretical frameworks from one study to an other one vary depending on how we approach the problem. To put it another way, it's like trying to find a specific type of teddy bear in a toy store with the only indication that it's a teddy bear. .

Grease the wheel

Under some special circumstance, the corruption may even be positive for firms and financial markets as corruption may act as speed money too. The corruption may act to bypass a too harder bureaucracy and so gaining profitability. Another impact is the tight connections with political power that allows to get better contracts and supports from the administrations. All this advantages are regrouped under the denomination **grease the wheel theories** in opposition of the **sand the wheel theories**. However, such cases are very particular and do not depict the vast majority. But it demonstrates that not all forms of corruption are the same. Not every effect is necessary harmful. That's why, the financial analysts shall know which one is a red flag. It is false to speak about one corruption with only one cause and consequence. As a result, the studies and business analyses must be more focused on what types of environments are present and what the drivers are in that situation.

In sum, corruption should be considered as a category rather than a singular phenomenon because it encompasses a wide range of practices. The difficulty lies in precisely identifying each channel and type of corruption.There we are confronted with the primary challenge of corruption, as well as the primary goal of this article: the identification of corruption.

Detect the undetectable

As it is illegal, corruption cannot be directly measured. It is hidden. Furthermore, the corruption's effect is not easily directly measurable as it creates a gap with an ideal state in which resources are correctly used.

Nowadays, The main way to measure corruption is through the **Corruption's Perception Index (CPI)** designed and measured by Transparency International. As its name suggests, the CPI does not measure the corruption itself but it collects survey about how the corruption is perceived among a representative sample of population, businessmen and politicians. It is a complex aggregation of non-parametric indicators. It is the most widely used metrics in academics as by financial institution like the International Monetary Fund or the World Bank (Anderson and Heywood 2009).The index has a scale from 0 to 100 as 100 representing the absence of corruption. Each year the countries' values are standardized so that the cross country mean is set to 45 (Transparency International 2020) following the following equation for the country i:

$$X_i = \frac{original\ value\ for\ X_i - mean}{standard\ derivation} * 20 + 45$$

The CPI has a number of flaws. The first one is the most obvious as it does not measure the corruption itself but it's perception, which is subjective. It has been proven that it exists a bias between the actual corruption and its perception (Anderson and Heywood 2009). For example, a country fighting against corruption will catch more corrupted agents than an autocracy with an high acceptance for corruption. A corruption affair will be mediated keeping the perception of corruption high due to the bias of availability bias.

The second main flaws is that the CPI relates to corruption in general. As previously stated, corruption is a broad category that encompasses a wide range of practices with varying outcomes. In order to have relevant information for the investment analysts, we need to be able to detect each different types of corruption. It is crucial for investment bankers and other financial analysts to understand where are the opportunities and where are the dangers. Taking corruption as a uniform phenomenon, we exclude many promising sectors and companies, whose operations are located in ar-

eas with a higher level of corruption. It excludes them without knowing whether they represent a genuine risk to the investment. The fastest growing economies are in developing countries where corruption is widespread. It represents the same number of missed opportunities.

Redefining the measurement

There is a real need to redefine more precisely the corruption for having a consistent approach between studies. It will allow a better clarity for the investment decision from private sector and from public investment agencies like the World Bank and the International Monetary Fund. A more critical beneficiary will be the rating's agencies. They will enjoy more reliable ratings that will increase their accuracy. Last but not least, the world's financial stability will be ameliorate. In a globalized economy, it is a must to be able to better identify each type of corruption. That's why, we need to rethink the way of measurement.

The task is difficult. Corruption is often combined with other macroeconomics features. Some worsen its effect. Other weakened it such as the liberty of press and freedom of economy (Anh-Tuan et al. 2020). Collinearity makes the identification way more challenging. However, the recent progress in machine learning and econometric open the possibility of better and more precise detection of corruption. Being able to detect the different type of corruption would be a major progress for the fight against it but also for more efficient and safer investment. It is surprising that the majority of the studies about the topic do not focus on the detection issues.

It exists many promising approaches that allow to identify more precisely some harmful types. The minding gap methods is suited for identify precisely embezzlement and kleptocracy (Sequeira 2012). The main advantage of this method is that it is a direct measurement. Moreover, it can be applied for public as for private investment projects. It allows a primary detection and avoid the inefficient expense that are important for investors. Another promising approach is the statistical and market inference through cross-country panel data but the most promising one is the Machine Learning detection. The first studies using machine learning (Colonelli, Gallego and Prem 2020), have found clear and efficient detection of the corruption. It is really well suited for non linear issue like corruption. The machine learning is extremely agile and allow to detection of many types. It is a new method but the results are promising. It requires more attention.

Final considerations

The aim of this article is not to detail or to summarize every methods. The main goal is that the financial private sector understands the crucial importance of corruption for its deals. A clear and precise detection of corruption could be extremely beneficial. The second goal is for future research to be more focused on relevant and efficient detection tools.Finding an index that includes different perspectives will improve understanding of the phenomenon, allowing for better research. To conclude, academics and the private sector must pay more attention to this question. Those who can identify where the risks and opportunities are will have a significant competitive advantage over their competitors. Often, the best undervalued opportunities are where others are hesitant to invest.

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