

DRAFT June 7, 2011

## Credible Signaling in Regulatory Relationships

*Hanzo van Beusekom, partner at Clear Conduct and research fellow at ANZSOG*

*Karina Raaijmakers, manager at the Netherlands Authority for the Financial Markets (AFM)*

### **Summary**

The relationship between regulators and regulated firms is strongly influenced by information asymmetries. Regulated firms have more information on their compliance level than the regulator has. Regulators will need to estimate the quality of regulated firms based on limited information in order to target their investigations at the firms with the lowest compliance quality. To avoid the costs of an investigation and possible corrective actions, regulated firms will try to signal to the regulator that they are of high quality and do not need to be investigated. Under certain conditions, signaling can overcome this information asymmetry and is beneficial to both the regulator and regulated firms with high compliance levels. If firms with a high compliance level succeed in signaling their high quality they will save the costs associated with investigations and the regulator can aim its investigations at firms with low compliance levels.

This article will first establish what the conditions for credible signaling are and will then investigate how the dynamics of signaling work in the regulatory context. The authors state that for a signal to be credible it needs to be *relevant, verifiable, costly and extra costly for low quality firms*. Using a simple model and a few basic assumptions, the article will show that the *lower* the compliance quality of the firm, the more the firm is willing to invest in signals to convince the regulator that it is of *high* quality in order to reduce the probability of an investigation. Trying to convince the regulator that the firm is of high quality is a dominant strategy for low quality firms, as long as the expected investigation costs are higher than the signaling costs. If successful, it prevents the regulator from inspecting and consequently punishing the firm once the firm's real compliance level is discovered. The first three conditions for a signal to be credible do not enable a regulator to distinguish high quality firms from low quality firms, as a low compliance firm is just as able as a high compliance firm to compose and send relevant, verifiable and costly signals. Only the inclusion of the fourth condition, *being extra costly for low quality firms*, enables the regulator to correctly target low quality firms.

The theoretical findings of this article lead to a number of practical implications for both regulators and regulated firms:

- *High quality firms should aim to send out signals that are extremely costly to replicate by low quality firms. Examples of these types of signals are independent audits on its compliance level and inviting the regulator to thoroughly assess the compliance quality level.*
- *Regulators should be wary of firms that make large investments in signals that are not more costly for low than for high quality firms as these might be indicators of low levels of compliance.*
- *Regulators should only value signals that encompass all four conditions of credible signaling.*

From our experience as regulators we know that regulators and regulated firms do not intuitively grasp these implications. For example, both regulators and regulated firms seem to overly value signals that are expensive, irrespective of whether these signals are more costly to low quality firms than to high quality firms. Our paper contains several hypotheses for further empirical research.

### **1. Strong information asymmetry exists between regulators and the regulated**

Regulators all around the world have a tough job to do. Whether they are regulating the financial market, environmental hazard, food safety or any other remit, they all face the same challenge: to deliver as much public value as possible while using as few resources as possible (Moore 1995). The standard approach to this challenge is to introduce risk based regulation. Risk based regulation implies directing the regulatory resources to the area's with the highest risks and to spend only little resources on the low risks. In this way the public value from the investment in regulatory capacity can be maximized.<sup>1</sup>

This approach raises an important question: how is the regulator able to find out what the highest risks are? In most regulatory areas the number of subjects is too large for a detailed assessment of the compliance and risk level. If we take a financial regulator in a midsize economy as an example, the regulator might be regulating several hundred or even a few thousand financial firms. Regulators can make a rough estimate of the compliance and risk level by using a range of instruments, such as analysis of annual accounts and management letters, self-assessments, surveys, and interviews with management. Usually the regulator only brings a few of these instruments into action on a specific firm, so strong information asymmetries remain. Even after using all of these instruments a considerable amount of uncertainty still exists about the compliance level of a specific firm. Given the sheer size and complexity of the firms, it is often just too costly in time or money to perform a thorough analysis of every firm. This leads to a classic example of asymmetric information; the regulator knows less about the compliance level than the regulated firms. To make it a bit more complicated, information asymmetries do not only exist on the compliance level of the firm but also on the intentions of regulated firms (e.g. Stiglitz (2000) makes the distinction between asymmetries concerning information about quality and asymmetries concerning information about intent). In this article, we primarily focus on information asymmetries on quality (i.e. compliance level).

Signaling theory is fundamentally concerned with reducing information asymmetries between two parties (Spence 2002). Over the past years, signaling theory has been applied to a wide array of research areas (Connelly 2011), for example strategic management (e.g. how CEOs signal the unobservable quality of their firms to potential investors (Zhang & Wiersema 2009)), entrepreneurship (e.g. the signaling value of board characteristics (Certo 2003)), and human resource management (e.g. signaling in the process of recruitment (Suazo, Martínez & Sandoval 2009)). Surprisingly, signaling theory has never been applied to the regulatory context.

Management of regulated firms usually has detailed knowledge of the compliance level of the firm. The day to day running of the firm gives them a good implicit knowledge of the compliance level. This

---

<sup>1</sup> There are several issues with this standard approach besides the one mentioned in the next paragraph, but they lie outside the scope of this paper.

knowledge is usually supplemented with large amounts of explicit knowledge that is provided by risk reduction functions such as internal audit, legal and compliance functions. Firms with a high level of compliance will be willing to try to communicate their compliance level to the regulator. Firms with a low level of compliance will try to reduce the probability of discovery by giving the regulator the impression of having a high compliance level. As a result of this dynamic all firms will try to signal that they have a high compliance level. The problem of asymmetric information is persistent and it remains difficult for the regulator to see which firms truly have a high level of compliance. Consequently, the regulator might misdirect its resources leading to unnecessary costs for the 'good' firms that are investigated and less public value as 'bad' firms are not investigated.

## **2. Regulators and firm with high compliance levels could benefit from credible signaling**

If high quality firms were able to credibly signal their compliance level, both regulators and firms with high compliance levels would be better off: the regulator increases efficiency in producing public value by focusing on the firms with low compliance levels and firms with high compliance levels save the costs that are associated with investigations by regulators.

A regulatory investigation of a firm can lead to substantial costs even when a firm has a high level of compliance. Management needs to spend time preparing the visit, documents and usually several meetings need to be prepared and held. All this usually leads to regulatory findings (good or bad) which are shared with the firm and to which the firm needs to reply, often assisted by expensive internal or external lawyers. The greatest worry of the management of a 'good' firm is that the regulator might find minor infringements despite the average high quality of compliance. Even if they are less severe than infringements at comparable firms, the investigation may lead to some form of enforcement with possible reputational damage.

It is interesting to note that the enforcement of minor infringements is also inefficient from a regulatory perspective. Regulatory resources could instead have been deployed on more severe compliance issues at firms with lower compliance levels. This alternative use of resources would have created a higher level of public value. Credible signaling may increase the probability that scarce regulatory resources are deployed on the most severe compliance issues and consequently 'good' firms and regulators benefit. Due to the wasted costs and resources 'good' firms and regulators would benefit from credible signaling. Firms with low compliance levels would of course lose from better signaling. They would bear the brunt of increased scrutiny by regulators as they no longer can hide by pretending to be a good firm as well. In summary, better signaling leads to a higher probability that each stakeholder gets what he deserves at minimal costs and, consequently, society benefits from better signaling.

Given the high interests that are at stake it is not surprising that all regulated firms send signals to their regulator. Sometimes this happens proactively and sometimes after the first knock on the door by the regulator, depending on the type of relationship between the regulator and the regulated. The important question is how regulators can distinguish between credible signals and mere noise. We will look at this question first from a theoretical point of view and will then discuss several examples of signaling dynamics.

### 3. What makes compliance signals credible?

Based on the signaling literature and our regulatory experience, we will investigate four different conditions that may give credibility to a signal sent from a regulated company to a regulator. The conditions are: relevance, verifiability, costliness, and discriminating power.

The first condition is that a signal needs to have sufficient *relevance* to the object under investigation, in this case the level of compliance.<sup>2</sup> Connelly et al. (2011) describe this aspect as 'signal fit', or the extent to which the signal is correlated with unobservable quality. There has to be a clear relationship between the signal and the implied level of compliance. This may sound blindingly obvious but in practice many signals violate this very simple first condition. For example, financial firms often signal to regulators that a specific product or practice has not led to a significant number of complaints from financial consumers and is therefore of good quality.<sup>3</sup> However, there can be many reasons why consumers are not complaining about a poor financial product or practice. Maybe they simply don't realize that their product is of low quality since its effects take years to materialize. Or they might just be sulking in silence as they think that complaining is no use. Or they are too ashamed to admit they were duped, as happens often with financial frauds. 'Absence of evidence' is not 'evidence of absence', so this 'no complaints' signal should be deemed to be of moderate to low relevance. Signals like: 'we have a new energetic compliance director', 'look at our new Corporate Social Responsibility programme' or 'we sponsor academic research' are ubiquitous but of even lower information content. The relationship with the object under study, the level of compliance, is too weak and as a result the signal has low credibility. If, on the other hand, a financial firm would tell the regulator that all sales by advisors are checked by an independent quality team with a clear mandate and incentives to enforce the 'customer comes first' rule, this would probably be seen as a credible signal.

The last example leads to the second condition. The signal needs to be *verifiable* in order to be credible. If the CEO states: 'we have an independent quality team with a clear mandate and the right incentives but you may never speak to them', this would certainly reduce the credibility of the signal. It is not a problem if verification comes at some cost but it should be possible in principle. The possibility of finding out whether the CEO tells the truth with one or two phone calls increases the credibility of the signal. If verification is extremely costly this reduces the power of the signal. Usually regulatory signals are verifiable at moderate cost so this condition is not too stringent.

The third condition is that signals need to be *costly* in order to be credible (e.g. Bird & Smith 2005). Biology gives interesting insights into this condition. The mainstream theory on why peacocks have such large and beautiful tails is because they are costly. Only the strongest males have the strength to grow and sustain such a magnificent tail. And by being able to afford this extravagance they signal quite credibly to prospective mates that they are the strongest male. In human relationships similar dynamics can be observed. In many cultures engagement rings need to be of a certain minimum value, e.g. two months salaries. The signal to the bride is quite clear: 'you are financially safe with me'. A cheap 20 dollar engagement ring simply does not do the trick.

---

<sup>2</sup> Lawyers know this too. If a signal by the opponent in court is deemed to be of low relevance, they shout: 'Relevance, your honor, Relevance!'. At least they do so in the TV series.

<sup>3</sup> We often use examples from financial firm because we have firsthand experience with this type of regulation. We are confident that the underlying dynamics we describe is applicable to a wide range of regulatory fields.

Although the management of financial firms usually does not buy engagement rings for regulators they do use the same mechanism. They might expand on the fact that the compliance division has a large budget ('despite the tough economic times') or that taking that specific not fully compliant product of the market has led to large costs or profits foregone. 'Talk is cheap' and 'put your money where your mouth is' are expressions to convey the same message: a signal needs to be costly in order to be credible. In the next paragraph we will investigate whether there is always a positive relationship between costliness and credibility.

The fourth and final condition is that a signal is more credible if it has discriminating power. With discriminating power we mean that a signal is more costly to a firm with a low compliance level and less costly to a firm with a high compliance level. In order to maintain their effectiveness, the costs of signals must be structured in such a way that dishonest signals do not pay (Connelly et al 2011). This aspect of signaling was first described by Michael Spence (1973) in the labour market. In this context employers want to hire recruits with the ability to learn. The problem is that all recruits claim to be good learners and only the recruits know firsthand to what extent. In this problem of asymmetric information formal education, such as going to college, can be a credible signal because it has discriminating power. Formal qualifications are more difficult to obtain (i.e. more costly) for recruits with low learning abilities than for recruits with high learning abilities. Interestingly enough the strength of the 'I finished college' signal is independent of the question whether or not the recruit actually learned something useful in college. This specific example meets all four credibility conditions: it is relevant, verifiable, costly, and discriminating.

In the next paragraphs we will apply these four conditions of credible signaling to the regulatory context. We will first look at a simple model that tests the first three conditions, then we will add the fourth condition of discriminating power to the model.

#### **4. How do the signaling dynamics work in the regulatory context?**

Let's assume that a regulator had more than a several hundred firms under its supervision. Out of this portfolio we will investigate the behavior of two specific firms with different characteristics. Firm A has an adequate level of compliance. It might make some mistakes and unintentionally break a rule or two, but in general it is willing and able to comply with the rules and regulations. Firm B, on the other hand, has a low level of compliance. It might be able, but is certainly not willing to play by the rules. By breaking the rules, for example by failing to treat customers fairly, it can sell lower quality products at similar prices as Firm A's. Consumers often cannot properly assess the quality of financial products and services (Llewellyn 1999). As a result the lower compliance Firm B makes more profit than Firm A does. These dynamics are quite pervasive in financial markets and probably other regulatory areas as well. It is costly to stick to the rules and a lot of money can be made by bending or breaking them. To start building a numerical model, assume that the compliance level of Firm A is 95 (where 100 is above all reproach) and the compliance level of Firm B is 80. By shirking the rules Firm B has an excess profit of €50 million over Firm A's profit.

The financial regulator is currently making the yearly standard assessment of the estimated compliance level of all firms. Only the ones that are deemed 'high risk' will be investigated thoroughly as there is no time to investigate all the firms of which the risk levels are estimated to be 'medium' or 'low'. Before and during this assessment process the management of Firm A and Firm B have the opportunity to send *relevant, verifiable and costly* signals to the regulator, in line with the

first three conditions of the previous paragraph. For a financial firm an example could be to take a specific low quality product out of the market that is known to be detrimental to financial consumers. Let's suppose there are in total five signals available to the management and that each signal bears a monetary cost of €1 million. The management of Firm A and Firm B now have to decide how much money to invest in these signals.

The management of both firms will make a cost-benefit analysis of investing in these signals. To be able to make this judgment they need to answer two questions. 1.: *What will be the costs of a regulatory investigation given my compliance level?* And 2.: *To what extent will investing in a signal reduce the probability of an investigation?*

1. *What would be the costs of a regulatory investigation given my compliance level?*

When the regulator will perform a thorough on-site investigation he will have a good probability of finding out the true level of compliance. For the sake of simplicity let's say that this is always the case. The investigation costs – both for a low compliance firm as a high compliance firm – consist of fixed costs of preparing and managing an investigation and variable (enforcement) costs, which depend on the results of the investigation. Let's assume that the fixed costs of a full scale investigation are €2 in lost management time and legal fees. If the regulator enforces the accidental mistakes of firm A this will lead to more legal fees and possibly a fine and reputational damage. Firm A estimates the total costs of enforcement of the unintentional errors to be €10 million, and the probability of enforcement to be 50%. As a result the total expected costs of a full scale investigation to Firm A with a compliance level of 95 is €2 million + 0,5 \* €10 million = €7 million.

Firm B faces the same fixed costs of an investigation of €2 million. But due to its lower compliance level of 80 its variable investigation costs are much higher. When the regulator finds out the true compliance level of Firm B it will almost certainly take corrective measures as consumers are clearly hurt and the breaches are clearly on purpose. So let's set the probability of enforcement at 100% if a thorough investigation occurs. When the regulator enforces it will impose a hefty fine and will make sure that consumers are at least partly compensated for their losses. The amount of the total monetary costs of enforcement depends on many factors but let's assume that the fine, the compensation and the reputational damage are expected to be €20 million. As a result the total expected costs of a full scale investigation to Firm B with a compliance level of 80 is €2 million + 1,0 \* €20 million = €22 million.

Of course we have assumed many specific numbers as we went along with this example. Two generic rules will apply to all cases one can reasonably imagine:

- 1) *The lower the observed level of compliance, the greater the probability of enforcement will be;*
- 2) *The lower the observed level of compliance, the larger the total costs of enforcement will be.*

Given these two rules the relationship between the compliance level and the costs of a thorough investigation will look something like this:

[insert graph, to be completed]

2. *To what extent will investing in a signal reduce the probability of an investigation?*

It is difficult to predict precisely what effect sending a *relevant, verifiable and costly* signal will have on the probability of getting investigated by the regulator. It depends on the perception the regulator has of the importance and credibility of the signal. But it will also depend on the total capacity of the regulator, and the number and seriousness of other investigations the regulator is considering. The effect of a signal might also depend on the regulators estimation of Firm A's and Firm B's compliance level before the regulator receives a signal. If the regulator correctly estimates Firm A's compliance level to be high (say in the 90 to 100 range), a positive signal might reinforce the regulators opinion and lead to a sharp decline in the probability of an investigation at Firm A. If the regulator correctly assumes Firm B's compliance level to be much lower (say in the 75 to 85 range), a positive signal could lead either to a sharp decline ('our prior estimate must have been wrong, we were clearly biased against Firm B') or only a moderate decline in the probability of an investigation ('this might be one positive signal but their overall compliance level will still be quite low').

Let's assume for now that the regulator attaches some weight to the signal and does so to the same extent for both Firm A and Firm B. The regulator is somewhat convinced by the fact that the signal is relevant, verifiable at reasonable cost, and of significant monetary cost to the firm that sends the signal. As a result the regulator reduces the probability that a firm is investigated by 10% per signal. And let's assume that the probabilities of an investigation prior to signaling for firm A are 30% (due to its estimated compliance level in the 90 – 100 range) and for Firm B are 60% (due to its lower estimated compliance level in the 75 to 85 range). It is now possible to analyze who will invest more in signals that are *relevant, verifiable and costly*.

### 5. So...who is investing in costly signals?

Let's start with Firm A, the good guys. They have a 30% probability of an investigation that would cost them €7 million. By investing in a signal they can reduce the probability of an investigation to 20% and save  $10\% * €7 \text{ million} = €0,7 \text{ million}$ . However each signal requires an investment of €1 million. It clearly makes no sense for Firm A to invest in one or more 'good compliance' signals that costs more than they are worth.

The math works differently for Firm B, the bad guys. They have a 60% probability of an investigation that would cost them €22 million. By investing in a signal they can reduce the probability of an investigation to 50% and save  $10\% * €22 \text{ million} = €2.2 \text{ million}$ . They would clearly benefit from investing in a 'good compliance' signal. And as they reduce expected costs by €1.2 million for each signal, they will invest in all five available signals!

This leads to the interesting result that the good firm doesn't make an investment in a signal of good behavior and the bad firm invests in as many signals as they can! We have made quite a few assumptions along the way to reach this result so we can imagine that you think that the result will change as the assumptions in the model change. If you increase the probability and costs of enforcement for Firm A they might start investing in signals as well. And if the added benefit of an extra signal is reduced after investing in two or three signals, Firm B might stop investing in all available signals. However, the basic underlying phenomenon is quite robust. Under all reasonable assumptions low compliance firms have much more to gain from increased credibility than high compliance firms. Therefore low compliance firms will be willing to invest much more to convince regulators that they are actually of high compliance and to reduce the probability of an investigation. This analysis leads to our first findings.

- a) In a scenario where signals are *relevant, verifiable and costly*, low compliance firms will be willing to invest more in credibility signals than high compliance firms;
- b) Regulators should be suspicious of firms that are using *costly* signals to convince them of their high level of compliance. These signals are *not credible* and can even be contra-indicators (indicators of *low* compliance levels).

Clearly, signals that are costly are not working in a context where firms make more profit by shirking the rules. The context is just not comparable to the biological example of the peacock. Rather than a signal of strength these types of investments are a signal of low credibility. As a firm you are willing to pay to keep the regulator away! It is an interesting object for empirical research to see whether regulated firms and regulators can see through this dynamic. Based on our own experience as regulators we expect both regulated firms and regulators to judge costly signals as relatively credible.

### 6. Add discriminating power to the signaling mix....

We will now analyze signals that not only are *relevant, verifiable and costly*, but also have *discriminating power*. In short, these types of signals are more costly for low compliance firms than for high compliance firms. As a result, this type of signal discriminates between low and high compliance firms, leading to a much higher credibility. For a signal to have discriminating power, the difference between the signaling costs for a low compliance firm and the signaling costs for a high compliance firm needs to be big enough. In general,

$\text{signaling cost}_{\text{low compliance}} - \text{signaling cost}_{\text{high compliance}} > \delta$ , in which  $\delta$  is a threshold value which depends on the expected costs of investigation and enforcement.

An example of a discriminating signal is pro-actively inviting the regulator to do a full regulatory scan of the firm's sales practices. Such a full scan can either be done by the regulator directly or, if the regulator has limited time or resources, can be done by an independent agency. The regulator can review the results of the independent agency. In both cases the invitation, if accepted by the regulator, will lead to full transparency on the firm's actual compliance level.

Let's work through a simple example using the same basic assumptions as in the previous paragraphs. Remember from paragraph 4 that without signaling, the high compliance firm, Firm A, faces a 30% probability of an investigation due to its relatively good estimated compliance level in the 90 to 100 range. If it is investigated this will lead to €2 million in fixed costs and a 50% probability of enforcement. If its unintentional flaws are enforced this will lead to €10 million total enforcement costs. The expected total regulatory costs that Firm A faces without signaling is therefore  $30\% * (\text{€2million} + 50\% * \text{€10 million}) = \text{€2.1 million}$ .

If firm A invests in a signal with discriminating power, as described above, two elements of the equation are expected to change. The *probability of an investigation* will change and the *probability of enforcement* once the true level is discovered will change as well. Once again it is not easy to predict the exact magnitude of these changes but we can make some reasonable assumptions about the direction of the changes. An invitation to inspect Firm A has two opposite effects on the *probability of an investigation* for this firm. The first effect is that the regulator will probably see this signal as proof of its earlier estimate that Firm A has a relatively high compliance level. Therefore, a high compliance firm's invitation to inspect its compliance level will *decrease* the probability of an

investigation. The regulator might see its prior belief justified and decides to deploy its resources elsewhere. The second effect is that an invitation to inspect focuses regulatory attention on the firm and lowers transaction costs for the regulator to perform an investigation. The firm literally puts itself on the regulatory radar and says: 'Hey, I'm here! I've got nothing to hide and will cooperate with an investigation. Why don't you come and have a look?!'. If the regulator has some form of output performance metrics installed (such as 'number of firms investigated per quarter') as most regulators have, this will be a tempting invitation. As a result of the higher awareness of this specific firm and the lower transaction costs of an investigation the probability of an investigation for Firm A *increases*. It is uncertain which of the two effects is bigger. To be on the safe side we will assume that the combined result of the two effects is that the probability of an investigation *increases* as result of the open invitation to 40%.

The second element of the equation that will change is the *probability of enforcement* after the investigation has concluded. The regulator will always have some findings given the not-perfect compliance level of 95. However, the regulator will also conclude that these findings seem to be unintentional and relatively minor and it will be mindful of the fact that the investigation was a direct result of the fact that Firm A invited the regulator. This will most probably *lower* the probability of an enforcement action. It is not sensible for a regulator to enforce non-compliance that is probably unintentional, relatively minor and from a firm that is fully cooperative and has invited the regulator to come and inspect. Even if it were to enforce, the regulator would treat the cooperativeness and the pro-active invitation as a mitigating factor. The regulator would lower the regulatory costs of the enforcement action by lowering the fine or by seeking less or no publicity. Let's be on the safe side here again and assume that the *probability of enforcement* in these circumstances is reduced to 25% and leave the regulatory costs of enforcement constant. The expected total regulatory costs for Firm A after sending the signal with discriminatory power becomes:  $40\% * (\text{€}2 \text{ million} + 0,25\% * \text{€}10 \text{ million}) = \text{€}1,8 \text{ million}$  instead of  $\text{€}2,1 \text{ million}$  without signaling.

The exact outcome of this calculation of course depends on our assumptions about the different probabilities and pay-offs. Sending a 'please come and inspect me' signal is worthwhile for the high level compliance firm as long as the regulator gives reasonable credit for the pro-active behavior and the severity of the infringements by lowering the probability or costs of enforcement. Notice that the higher the reduction in enforcement probabilities or costs are at high compliance levels, the more profitable this signal becomes for these types of firms. However, if the regulator enforces all infringements irrespective of circumstances, then sending this type of signal will not be profitable, even for firms with very high compliance levels. In that case all firms will just try to keep off the regulatory radar as well as they can. This trade-off between sending signals and trying to stay off the radar is an important dynamic in regulator – regulated relationships. This trade-off becomes more complicated when regulators are perceived to behave in unpredictable ways. We will explore this dynamic a bit further in the final paragraph. First we will turn our attention to the bad guys.

## 7. ...And the low compliance firms will signal less...

The signaling dynamics work differently for Firm B, the low compliance firm with a compliance rating of 80. Recall from paragraph 4 that this firm has a 60% probability of an investigation due to its relatively low estimated compliance level in the 75 to 85 range. If it is investigated this leads to €2 million fixed costs and a 100% probability of enforcement. Its more severe compliance infringements will lead to €20 million in enforcement costs. The expected total regulatory costs the firm faces without signaling is therefore:  $60\% * (\text{€}2 \text{ million} + (1.0 * 20 \text{ million})) = \text{€}13.2 \text{ million}$

If this firm sends the same 'come and inspect me, I have nothing to hide' signal the *probability of an investigation* will change. Before receiving the signal the regulator estimated Firm B's compliance rating to be in the 75 to 85 range. The regulator will most probably receive this signal with some skepticism as it contradicts its earlier low compliance estimate. At the same time the signal lowers the regulator's inspection costs, since Firm B has just promised to disclose everything and to fully cooperate. Given the fact that the signal contradicts the regulator's estimate and lowers the inspection costs, it is reasonable to assume that the *probability of an investigation* will rise. In this example we assume that this probability rises from 60% to 70%. This assumption is a conservative estimate as it is the same as the increase in probability of investigation for the good firm where the signal does not contradict the regulator's estimate of compliance levels.

If the regulator decides to start an investigation it will find out that the breaches are severe and most probably intentional. As a result it is to be expected that the *probability of enforcement* will remain close to 100% and the enforcement costs will remain similar as well. Given the severity of the breaches the regulator will give little or no credit for the pro-active behavior of the firm. The expected total regulatory costs Firm B faces with signaling are now:  $70\% * (2 \text{ million} + (1.0 * 20 \text{ million})) = \text{€}15,4 \text{ million}$ . In general, this signaling strategy will not be beneficial for low compliance firms as long as the discriminatory signal leads to an increased probability of enforcement and similar expected costs of enforcement.

This example also illustrates that regulators should be careful not to give too much credit to low compliance firms that self-report regulatory breaches. A leniency scheme for firms that self-report breaches and that reduces the expected costs of enforcement to very low levels might very well induce a strategy of 'break the rules, make illegitimate profits and tell the regulator as soon as she comes close'. In other words, a leniency scheme might give bad firms an incentive to keep their compliance level low. This makes it necessary to make a distinction between relatively high compliance firms with unintentional breaches and lower compliance firms with more intentional breaches. High quality firms need leniency in enforcement policies to make them reveal their high compliance status. But if this leniency is also extended to lower compliance quality firms then this can easily lead to perverse strategic behavior. And here we're back to the topic of this article: the challenge of using signals to distinguish between low and high compliance firms. The fact that the firm might misjudge their own compliance level and the possibility that the regulator might act in unpredictable ways further complicates this signaling dynamics.

If we put these complications aside we can now clearly see that 'discriminatory power' is one of the most important characteristics of a credible regulatory signal. The larger the difference between the signaling costs for the high compliance firm and the low compliance firm, the better signaling will work. High compliance firms will often send credible (and consequently discriminatory) signals and as

a result is able to build a strong relationship with the regulator. Low compliance firms will never or very rarely send signals with strong discriminatory power and as a result will draw regulatory attention towards them. Consequently, it's not the direct investment required to send a signal that determines the credibility of a signal but the difference in signaling costs for low and high quality firms and consequently the degree to which a signal had discriminatory power. As we described in paragraph 5, a costly signal with no discriminatory power will have low credibility as it pays for low compliance firms to invest in this type of signal.

## 8. Conclusion and areas for further research

The previous paragraphs lead to a number of conclusions:

1. The relationships between regulators and regulated firms are characterized by strong information asymmetries. Regulated firms have more information about their compliance levels than regulators, while regulators need to have information about the compliance levels of regulated firms to allocate their resources effectively.
2. Public value would be increased substantially if regulated firms were able to credibly signal their true compliance level. Regulators would be more successfully able to target their scarce resources on the highest risks: namely, on the firms with low compliance levels. Firms with high compliance levels would save the fixed costs of investigations.
3. Based on signaling literature we conclude that signals need to be *relevant*, *verifiable*, *costly* and *discriminating* in order to be credible.
4. We show that in the regulatory context *relevant*, *verifiable*, and *costly* signals can easily lead to perverse effects. Low compliance firms may increase their profits by breaking the rules and are therefore willing and able to invest more in *costly* signals to keep the regulator off its back and to reduce the probability of a thorough inspection.
5. To be credible, compliance signals need to be *discriminating*. Signals with discriminatory power are more costly for low compliance firms than for high compliance firms. We show that if this difference is high enough only high compliance firms will be able to send discriminatory signals and consequently the regulator will be able to distinguish high compliance firms from low compliance firms.
6. In order to promote this public value enhancing signaling dynamics, regulators may install a leniency policy that tolerates unintentional regulatory breaches by firms with high compliance levels (but not more serious breaches).
7. This signaling dynamics will be more powerful if firms can accurately assess their own compliance levels and if regulators can observe these compliance levels well during an investigation.
8. This signaling dynamics will be less effective if the firm is unsure about its own compliance level, if the regulator is perceived to be unpredictable, and if the regulator has an (implicit) policy of enforcing all regulatory breaches.

### *Areas for further research*

We have developed our findings by using the economic signaling literature, a simple model of the relationship between regulators and the regulated firm and our own experience as regulators. Certainly, many of our findings could be verified and enriched using a more empirical approach. Two examples of research questions are described below.

*Can regulators see through the costly signal fallacy?* We have shown in this paper that costly signals are not credible by themselves. We know from our own experience that many costly but non-discriminatory signals are sent by regulated firms. It might be interesting to investigate to what extent regulators are misguided by costly non-credible signals. Increasing the awareness of this perverse signaling dynamic and the way it might be dissolved is an easy low-cost way to strengthen regulatory outcomes.

*Can credible signaling lead to better regulatory outcomes?* We would also like to test whether sending credible signals can increase regulatory outcomes. In order for this dynamics to be successful a number of conditions need to be met which can be investigated:

- Are regulated firm able to assess their own compliance level relatively accurately?
- Is the regulator willing and able to distinguish between high and low compliance firms when deciding on leniency and enforcement?
- Are regulators perceived to behave in a predictable way or are they deemed to be irrational or enforcing all breaches that are noted?

There are many related research issues concerning signaling dynamics between regulators and the regulated community. As far as we can see very little to no research has been done to explore this relationship. In order to improve the risk based regulatory approach, it's important to fill this gap.

### **References**

- Bird, R.B. & Smith, E.A. (2005), Signaling theory, strategic interaction, and symbolic capital, *Current Anthropology*, 46: 221-248.
- Certo, S.T. (2003), Influencing initial public offering investors with prestige: Signaling with board structures, *Academy of Management Journal*, 28: 432-446.
- Connelly, B.L., Certo, S.T., Ireland, D. & Reutzel, C.R., Signaling Theory: A Review and Assessment, *Journal of Management*, 2011: 39-67.
- Llewellyn, David (1999), The Economic Rationale for Financial Regulation, *FSA Occasional Papers in Financial Regulation*, p. 34-41.
- Moore, M.H. (1995), *Creating Public Value, Strategic Management in Government*, Harvard University Press.
- Suazo, M.M., Martínez, P.G. & Sandoval, R. (2009), Creating psychological and legal contracts through human resource practice: A signaling theory perspective, *Human Resource Management Review*, 19: 154-166.
- Spence, M. (1973), Job Market Signaling, *Quarterly Journal of Economics*, 87: 355-374.
- Spence, M. (2002), Signaling in retrospect and the informational structure of markets, *American Economic Review*, 92: 434-459.
- Stiglitz, J.E. (2000), The contribution of the economics of information to twentieth century economics, *Quarterly Journal of Economics*, 115: 1441-1478.

- Zhang, Y. & Wiersema, M.F. (2009), Stock Market Reaction to CEO certification: The Signaling Role of CEO background, *Strategic Management Journal*, 30: 693-710.