Revolving Doors and Regulatory Complexity
or
Another Reason Why American Regulation is So Darn'd Difficult

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Abstract

Regulators often enjoy lucrative post-agency periods either working for, or selling advice to, the industry they previously policed. Conventional wisdom is that such jobs are rewards for earlier 'favours' and are indicative of regulatory capture. In the model here, successive generations of regulators maintain an excessively complex 'regulatory interface'. The complexity underpins their post-regulatory employability, and has a self-sustaining character. The analysis points to a causal link between the phenomenon of the revolving door, the often-alleged over-complexity of regulatory practices and procedures in the US, and resistance to their reform. The industry can, in a manner of speaking, be said to have been 'captured' by the regulator. We show that capping advisory fees will be preferable to the usual response of imposing 'cooling-off' periods. **Keywords: Regulatory complexity - expert advice**

"And he erected a multitude of New Offices, and sent hither swarms of Officers to harass people, and eat out their substance." (The American Declaration of Independence).

1 Background

Upon leaving the regulatory agency most American regulators go to work either (a) for the industry they previously regulated or (b) in the legal and consulting sector, selling advice to those they previously regulated. This is true for the EPA, the ICC, IRS and many other government regulatory and quasi-regulatory agencies.

The phenomenon of regulators passing through the so-called 'revolving door' is not a new one. Eckert (1981: 113) notes: "(T)he tendency of ex-regulators to take jobs related to the regulated industry is as old as commission regulation itself" and gives examples back to 1887. The numbers are striking. Eckert summarises the careers of all 142 ex-members of the CAB, FCC and ICC through 1977. Excluding those who died in office, or who couldn't be located, 72 out of 109 left their commission posts to work for the regulated industry.[1]

Early economic analysis, and most popular commentary, painted a negative picture of the revolving door as indicative of capture.[2] Some such stories, at least in their simple versions, do not stand up to scrutiny. The notion, for example, that a firm promises a lucrative post-agency job to a regulator in exchange for preferential treatment (as in Brezis and Weiss (1997)) is not time-consistent. In the absence of an enforceable contract the firm should renege on any such deal, and would have to find extra-contractual mechanisms (such as reputation) to make a job promise credible. These mechanisms throw-up difficulties and subtleties of their own.

[1] These include direct employment, or those going in to law or consultancy practices servicing the regulated industry. Eckert uses the Martindale-Hubbell Directory of Law Practices to identify those whose practice relates to regulatory issues. Spiller (1990) finds that the pattern is sustained through the 1980's, whilst anecdotal evidence suggests a similar pattern elsewhere.

[2] The term 'revolving door' reflects the fact that many regulators are also recruited from regulated industry. This is, however, less pronounced. Of the sample of 129 contained in the employment transition matrix in Spiller's (1990) Table 3, 96 joined the agency from other public sector employment, 20 from the regulated industry. The 'exit' side of the revolving door that interests us here.

Recent work, in contrast, points to channels where-by a well-greased revolving door can enhance incentives on one or both sides of the regulatory relationship.

In Che (1995), the regulator's incentive to invest in industry-specific expertise may be enhanced by the knowledge that such human capital will increase her post-agency marketability. The additional expertise may have the incidental benefit of improving the performance of regulatory personnel during their agency career. The second case he makes in favour of the revolving door is based on a signaling story. If industry-specific expertise is not observable to the industry, but that expertise increases the marginal productivity of an individual agent's monitoring effort, then highly-qualified agency personnel can credibly signal their type by aggressive monitoring. The government can benefit from this added monitoring incentive.

Salant (1995) presents a series of examples that throw light upon the revolving door, and other aspects of personnel policy. The underlying incentive problem throughout is the under-incentive that short-stay regulators have to allow or encourage firms to make long-term investments.[3] He shows that anticipation of post-agency employment in the regulated industry can increase the stake of a regulator in the future of the firm-regulator relationship. In so doing it can encourage long-termism and a more efficient attitude towards investment such that ". . the well-being of both ratepayers and utility shareholders can be improved when the revolving door turns smoothly" (Salant (1995: 363)). While his model is framed in terms of rate regulation of a monopoly, it is applicable to any regulatory context in which some or all of the returns from costly actions taken in during the tenure of one regulator are reaped during the tenure of another.

Spiller (1990) (in a paper subtitled 'Let Them be Bribed') develops a model in which Congress competes with special interest groups for favours from the regulator. Congress offers agency staff a 'bribe' in the form of discretionary budget, regulated industry - precluded from direct financial inducements - offer bribes in the form of post-agency career opportunities. The resulting equilibrium can have desirable characteristics. As in Brezis and Weiss (1997) the job acts as a simple substitute for a cash payment.

In the model here we highlight a different dimension of the problem -

[3]There is a more general literature on the difficulties which arise when a long-lived industry is regulated by a series of short-lived regulators. For good examples see Lewis and Sappington (1991). If the regulator cares about industry performance only during his period of tenure, this makes him short-termist.

the implications of the operation of a revolving door for the complexity of what we will refer to as the 'regulatory interface'. In so doing we suggest a causal link between the revolving door and the alleged over-complexity of regulatory practice in the US (Newman and Breeden (1992) introduce and provide examples of the "why use one simple form when four difficult ones would do?"-mentality).

The complexity variable we introduce measures not the *substance* of the regulatory programme but, rather, the degree of difficulty or idiosyncracy involved in the *process and procedures* of compliance and compliance-assurance. How difficult it is to learn about rules, paperwork requirements, the degree of jargon, procedural etiquette, reporting conventions *etc.* These are all things that the regulated firm must come to terms if it is to deal effectively with the agencies which regulate them.[4]

In addition, much regulatory rule-making is informal and case specific, and the inability of a firm to correctly forecast agency decisions imposes costs. Part of the value of having a recent ex-regulator as an advisor will be his ability to predict - more accurately than someone without inside experience - agency decisions.[5]

Realised transactions costs are inherently difficult to measure, but are undoubtedly substantial.[6] "The term transaction costs may give the impression that some minor impediments exist that will somehow not be important or can be left to others to worry about" (Tolley and Edwards (1997: 188)).

[4] As Mintz (1995) notes, "Regulatory compliance is quite a different matter than compliance with traffic laws". Many firms are unaware of which regulations apply to them, how and when to comply, of when waivers and deferrals might be available, of how to keep and disclose appropriate records in the manner, and of the plethora of unwritten rules and conventions governing the way the regulator likes to 'do business', *etc.* McIntosh (1998) is replete with examples of how difficult it is for firms to deal with the multitude of written and unwritten EPA guidelines, and how that difficult leads to a need for expert advice. The collection of case studies comprising Kosobud and Zimmerman (1997) documents pleas from industry for simplification (as opposed to weakening) of environmental regulation.

[5] We are not suggesting that the ex-regulator is able to *influence* those decisions (though many others have), merely that his experience and knowledge of agency culture and the individuals involved will allow him to 'get inside the skin' of the agency and predict how it will act when confronted with particular choices. This can allow the firm, for example, to make imperfectly reversible capital and strategic decisions earlier and with less regulatory risk. We ignore the possibility of influence here.

[6] The costs - in terms of distorted investment incentives *etc.* - associated with regulatory unpredictability are likely to be even more difficult to estimate.

Hopkins (1997) estimates that of the $688 bn annual burden of regulatory compliance in the US, over one-third relate to transactions costs.[7]

We set up a simple model in which the representative firm faces transactions costs in finding its way through the 'hoops and hurdles' of the regulatory process. The magnitude of these costs depends upon the complexity of the regulatory interface, but can be reduced by the hiring of someone with regulatory agency experience. The model points to a bias towards excessive complexity which, in the overlapping-generations framework employed, is self-perpetuating. Cooling-off periods are the most popular policy-response to the perceived problem of the revolving door. We show that whilst they may offer a (partial) solution to the problem, they are expensive in terms of welfare. A complete ban on agency staff transferring to the regulated sector has an ambiguous impact on both welfare and steady-state transactions costs. A more efficient policy involves capping the payments that those going through the revolving door can receive.

The analysis points to a linkage between the revolving door and regulatory complexity. The complexity has, also, a self-sustaining character that is worth noting. The current regulator has an incentive to bequeath a regulatory interface more complicated than he otherwise might, because that complexity enhances his value in the post-tenure market for advice. The marginal cost of so doing - in terms of degraded performance of the regime whilst he is in charge, about which he also cares - is comparatively low precisely *because* the firm is advised by his predecessor. He, in turn, will reduce the cost to his successor.

2 A Stylised Model

Regulator t lives two-periods. In period t he regulates some dimension of a firm's activities during period t. At the end of that period he is discharged, and during period $(t+1)$ has the opportunity to work for the regulated industry.[8]

In addition to the compliance costs associated with the substance of regu-

[7] To put these numbers into perspective, total pretax corporate profits in the US in 1997 were $598 bn.

[8] It makes no difference to the analysis whether he becomes an employee of the firm itself, or goes into private practice and sells his services as a contractor. We also talk about 'the' regulator, but could think of cohorts of regulatory staff.

lation, the firm also bears regulatory transactions costs. These are the costs generated by the *process* of regulation and compliance-assurance, and are denoted $c(\Lambda|\alpha)$. These include the costs of finding out what the relevant regulations are, understanding them, cataloguing and communicating compliance with them to the satisfaction of the agency *etc.*.[9] They depend upon Λ, a measure of the complexity of the regulatory interface, and a variable α which takes the value A if the firm is advised by a retired regulator, NA if not (think of A and NA as 'Advisor' and 'No Advisor'). It is reasonable to assume that $c_\Lambda(\Lambda|\alpha) > 0$, other things equal greater complexity implies a greater transactions cost burden, and that

$$c(\Lambda|NA) > c(\Lambda|A), \tag{1}$$

the advice of a former regulator reduces that burden. The model, then, is consistent with the claim, made by both advisors and firms, that the advice of the former is *useful*.[10] We further assume that $c_\Lambda(\Lambda|NA) > c_\Lambda(\Lambda|A))$, such that

$$\frac{\partial(c(\Lambda|NA) - c(\Lambda|A))}{\partial\Lambda} > 0. \tag{2}$$

The difference between $c(\Lambda|NA)$ and $c(\Lambda|A)$ is a measure of how valuable the ex-regulator's 'inside' advice is in reducing transactions costs. That value is greater - the advice more useful - the more complex is regulation.

Ignoring the transactions costs it imposes, complexity generate benefits (though at a diminishing marginal rate) allowing, as it does, regulation to be tailored into every 'nook and cranny' of the regulatory problem. These benefits are denoted $b(\Lambda) > 0$, where $b' > 0$, $b'' < 0$. The net social benefits of the regulation, then, are $(b(\Lambda) - c(\Lambda|\alpha))$, which we will assume to have an interior maximum. That interior minimum (contingent on α) is identified on Figure 1.

In period t, regulator t regulates. As well as his input into the substance of regulation, and its routine implementation, he makes decisions that impact the complexity of the regulatory interface, and this influence is summarised

[9] The costs are similar in spirit to the 'process costs' that Tiller (1997) asserts that regulatory agencies face in their dealings with the judiciary. The ability to impose process costs (rather than to, say, reverse decisions) is argued to be a potent weapon of the judiciary in its oversight of agency activity.

[10] In a standard bribe model (e.g. those of Brezis and Weiss, or Spiller) the job is simply a payment and could be replaced by a lump-sum transfer. The same is not true here.

by his choice of γ_t.[11] A high (low) value of γ_t is indicative of a regulator who pushes the interface in a more (less) complex direction.

The complexity of the interface at any time is likely, however, to depend not just upon the decisions of the current regulator, but also upon those of his predecessors. We capture this by assuming that $\Lambda_t = \Lambda(\gamma_t, \gamma_{t-1})$, where Λ is increasing in both of its arguments. To keep things simple we adopt a specific functional form,

$$\Lambda_t = \frac{\gamma_t + \gamma_{t-1}}{2}. \tag{3}$$

Thus current complexity is simply the unweighted average of the γ picked by the current regulator and that picked by his immediate predecessor. The firm observes Λ in each period, but neither Λ nor γ_t are verifiable by third parties - the 'user-friendliness' of regulatory procedures is only observable to the two sides engaged in the process.

During his period of service the regulator is rewarded according to some exogenously-specified function of the net benefits generated by the regulatory programme during the period of his tenure,

$$f(b - c). \tag{4}$$

The specification of f is deliberately left general, we require only that $f' \geq 0$. The rewards will be both the pecuniary, but also the returns due to peer-esteem, public recognition, altruism *etc.* derived by public servants doing a good job.

After his agency service, in period $(t+1)$, regulator t can sell advice to the firm. His outside option is normalised to equal zero, such that in equilibrium the ex-regulator and firm will trade. The surplus created by the trade is assumed to be split with shares $(1 - \beta)$ and β going to the firm and ex-regulator respectively. β and $(1 - \beta)$ can measure the respective bargaining strengths of the two parties, in the usual way.

2.1 Equilibrium complexity

Regulator t sets γ_t to maximise his lifetime income, taking as given (a) the actions of his predecessor (and therefore the complexity of the regulatory

[11] We model it as a single decision, but it is likely to capture the cumulative effect of a large of small decisions made by the regulator during his tenure. Newman and Breeden (1992) talk about the regulator 'designing a knitting pattern'.

interface he inherits) and (b) that the regulated firm will, in equilibrium, benefit from the advice of an ex-insider. His problem, then, is

$$\max_{\gamma_t} \left\{ f(b(\Lambda_t) - c(\Lambda_t|A)) + \beta.(c(\Lambda_{t+1}|NA) - c(\Lambda_{t+1}|A)) \right\}. \tag{5}$$

(when required we will use $F(\gamma_t|\gamma_{t-1})$ to denote the expression in curly-brackets). The first-order condition describing the interior solution to the regulator's problem is

$$F_{\gamma_t}(\gamma_t^*|\gamma_{t-1}) = 0$$

(an asterisk denotes the privately optimal level). This can be written more fully as:

$$\begin{aligned} &\frac{1}{2}f'\left(\frac{\gamma_t^* + \gamma_{t-1}}{2}\right)\left(b'\left(\frac{\gamma_t^* + \gamma_{t-1}}{2}\right) - c'\left(\frac{\gamma_t^* + \gamma_{t-1}}{2}|A\right)\right) = \\ &-\frac{\beta}{2}.\left(c'\left(\frac{\gamma_{t+1}^*(\gamma_t^*) + \gamma_t^*}{2}|NA\right) - c'\left(\frac{\gamma_{t+1}^*(\gamma_t^*) + \gamma_t^*}{2}|A\right)\right)\left(1 + \frac{\partial\gamma_{t+1}^*(\gamma_t^*)}{\partial\gamma_t}\right), \end{aligned} \tag{6}$$

The left-hand side of 6 is the impact of a marginal increase in γ_t upon regulator t's in-office pay-off induced by changes in the performance of the regulatory regime during his tenure. The sign of this expression is, in general, ambiguous, depending upon whether Λ_t is above or below Λ^{FB}. Note that γ_{t-1} is predetermined at the time that γ_t is set. Also note that $c'(\Lambda|\alpha)$ is evaluated at $\alpha = 1$ - on the assumption that the firm will be advised by t's regulator - which we know will, in equilibrium, be the case.

The right-hand side is the impact of a marginal increase in γ_t upon regulator t's expected post-agency remuneration. The surplus that the regulator can extract from selling advice during the second-period of his life depends upon the Λ_{t+1}, the complexity of the regulatory interface in the period after his departure from the agency. Any change in γ_t has a direct impact upon Λ_{t+1}, but also an indirect effect through any induced changes in γ_{t+1}. The overall impact of a marginal change in γ_t upon Λ_{t+1} will be positive provided the induced effect is either positive, or negative but not large. More concretely, in the vicinity of equilibrium it must be the case that

$$\frac{\partial\gamma_{t+1}^*(\gamma_t^*)}{\partial\gamma_t} > -1. \tag{7}$$

We assume that 7 is satisfied (which will be the case provided f'' is not too large) such that an increase in the complexity of procedures and practices put

in place during the tenure of regulator t implies an increase in the complexity of the regulatory interface in period $t+1$. This rules out the implausible perverse case in which the induced change in the decisions of t's predecessor is so pronounced as to more-than-fully crowd-out the direct effect.

The first-order condition (6) dictates that the regulator increases γ_t up to the point at which the marginal impact on in-office pay-off equals (minus) the marginal impact on expected post-tenure pay-off. The assumption in 7 implies that the right-hand side of 6 is negative such that

$$b'\left(\frac{\gamma_t^* + \gamma_{t-1}}{2}\right) - c'\left(\frac{\gamma_t^* + \gamma_{t-1}}{2}|A\right) < 0. \tag{8}$$

For any *given* state in which he inherits the regulatory interface, regulator t will set γ_t such that Λ_t is beyond the point at which net regulatory programme benefits are maximised.[12] For current purposes we are primarily interested in the characteristics of steady-state.[13] In steady-state,

$$\gamma_{t-i} = \ldots = \gamma_t = \gamma^{SS}.$$

Substituting into 6 gives

$$\frac{1}{2}f'(\gamma^{SS})(b'(\gamma^{SS}) - c'(\gamma^{SS}|A)) = \tag{9}$$

$$-\frac{\beta}{2}.(c'(\gamma^{SS}|NA) - c'(\gamma^{SS}|A))\left(1 + \frac{\partial\gamma_{t+1}^*(\gamma^{SS})}{\partial\gamma_t}\right).$$

Regulatory complexity Λ_t, then, equals $(\gamma^{SS} + \gamma^{SS})/2$ or γ^{SS} in each period.

We will adopt a social welfare function which is an unweighted sum of net benefits (the planner is not concerned with the division of that surplus):

$$W(\Lambda, \alpha) \equiv b(\Lambda) - c(\Lambda|\alpha).$$

[12]Regulator t sets γ_t too high taking his inheritance as given. Of course we cannot, from this alone, say whether things will be more or less complicated under his reign than under his predecessor's (whether Λ_t will be bigger or smaller than Λ_{t-1}).

[13]It is not difficult to derive the adjustment process for the system starting away from steady-state, and the restrictions necessary to ensure stability. The derivation yields very little extra insight.

First-best steady-state, then, requires that in each period t, (a) the firm be advised by the ex-regulator, and (b) the level of complexity, Λ^{FB}, be set such that

$$b'(\Lambda^{FB}) - c'(\Lambda^{FB}|A) = 0. \tag{10}$$

In the steady-state described by 9, (a) is satisfied. Rearranging 9, however, gives

$$b'(\Lambda^{SS}) - c'(\Lambda^{SS}|A) < 0. \tag{11}$$

Given convexity of net benefits in Λ this leads directly to:

Proposition 1 *In steady-state, the regulatory interface will be too complex.*

This is intuitive. The decisions taken by each regulator t during his tenure impact the complexity in the period after he leaves office, and therefore the surplus he can extract from the regulated firm in the post-agency period of his life. As more complexity means greater surplus the regulator has an incentive to bias his choice of γ_t upwards.

It is worth noting that the post-tenure advisory role of regulators inserts a self-sustaining element into the excess complexity by both providing the incentive for regulator t to inflate γ_t, but also by reducing the cost of inflation to his successor.

2.2 Cooling-off

By far the most common policy-response to the 'problem' of the operation of the revolving door has been the use of cooling-off periods - a period immediately after leaving agency employment during which the ex-regulator can't work for the regulated industry. In the US the Ethics Reform Act (1989) places restrictions ranging from 2 years to lifetime bans. In France and Japan the period is 5 years (see Brezis and Weiss (1997: 531) for more detail and further examples).

The principle that cooling-off periods are the appropriate way to deal with the revolving door phenomenon is, then, well-established. How will they work in the world as we model it? If they are to be used, how lengthy should they be? What alternative instruments might work better?

Normalising each period of the regulator's life to be of unit length, consider the impact of implementing a fully-enforced cooling-off period of length $0 \leq \tau \leq 1$, where $\tau = 0$ corresponds to no cooling-off requirement, $\tau = 1$

corresponds to a lifetime ban on post-agency employment in (or by) the regulated industry.

Regulator t's objective function becomes, then

$$f(b(\Lambda_t)-(\tau c(\Lambda_t|NA)+(1-\tau)c(\Lambda_t|A)))+(1-\tau).\beta.(c(\Lambda_{t+1}|NA)-c(\Lambda_{t+1}|A)). \tag{12}$$

His objective function has been adjusted in two ways, and will now be denoted $F(\gamma_t|\gamma_{t-1},\tau)$. Firstly, (a), the transaction cost burden whilst regulator t is in-office is now $c(\Lambda_t|NA)$ for the fraction τ of his tenure, since during that period the firm is prevented from accessing the advice of his predecessor. Secondly, (b), he will only be able to advise the regulated firm for a portion $(1-\tau)$ of the post-agency period of his life.

The steady-state will now be characterised by

$$\begin{aligned}\frac{1}{2}f'(\gamma^{SS})(b'(\gamma^{SS})-(\tau c'(\gamma^{SS}|NA)+(1-\tau)c'(\gamma^{SS}|A))) = \\ -\frac{(1-\tau)\beta}{2}.(c'(\gamma^{SS}|NA)-c'(\gamma^{SS}|A))\left(1+\frac{\partial\gamma^*_{t+1}(\gamma^{SS})}{\partial\gamma_t}\right).\end{aligned} \tag{13}$$

The equality in 13 implicitly defines the steady-state complexity of the regulatory interface as a function of the length of the cooling-off period in force, $\gamma^{SS}(\tau)$.[14] The following can now be shown:

Proposition 2 *The complexity of the regulatory interface, γ^{SS}, is decreasing in the length of the cooling-off period, τ.*

To verify this, note that implicit differentiation of 13 gives

$$\frac{\partial\gamma^{SS}}{\partial\tau}=-\frac{\partial F_{\gamma_t}(\gamma^{SS}|\gamma^{SS},\tau)/\partial\tau}{F_{\gamma_t\gamma_t}(\gamma^{SS}|\gamma^{SS},\tau)}$$

The denominator is negative by the second-order condition associated with the solution to a representative regulator's problem. The sign of the expression will coincide with the sign of $\partial F_{\gamma_t}(\gamma^{SS}|\gamma^{SS},\tau)/\partial\tau$, which can be written:

$$\frac{\partial F_{\gamma_t}(\gamma^{SS}|\gamma^{SS},\tau)}{\partial\tau}=-\frac{1}{2}f'(\gamma^{SS})(c'(\gamma^{SS}|NA)-c'(\gamma^{SS}|A)) \tag{14}$$

[14] Note throughout that in steady-state Λ equals γ^{SS} (being simply $(\gamma^{SS}+\gamma^{SS})/2$).

$$-\frac{\beta}{2}(c'(\gamma^{SS}|NA) - c'(\gamma^{SS}|A))\left(1 + \frac{\partial\gamma^*_{t+1}(\gamma^{SS})}{\partial\gamma_t}\right)$$
$$+\frac{\beta}{2}(1-\tau)(c'(\gamma^{SS}|NA) - c'(\gamma^{SS}|A))\frac{\partial}{\partial\tau}\left(\frac{\partial\gamma^*_{t+1}(\gamma^{SS})}{\partial\gamma_t}\right)$$

which is negative. Each of the three components of 14 is negative. A marginal increase in τ has three effects (all of which work in the direction of reducing complexity). Firstly, the private costs of increasing complexity (in terms of diminished in-office performance) is raised because the firm will only benefit from the advice of an ex-insider for a portion $(1-\tau)$ of the regulator's term. Secondly, the pursuant private benefits in terms of post-agency advisory fees are reduced because the retired regulator can now only extract those fees for a portion $(1-\tau)$ of his post-agency career. Thirdly, the impact of an increase in γ_t upon $\Lambda_{t+1} = (\gamma_t + \gamma^*_{t+1}(\gamma_t))$ is smaller, because the induced effect on the complexity of his successor's decision-making is reduced $(\partial(\partial\gamma^*_{t+1}/\partial\gamma_t)/\partial\tau < 0)$ - though the direction of that induced effect remains ambiguous. This further reduces, correspondingly, the marginal impact upon the value he can extract from advice during his post-agency career.

Before proceeding to determine when cooling-off periods should be used, and how long they should be, we note some implications of permanent closure of the revolving door.

Remark 1 *When there is a lifetime ban on post-agency employment ($\tau = 1$), each regulator t will set γ_t to maximise welfare. The regulatory interface will be less complex than first-best.*

This can be seen by noting that under a lifetime ban the last composite term of the regulator's objective function (12) disappears. The tth regulator's choice of γ will, then, be described by:

$$\frac{1}{2}f'(\gamma^*_t)(b'(\gamma^*_t) - c'(\gamma^*_t|NA)) = 0 \tag{15}$$

This implies $b'(\gamma^{SS}) = c'(\gamma^{SS}|NA)$, *i.e.* that each regulator will set γ_t to maximise social welfare. This is intuitive. With a ban on post-agency employment, the regulator cares only about the performance of the industry while he is in office, which coincides with that of the social planner.

A lifetime ban, importantly, does not implement first-best. First-best requires that the ex-regulator work for the firm, and that $b'(\gamma^{SS}) = c'(\gamma^{SS}|A)$.

Here the choice of γ_t is efficient *given that the firm is not advised by an ex-regulator*. To see that the interface will, in steady state, be less complex than first-best recall that $c'(\gamma|NA) > c'(\gamma|A)$ for all γ. Thus

$$b'(\gamma^{SS}) - c'(\gamma^{SS}|NA) = 0 \Rightarrow b'(\gamma^{SS}) - c'(\gamma^{SS}|A) > 0 \tag{16}$$

which, given convexity of $(b - c)$, implies $\gamma^{SS} < \Lambda^{FB}$.

Remark 2 *Whilst the regulatory interface will be less complex when a lifetime ban is in operation than in the unrestricted case, the transactions costs burden may be higher or lower.*

That the first part is true follows directly from Proposition 2. The second part holds because even though the regulatory interface is less complex under a lifetime ban, the burden of dealing with each unit of complexity is increased because the firm is prevented from procuring advisory services. Formally, we note that

$$c(\gamma^{SS}(0)|A) \gtreqless c(\gamma^{SS}(1)|NA). \tag{17}$$

The terms of this inequality will not, however, determine the firms attitude towards the implementation of a ban. Taking account of the payments made for advice in the no ban case, the firm will benefit (in steady-state) from the operation of a lifetime ban if and only if

$$(1-\beta)c(\gamma^{SS}(0)|A) + \beta c(\gamma^{SS}(0)|NA) > c(\gamma^{SS}(1)|NA). \tag{18}$$

Ignoring the transition phase, the social planner's problem is to choose $0 < \tau < 1$ to maximise steady-state periodic welfare. Given convexity of the regulator's problem a sufficient condition for $\tau^* > 0$ (for the operation of a cooling-off period to be optimal) is simply

$$\left.\frac{d(b(\gamma^{SS}(\tau)) - (\tau c(\gamma^{SS}(\tau)|NA) + (1-\tau)c(\gamma^{SS}(\tau)|A)))}{d\tau}\right|_{\tau=0} > 0, \tag{19}$$

Which after some manipulation becomes the condition in the following:

Proposition 3 *A sufficient condition for the implementation of a cooling-off period to be welfare-improving is*

$$\frac{\partial\gamma^{SS}(0)}{\partial\tau}(b'(\gamma^{SS}(0)) - c'(\gamma^{SS}(0)|A)) > c(\gamma^{SS}(0)|NA) - c(\gamma^{SS}(0)|A) \tag{20}$$

Starting from $\tau = 0$ a marginal increase in τ has two effects. First, it causes a marginal reduction in steady-state complexity. Because complexity was initially excessive this is a good thing. Second, however, it means that for some part of each period the firm will be disallowed ex-regulatory advice. As that advice reduces transactions costs (and would otherwise be exchanged) such a bar imposes a deadweight loss.

The two effects are captured by the left and right-hand sides of 19 respectively. Both sides are positive (to see that both terms on the left-hand side are negative review Equation 11 and Proposition 2). The condition says that it will be optimal to install a cooling-off requirement if the first effect is bigger than the second. This is more likely to be the case when the induced reduction in regulatory complexity is comparatively large (*i.e.* $\left|\partial\gamma^{SS}(0)/\partial\tau\right|$ is large) and/or the social value of advice evaluated in the vicinity of $\gamma^{SS}(0)$ is comparatively small.

Having detailed the lower corner, we will not dwell on the upper.[15] Supposing, instead, that the solution to the social planner's problem is interior (that is $0 < \tau^* < 1$), τ^* will be implicitly defined by the following first-order condition

$$\frac{\partial\gamma^{SS}(\tau)}{\partial\tau}(b'(\gamma^{SS}(\tau)) - (\tau c'(\gamma^{SS}(\tau)|NA) + (1-\tau)c'(\gamma^{SS}(\tau)|A))) \\ = c(\gamma^{SS}(\tau)|NA) - c(\gamma^{SS}(\tau)|A) \qquad (21)$$

In setting the cooling-off period the planner increases its length up to the point at which the marginal social benefits implied by the reduced complexity (the left-hand side) equals the marginal social cost implied by the firm having to deal with regulation without the advisory services of an ex-insider (the right-hand side).

The trade-off is illustrated in Figure 2. The higher and lower curves are

$$b(\Lambda) - c(\Lambda|\alpha)$$

evaluated at $\alpha = A$ and $\alpha = NA$ respectively. They measure, then, periodic welfare as a function of complexity with and without advice. The former is everywhere higher is because advice is productive.[16] The equilibrium points on those curves are determined by evaluating them at $\gamma^{SS}(0)$ and

[15] The sufficient condition for $\tau^* = 1$ (for a lifetime ban to be optimal) is that the inequality in 20 hold when evaluated at $\tau = 1$. It has similar interpretation.

[16] It is straight-forward (noting that $c'(\Lambda|NA) > c'(\Lambda|A)$, $\forall\Lambda$) to verify that the turning point of the higher curve is the the right of that of the latter, as in the Figure.

$\gamma^{SS}(1)$ respectively. Comparison of these points, associated with the corner outcomes $\tau = 0$ and $\tau = 1$, illustrates the trade-off. A lifetime ban puts the economy on a low welfare possibility curve, but by removing the incentive for regulators to inflate regulatory complexity at least ensures that we are at its maximum.. In the unrestricted case the economy is on the high welfare possibility curve, but regulatory complexity is inflated such that we arrive at a steady-state at some point on its downward-sloping right limb. We are unable to say, without further restrictions, which point yields higher welfare:

$$b(\gamma^{SS}(0)) - c(\gamma^{SS}(0)|A)) \gtreqless b(\gamma^{SS}(1)) - c(\gamma^{SS}(1)|NA)).$$

In comparing the two extreme options (no ban, lifetime ban) it is apparent, given the generality of the specification, why such ambiguity should arise.

Thinking about any interior solution, we observe that as we introduce and then lengthen the cooling-off requirement - from a starting point of $\tau = 0$ - the welfare possibility curve is pushed down, but the equilibrium moves leftward up that curve. In terms of welfare these two effects work in opposite directions and correspond to those discussed above. The point at which they are balanced at the margin is defined by 21.

2.3 A better policy option - capping advisory fees

In the present model, we have seen, cooling-off periods may or may not be preferable to no policy intervention. They do not, however, allow first-best to be implemented.

In a world in which γ_t is not contractible, the difficulty in designing a legal framework that *will* implement first best is that the two requirements - (a) the firm benefit from the expertise of the ex-regulator and, (b), complexity of the regulatory interface be set to maximise net social benefits - are in conflict. It is the anticipation of post-regulatory employment that provides the incentive for the current regulator to bequeath an excessively complex interface to his successor. Cooling-off requirements mitigate (b) but sacrifice (a).

The two requirements can, however, be simultaneously accomplished by capping the fees that regulator t is allowed to extract for advisory services

in $(t+1)$.[17] To see this, consider a cap Θ satisfying

$$\Theta < \beta.(c(\gamma^{FB}|NA) - c(\gamma^{FB}|A))$$

In equilibrium advice will be exchanged, but no generation of regulator will have an incentive to inflate complexity because each is precluded from extracting surplus beyond what can be extracted when $\gamma = \gamma^{FB}$.[18] In that case each regulator t has no incentive to do other than make decisions compatible with first-best.

The cap works by allowing the regulator, once retired, to make enough from advising to make him wish to do it, but disqualifies him from being able to benefit from inflating complexity beyond its first-best level. It should also be noticed that setting an appropriate cap on fees is likely to be less informationally-demanding than is setting an appropriate cooling-off period as it requires only that Θ be set to satisfy an *inequality* constraint. It could simply be set at the ex-regulators reservation wage level, here normalised to zero.

3 Conclusions

We have sought to bring together - and suggest a channel of causation - between two well-documented stylised facts of US regulation, namely (a) the remarkable propensity for retiring regulatory commissioners and senior regulators to transfer into the employment of the industry they previously policed and, (b), the apparently inflated procedural and implementational complexity in US regulation in a variety of fields.

This is not to suggest (a) is the only cause of (b), any more than (b) is the only potential impact of (a). Establishing the link from (a) to (b), however,

[17] The other is to try to make γ_t verifiable (through GAO oversight, industry watchdogs *etc.*) so that it can be subject to contract. As usual, misincentives due to incomplete contracts can be 'solved' by making contracts complete. McIntosh (1998) - himself Chair of the US House of Representatives Subcommmittee on *National Economic Growth, Natural Resources and Regulatory Affairs* - asserts that regulation has become too difficult to understand and calls for increased transparency and predictability. Things like the Paperwork Reduction Act (which requires justification for reporting and record-keeping requirements placed on the private sector) are an attempt to control Λ directly.

[18] Throughout the paper we have retained the assumption that the regulator's outside option (reservation wage) in the second-period of his life is 0. It would be straight-forward to adjust the analysis to allow for a strictly positive outside option. As the outside option acts as the ex-regulator's threat point, Θ would have to be adjusted accordingly.

has required only innocuous assumptions - that complexity of the interface is influenced by the actions of past as well as present regulatory staff; that complexity is imperfectly contractible; that the value of advice from those former staff is increasing in the degree of complexity; and that they act in a self-interested way.

In thinking about attempts to make regulation simpler, more predictable and 'user-friendly', the analysis also points to the likelihood of 'enemies within'. Whilst the revolving door continues to turn regulatory insiders, other things being equal, have a vested interest in opposing such reform. The model might also have something to say about agency preferences between regulatory instruments (*e.g.* for command-and-control over market-based instruments in environmental regulation) in terms of the scope they provide for maintaining the market value of insider experience.

The Peltzman/Stigler approach to regulation seeks to understand regulation as arising and developing to suit the needs of those involved in the regulatory process (Peltzman (1976)). The current models fits within that tradition, with the interests of the regulators themselves coming to the fore. The industry and regulatory process can, in manner of speaking, be said to have been 'captured' by the regulatory staff.

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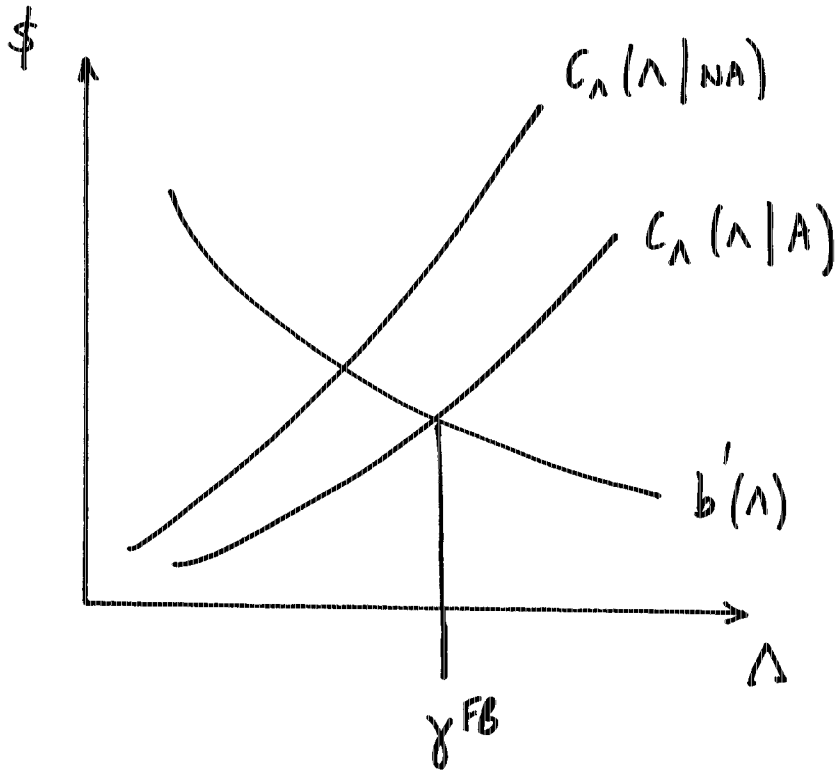

FIGURE [1]

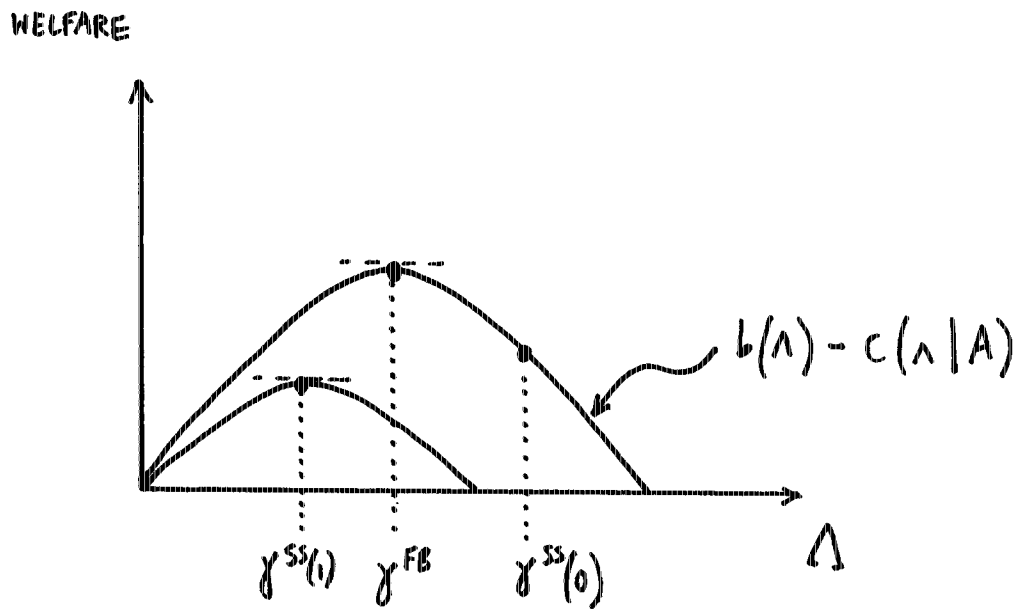

FIGURE [2]