Red tape: Oiling the Hinges of the “Revolving Door”

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Abstract

This paper presents a behavioral model of regulators. In our model, the regulator creates red tape – bureaucratic rules and regulations that complicate procedures in an industry. As the enactor of these rules and regulations, the regulator has better knowledge of the ins-and-outs of the system and any possible loopholes. Such knowledge is valuable to the firms in the industry, and thus, after leaving public service, the regulator can cash-in on the red tape he has created. Comparative statics show a negative relationship between the amount of red tape generated and the duration of the cooling-off period. Analysis of the data yields results compatible with this outcome.

Keywords: Red tape, Cooling-Off Periods, Revolving Door, Regulation

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Red Tape, n. - official routine or procedure marked by excessive complexity which results in delay or inaction.

(Merriam-Webster Online)

I. Introduction

The prevalence and prominence of red tape have long been fertile ground for theoretical and empirical investigations. Red tape, frequently used synonymously with inefficient bureaucracy, is often associated with another detrimental phenomenon – corruption. Yet, the two phenomena are clearly different: while corruption refers to wrongdoing by an individual or individuals (e.g., taking bribes), red tape is an outcome (excessive complexity), which is not necessarily attributable to any purposeful activity by its perpetrator. In fact, red tape may be no more than an unfortunate side effect of any bureaucratic system; along with the necessary rules and regulations, there are bound to be aspects of the bureaucratic machinery that slow down progress. In the present study we reject this approach, and consider, instead, a new idea – regulators might deliberately create red tape in order to generate rents that they can later reap. Thus, rather than assuming that it is coincidental, we propose a positive model involving the deliberate creation of red tape.

We construct a behavioral model in which the impetus for red tape creation by a regulator is provided by the rents he can command after leaving the public sector and entering the industry he previously regulated. (This phenomenon of moving from a regulatory agency into the regulated industry is commonly referred to as the “revolving door.”) Such rents are obtained by enacting bureaucratic rules and regulations that needlessly complicate procedures in the regulated industry. As the enactor of these rules and regulations, the regulator can benefit from their existence since he is well acquainted with the ins-and-outs of the system, and any possible loopholes. This knowledge is valuable to the firms in the industry, and its

1 See, for instance, Niskanen (1971, 1975), Margolis (1975) and Banerjee (1997).
2 For recent work on corruption, see Shleifer and Vishny (1993), Mauro (1995) and Bardhan (1997).
3 Eckert (1981) was the first to consider this issue of the “revolving door,” showing that a surprisingly high percentage of regulators accepted employment in the regulated industry immediately after leaving the regulatory agency. This is generally viewed as a potential source of corruption. As Laffont and Tirole (1996) state: “Monetary bribes are feasible although not common due to their illegality. More pervasive are the hoped for future employment for regulators with the regulated firms.” While some researchers have focused on the potentially undesirable effects of such practices and the possible solutions (Spiller, 1990, and Brezis and Weiss, 1997), others suggest that the revolving door may have positive aspects that should not be overlooked (Salant, 1995, and Che, 1995).
4 The frequent changes in tax forms (1040 forms in the U.S.) is a simple example. While the changes are not usually substantial, they are sufficient to place an extra burden on the tax-payer, and thus become quite lucrative for tax accountants.
existence “oils the hinges” on the revolving door, so the regulator is able to obtain more lucrative offers after leaving the public service. In other words, in order to advance his own interests, the regulator invests in industry specific human capital (which we term “red-tape capital”) while he is regulating the industry. The yield on this particular investment is harvested only after the regulator passes through the revolving door and accepts a job in the regulated industry. Hence, the creation of red tape is a means of accumulating economic power.

Eliminating this red tape would, *ceteris paribus*, improve the well-being of the public. This is taken into account by the legislator when appointing the regulator and determining his employment conditions. Without specifying the legislator’s utility function, we assume that she is interested in limiting the amount of red tape, while, at the same time, attracting high-quality candidates to the public sector. We further assume that the legislator cannot directly monitor or control red tape creation, but can take indirect steps affecting the amount created. These steps, however, also have the effect of making employment in the regulatory agency less attractive, and, in turn, lead to less effective regulation. Thus, the legislator faces a tradeoff, and we show that, in general, it would be sub-optimal from her perspective to eliminate red tape completely. Rather, the legislator will tolerate limited (non-zero) red tape formation.

There are several instruments potentially available to the legislator to affect the regulator’s actions. The main one we consider is the legislation of a “cooling-off” period for regulators (a period during which the regulator is not allowed to accept a job in the regulated industry). Such a cooling-off period lessens the benefit to the regulator from red tape creation (which requires effort, and so is costly to the regulator), so less will be created. The legislator is a Stackelberg leader, and chooses the cooling-off period with full knowledge of

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5 Our approach has some similarity that of Niskanen (1971, 1975), who emphasizes that self-interested behavior by the bureaucrat may lead to over-budgeting agencies, and, consequently, too much bureaucracy. Inefficiency in his model is linked to the size of the bureaucracy, while in our paper the activities of the regulator, and not the size of the regulatory agency, comes under scrutiny. See also Margolis (1975). Our approach differs from Wilson’s (1989), who suggested that red-tape results from a set of highly rigid rules developed with the sole intention of limiting the amount of corruption within a bureaucracy by limiting the regulator’s discretionary power. Hence, in his view, red-tape harms, rather than helps, the regulator. Banerjee (1997), like us, has red-tape being determined endogenously, but his treatment differs from ours in that, in his model, red tape is a device that increases the cost of operating, and thus screens firms.

6 Brezis and Weiss (1997) showed that a cooling-off period could also be used to reduce the level of corruption by regulators while increasing their effectiveness. In the current paper the cooling-off period is shown to reduce red tape and increase effectiveness. These two papers are complementary, and comparing them clarifies the difference between corruption and red tape.
its effect on the regulator’s behavior. The comparative statics of the model yield testable hypotheses.

The paper is organized as follows. The basic behavioral model of a regulator is presented in Section II, first analyzing the behavior of the Stackelberg follower, the regulator, and then using the results to explore the legislator’s choice and the equilibrium. Section III presents and analyzes data that lend support to our hypotheses. The paper ends with a brief summary.

II. The Model

The framework is as follows. The government, or legislator, employs a regulator who is responsible for the regulation of a certain sector of the economy. Candidates for the regulatory job differ in their innate ability, which is observable by the legislator. Individuals with greater ability are more effective regulators, but, concurrently, are also more productive in the private sector, and thus can exact a higher wage in alternative employment. A candidate is attracted to the public sector job only if the present value of his income when accepting the appointment is as least as high as the present value of his alternative income in the private sector. Recognizing this constraint, the legislator chooses as regulator the available candidate with the greatest ability.

After completing his public-sector appointment, the regulator goes through the “revolving door” and accepts employment in the industry he previously regulated, with the salary he realizes in this sector being one of the determinants of the lifetime income mentioned above. The basic assumption of our model is that steps the regulator takes while employed in the public sector affect this salary. Specifically, the regulator can institute complicated rules and regulations – red tape – that are detrimental to the regulated sector, but constitute human capital for the regulator (resulting from his superior knowledge of the ins-and-outs of the system), thereby resulting in higher pay in the regulated industry. The legislator cannot take direct actions to avoid such red tape creation, but can take indirect steps that lessen the regulator’s payoff from it, leading to less red-tape creation. However, this has the undesired effect of lowering the appointment’s attractiveness, which, in turn, discourages high-ability workers from being interested in the position of regulator. Thus, there is a tradeoff between effective regulation and decreasing red tape. We demonstrate that, at the optimum, this tradeoff will generally lead to non-zero red tape creation. We begin by modeling the behavior of the regulator, who is a Stackelberg follower.
A. The Regulator

The regulator’s work-life consists of N years, divided into three disjoint periods. During
the first period, he is offered, and accepts, employment by the legislator for a period of \( \tau \) years
at a wage rate of \( W_1 \) per year. While the regulator can choose to quit his post before his term
is complete, we assume for now that \( \tau \) is binding, i.e., the regulator is not interested in serving
for less than \( \tau \) years. We relax this assumption below.

The second period, which begins when the term as regulator concludes, is a cooling-off
period of \( T \) years during which the regulator is restricted from operating in the industry for
which he was responsible. He therefore works in an alternative industry, receiving a wage of
\( W_2 \) per year. We set this wage as the numeraire, so that \( W_2 = 1 \) (i.e., \( W_1 \) is the normalized
wage during the regulatory period). The parameters \( \tau, T \), and \( W_1 \) are assumed to be exogenous
to the regulator. During the third and final period, the regulator works in the industry he
formerly regulated, and receives a normalized annual wage \( W_3(t) \), where \( t \) is the number of
periods employed in the regulated sector. The third period lasts \( N-\tau-T \) years, so that \( 0 \leq t \leq N-\tau-T \). However, unlike \( W_1 \), \( W_3 \) depends on the regulator’s actions during his period as
regulator, and also on the number of years he is employed in the regulated industry.

As stated above, our model’s basic assumption is that the regulator can create
complicated rules and regulations – red tape – that benefit him but harm the regulated sector.
The industry is harmed because complicated bureaucratic procedures are costly to firms. The
regulator benefits, since he is most knowledgeable about the new regulations, and can
therefore attain rents from firms who are required to follow them. Note that the regulator also
enacts rules that are beneficial to the economy, which partly accounts for his effectiveness.
Red tape, however, refers to those additional rules that are harmful to the economy.

During the initial period, the regulator creates red tape that accumulates during his term
in office. The creation of red tape requires effort, which is costly to the regulator. The effort
level is chosen at the start of the regulator’s term, and remains constant throughout his term.\(^7\)
Defining \( E \) as the cost-equivalent units of effort per year, the regulator’s net wage per year
during the first period equals \( W_1 - E \). The amount of red tape created by the regulator

\(^7\)This is not an assumption; it results automatically from our model. Since there is no discounting in our model,
the cost of a unit of effort is constant, and there are diminishing returns in red tape creation in each period, it will
therefore always be optimal for the regulator to evenly spread his effort out over his years in the agency.
increases monotonically and is concave with respect to total annual effort. We denote this amount by $b(E)$, with $\partial b/\partial E > 0$, and $\partial^2 b/\partial E^2 < 0$. This rate of accumulation is constant over the regulator’s term, so that, at the end of his term, the total amount of red tape he has created is $B(E, \tau) = \tau b(E)$. Note, in particular, that the accumulation process begins anew each year. This adds a time dimensionality to red tape creation, such that the creation of a given amount of red tape is more costly if carried out in a single, rather than over several, periods. Assuming the converse would lead to the counterintuitive conclusion that reducing the duration of the regulator’s term in office will lead to increased red tape creation. We adopt the functional form $b(E) = E^\gamma$, $0 < \gamma < 1$, where $\gamma$ is an effort productivity parameter, which equals the elasticity of red tape formation $\left( \frac{\partial b}{\partial E} \right)$.

After completing his term in office, the stock of red-tape capital created by the former regulator begins to diminish since the new regulator makes changes to existing rules and regulations. Hence, depreciation begins only after the regulator leaves office. Denoting the depreciation rate by $\rho$, the former regulator’s stock of red-tape capital at time $t$ is given by:

$$B_t(E) = B(E) e^{-\rho(T+t)} = \tau E^\gamma e^{-\rho(T+t)},$$

and this affects the wage he subsequently receives as an employee in the regulated industry. We assume that the regulator’s wage in the regulated industry is always greater than that in the alternative one, $W_2$ (normalized to unity), since, otherwise, the regulator will prefer to spend some of the final period in the alternative sector. We also assume, for simplicity, that the wage is linear in $B_t(E)$. Therefore, we specify:

$$W_3(t) = 1 + \alpha B_t(E),$$

where $\alpha$ is the normalized wage value of a unit of red-tape capital, and the $1$ is the normalized wage in the second period.

The regulator’s objective is to maximize the present value of his lifetime income, $V$. Assuming no discounting for simplicity, this is expressed by:

$$\text{Max } V : \quad V = \tau (W_1 - E) + T + (N - \tau - T) W_3.$$
the average wage during the third period. Note that, in our model, the wage falls throughout
the third period since the stock of red-tape capital begins to depreciate as soon as the regulator
leaves office.\footnote{While it would be easy to incorporate an increasing wage over time due to the acquisition of on-the-job
training, this would serve no purpose in our model.}

The average wage during the third period is:

\[
\bar{W}_3 = 1 + \frac{1}{N - \tau - T} \int_0^{N - \tau - T} \alpha \tau e^\gamma e^{-\rho (T + t)} dt = 1 + \frac{\alpha \tau e^\gamma e^{-\rho (N - \tau - T)}}{\rho (N - \tau - T)}.
\]

Thus,

\[
V = \tau (W_1 - E) + (N - \tau) \frac{\alpha \tau}{\rho} e^\gamma e^{-\rho (N - \tau - T)} (1 - e^{-\rho (N - \tau - T)}),
\]

where effort is the regulator's choice variable. Maximizing (5) yields the optimal amount of
effort spent creating red tape:

\[
E^* = \left[ \frac{\alpha \gamma}{\rho} e^{-\rho (N - \tau - T)} \right]^{\frac{1}{1-\rho}}.
\]

Hence, the amount of red-tape capital created by the regulator will be:

\[
B(E^*) = \tau \left[ \frac{\alpha \gamma}{\rho} e^{-\rho (N - \tau - T)} (1 - e^{-\rho (N - \tau - T)}) \right]^{\frac{\gamma}{1-\rho}}.
\]

The following Lemma summarizes the comparative statics.

**Lemma:** The amount of effort exerted in producing red tape (E) and the cumulative amount
of red tape created by a regulator (B) would increase if \( \rho \) (the depreciation rate) or \( T \) (the
cooling-off period) decreases, or if \( \alpha \) (the value of a unit of red-tape capital) or \( \gamma \) (the
elasticity of red tape creation) increases. A decrease in \( \tau \) (the duration of the regulatory
appointment) would lead to an increase in \( E \), but its effect on \( B \) is ambiguous.

**Proof:** The first part of the Lemma follows directly from Equations (6) and (7). The
effect of the depreciation rate can be seen by noting that the existence of a third period
requires that \( T < N - \tau \).

A change in the duration of the regulator's appointment has two opposite effects, so that
the total effect on the amount of capital he created is indeterminate. Differentiating (7) with
respect to \( \tau \):
\[
\frac{\partial}{\partial \tau} B(E^*) = (E^*)^\gamma + \tau \gamma (E^*)^{\gamma-1} \frac{\partial E^*}{\partial \tau} = (E^*)^\gamma [1 - \eta]
\]

(8)

\[
= \left[ \frac{\alpha \gamma}{\rho} e^{-\rho \tau} (1 - e^{-\rho(N - \tau - T)}) \right]^{\gamma-1} \left[ 1 - \frac{\tau \rho \gamma}{(1 - \gamma)(1 - e^{-\rho(N - \tau - T)})} \right],
\]

where \( \eta = -\frac{\partial E^*}{\partial \tau} E^* > 0 \). Consider the first equality. The first term on the right-hand-side is the positive direct effect of an increase in the duration of the regulatory period, and the second is the negative indirect effect. By the direct effect, an increase in the regulator’s term increases the amount of time available for red tape creation, and, in turn, its total amount. However, there is also an indirect effect – increasing \( \tau \) leaves the regulator less time to reap the fruits of his labor. The balance of these forces is not, a priori, determinable. \( Q.E.D. \)

The intuition behind these comparative statics is clear. As the depreciation rate \( (\rho) \) increases, red-tape capital formation is less valuable, so effort is less lucrative. Similarly, as the cooling-off period \( (T) \) increases there is less time to collect the fruits of these efforts, and, therefore, less effort will be exerted. An increase in the value of red tape \( (\alpha) \), or the efficiency with which red tape is formed \( (\gamma \text{, the elasticity of red tape formation}) \) would naturally lead to more red tape creation. The reason for the ambiguity with respect to the duration of the regulatory appointment \( (\tau) \) is due to the opposing effects described in the proof of the Lemma.

In the following Proposition, we relax the assumption that the regulatory period set by the legislator is binding, recognizing that the regulator might be interested in serving less than a full term. Thus, we explicitly assume that the regulator may quit his job whenever he wishes, which introduces the concept of the optimal duration of the regulatory appointment from the regulator’s perspective. \( \overline{\tau} \). This is accomplished by expanding the choice variables in Equation (3) to include not just \( E \), but also \( \tau \), and defining \( \text{argmax}(\tau) = \hat{\tau} \). Define \( \hat{\tau} \) as the actual amount of time spent in the regulatory agency. It is clear, therefore, that \( \hat{\tau} \) will equal the lesser of the appointment duration \( (\tau_0) \) and the optimal duration of the regulatory appointment from the regulator’s perspective \( (\tau^*) \), i.e., \( \hat{\tau} = \text{Min}(\tau_0, \tau^*) \), where \( \tau_0 \) is now the appointment duration set by the legislator. If \( \tau^* < \tau_0 \), then the regulator does not serve out his

\footnote{While it is possible to design contracts that inflict monetary penalties if a worker does not remain in a certain job for a minimal period, it is unlikely that contracts exist that effectively tie the worker to a single workplace for his entire worklife. We assume that such a contract is not written, or is not enforceable.}
term, and if \( \tau^* > \tau_0 \) he would desire a longer term, but is not given this option. With this understanding, the following Proposition specifies the conditions under which endogenous red tape is created by regulators.

**Proposition:** Red tape is always created, unless the regulator does not wish to be employed in the regulated industry.

**Proof:** Replacing \( \hat{\tau} \) in (7), it is clear that the amount of red tape created is zero only if \( \hat{\tau} = 0 \), or \( \hat{\tau} = N - T \). We proceed, then, to demonstrate why these equalities will not hold. If \( 0 < \tau_0 < N - T \) this requires showing that \( \tau^* > 0 \), and if \( \tau_0 \geq N - T \) we must also show that \( \tau^* < N - T \). In either case, we need to characterize the regulator’s optimal duration of the regulatory appointment (\( \tau^* \)).

Substituting (6) in (5) yields the maximized value of the regulator’s lifetime income:

\[
V^* = N + \tau(W_1 - 1) + \frac{\tau(1-\gamma)}{\gamma} \left[ \frac{\alpha \gamma}{\rho} e^{-\rho(1-\gamma) \tau} \right]^{\frac{1}{1-\gamma}}.
\]

Letting the regulator choose the appointment duration, the first-order condition with respect to \( \tau \) is given by:

\[
\frac{\partial V^*}{\partial \tau} = (W_1 - 1) + \frac{1-\gamma}{\gamma} E^* + \frac{\tau^* (1-\gamma)}{\gamma} \frac{\partial E^*}{\partial \tau} = (W_1 - 1) + \frac{1-\gamma}{\gamma} E^* [1-\eta] = 0.
\]

We first show that if the regulator is, at any point, to go and work in the regulated industry (i.e., to pass through the revolving door) then \( \tau^* > 0 \). Using (6), we see that when \( \tau \to 0 \), then \( \eta \to 0 \), but \( E^* \) remains strictly positive. Thus, if \( W_1 \geq W_2 = 1 \), then \( \partial V^*/\partial \tau > 0 \), so \( \tau^* > 0 \). In addition, even if \( W_1 < W_2 \) (\( W_1-1 < 0 \)) this will continue to hold, unless \( W_2 \) is so much greater than \( W_1 \) that no one would ever choose to be a regulator. This, of course, is a degenerate case in which there is no regulation – an irrelevant circumstance.

To show that \( \tau^* < N - T \), note that \( \eta \) increases with \( \tau \), and is greater than 1 for values of \( \tau \) approaching, but strictly less than, \( N - T \). For these values of \( \tau \) the last part of (10) is negative. Thus, unless \( W_1 \) is much greater than \( W_2 \), \( \partial V^*/\partial \tau < 0 \) in this region. Under this condition and the one in the previous paragraph, \( \partial V^*/\partial \tau = 0 \) at an interior value of \( \tau \). If, however, the difference between \( W_1 \) and \( W_2 \) (\( W_1-1 > 0 \)) is so great that the regulator prefers to remain in government employment throughout his work-life, and this is allowed by the legislator (i.e., \( \tau_0 \geq N - T \)), then the condition in the Proposition fails since the regulator would not wish to find
alternative employment in the regulated industry, and hence would not have any incentive to create red tape. \( Q.E.D. \)

According to the Proposition the regulator wants to create red tape, and then to have time to cash in on his investment. As stated, for appointment duration less than \( \tau^* \), the regulator will have no choice but to leave when his term ends even though it is sub-optimal from his perspective. If, alternatively, the legislated duration is longer than \( \tau^* \), then the regulator will still create red tape, but will quit his job before his term expires.\(^{10} \)

Two additional points should be noted. First, by Equation (9), just as a change in the duration of the regulatory appointment was shown to have an ambiguous impact on the amount of red tape created (Lemma), so it has an ambiguous affect on lifetime income. We return to this point below. Second, we would like to emphasize that the results in the Lemma and Proposition consider only the regulator’s perspective, and not the legislator’s objectives and choices.

Comparative statics on \( \tau \) yields the following corollary.

**Corollary:** If regulators are more successful at creating red tape (i.e., if the elasticity of red tape creation is increased), they will desire shorter terms in office.

**Proof:** Since \( \frac{\partial^2 V^*}{\partial \tau^2} < 0 \) (the second-order condition is globally satisfied) and \( \frac{\partial \tau^*}{\partial \gamma} = -\frac{\partial^2 V^*}{\partial \tau^2} \), the sign of \( \frac{\partial \tau^*}{\partial \gamma} \) is determined by the sign of \( \frac{\partial^2 V^*}{\partial \tau^2} \). Differentiating Equation (10) with respect to \( \gamma \), one finds that \( \frac{\partial^2 V^*}{\partial \tau^2} < 0 \), and hence, \( \frac{\partial \tau^*}{\partial \gamma} < 0 \). \( Q.E.D. \)

This result is somewhat surprising since as the effort productivity (\( \gamma \)) increases, so does the payoff from red tape, which might lead one to expect that more time would be desired for the creation of red-tape capital. This is not the case, since the benefit from entering the private market and cashing in on the increased capital stock overcomes this consideration. Of course, as shown in the Lemma, the total amount of red tape still increases.

\(^{10}\) Two additional necessary conditions for this are \( T<N \) (i.e., the regulator will be allowed to enter the regulated industry at some point), and \( s_0 \), as set by the legislator, is not contractually binding, as discussed above.
B. The Legislator and Equilibrium

Until this point, we have only been concerned with the regulator’s reactions to the variables set by the legislator. As shown, regulators always create red tape (unless they never pass through the revolving door). We now turn to the legislator’s objectives.

Two pertinent issues are of interest to the legislator: the amount of red tape and the effectiveness of the regulation. The amount of red tape is measured by the size of the stock of red-tape capital weighing on the economy (and not merely the amount of red tape created by any specific regulator). The total stock of red-tape capital, $S$, is a function of the amount of red tape created by each of the (infinite) regulators who served in the past, and, therefore, at the end of a regulator’s term, the stock of capital equals:

$$S = B(E) + B(E_{-1})e^{-\rho \tau} + B(E_{-2})e^{-2\rho \tau} + \ldots$$

In a steady state each regulator acts identically, and the additional red tape created by the last regulator is exactly equal to the depreciation in the capital stock from previous regulators. Hence, using (11), the total steady-state stock of red-tape capital is given by:

$$S = \frac{B(E)}{1 - e^{-\rho \tau}} = \frac{\tau}{1 - e^{-\rho \tau}} \left[ \frac{\alpha \gamma}{\rho} e^{-\rho \tau} \left(1 - e^{-\rho(N-\tau-\tau)}\right) \right]^{\frac{\gamma}{1-\gamma}}.$$

The second issue of concern to the legislator is the effectiveness of regulation. Candidates for the regulatory job are assumed to differ in their innate ability, which is observed by the legislator without error. Higher-ability individuals are more effective regulators, but demand higher lifetime earnings since they also have higher opportunity costs (i.e., they can earn more than their lower-ability counterparts in the private sector). Specifically, if the present value of the candidate’s lifetime income when he becomes a regulator ($V$) is less than it would be if he were employed elsewhere (his "reservation value"), then he will not accept employment in the regulatory agency. In equilibrium, the legislator

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11 These may be of concern to the legislator because of their effect on voters (and, in turn, on reelection campaigns), or because of a benevolent concern the legislator may have for the population’s welfare.

12 In order to keep the model as simple as possible, we assumed that the lifetime income of anyone accepting a job in regulation ($V$) is independent of ability, so that the benchmark for all candidates is identical. Those candidates for whom lifetime income in the private sector exceeds this benchmark will not offer their services to the legislator. For this assumption to be precise, it is necessary that (a) the wage in the alternative sector ($W_2$, normalized to unity) and (b) the regulator’s wage in the final period, must both be independent of ability, but (c) wages in the regulated industry for those not serving as regulators must depend on ability. This will occur if the regulator's skills are industry specific (justifying (a) and (c)), but are usurped after serving as a regulator by the presence and quantity of red-tape capital (justifying (b)). Relaxing these assumptions will change the quantitative, but not qualitative, results.
will choose the best regulator she can find who is willing to work in the agency given the employment conditions (i.e., that regulator for whom \( V \) exactly equals his reservation value). For expository purposes, and without loss of generality, we can, therefore, assume that \( V \) also measures regulation effectiveness.\(^{13}\)

In order to best attain the dual goals discussed above, the legislator has to take the regulator’s behavior into account when setting policy. The instrument we analyze that affects the regulator’s behavior is the duration of the cooling-off period, \( T \).\(^{14}\) From (9), it is clear that decreasing the cooling-off-period duration would lead to an increase in the regulator’s lifetime income, and, hence, also in the highest-ability candidate attracted to the job, with a concurrent increase in the effectiveness of regulation. However, from the Lemma, we saw that decreasing \( T \) also leads to an increase in the amount of red tape created by each regulator, which, from (12), increases the stock of red-tape capital. Thus, in choosing \( T \), the legislator faces a tradeoff between the effectiveness of regulation (measured by \( V \)) and the stock of red-tape capital (\( S \)).

Optimization by the legislator may often yield a strictly positive and limited (less than \( N \)) value of \( T \). However, two corner solutions must also be considered: no cooling-off period (\( T=0 \)), and a complete prohibition from working in the regulated industry (\( T=N \)).

The former is likely in many situations, and, indeed, many countries have not legislated a cooling-off period (See Appendix). This is likely to be optimal when, for instance, red tape is difficult to create, yields a small payoff in the private market, or depreciates quickly.

The other extreme – barring the legislator from employment in the regulated industry for life – seems less likely for two reasons. The first is related to our model: Imposing a lifetime ban would be very costly to regulators, and would lead to very ineffective regulation since the job would only attract low-ability candidates. Therefore, it is most likely be optimal for

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\(^{13}\) A subtle distinction arises from this discussion pertaining to international comparisons. Effectiveness is a relative measure that results from a comparison between the regulator’s income in the public sector and in industry. Both these wages are measured within a single country. It is possible, therefore, that the entire population in country A is more skillful in regulation than that in country B, but conditions are such that the most skillful person willing to accept the job of regulator in country B is more highly ranked than in country A.

\(^{14}\) Two other instruments discussed in our model may also be available: the wage in regulatory employment, \( W_{1} \), and the duration of the regulatory appointment, \( \tau \). We assume that \( W_{1} \) is tied to other government salaries, and thus, for our purposes, is fixed. We do not consider changes in \( \tau \) because, as shown above, they would have an ambiguous effect on the amount of red tape created (Lemma) and on lifetime income. Thus, there are no testable implications with respect to this variable.
legislators to consent to the creation of *some* red-tape capital in order to attract better regulators despite the low wages. One might interpret this acquiescence by the legislator as a compensating differential.

Secondly, imposing *any* cooling-off period is considered a strain on democracy in many developed countries since it negates the important democratic principle of freedom of occupational choice.\(^{15}\) For this reason, when such a restriction is nonetheless implemented, its scale and scope tend to be as limited as possible. Completely prohibiting such employment would be unconscionable in most countries.

Several testable implications can be derived from the model with respect to the effect of the underlying variables on the optimal duration of the cooling-off period, the resulting amount of red tape and the quality of regulation. Available cross-country data allow empirical testing of the following implication of the theory.

**Hypothesis:** The duration of the cooling-off period and the amount of red tape are negatively correlated.

This follows from the discussion above. While we do not claim that such a correlation establishes our theory as more reasonable than other theories, it should be noted that correlation between these variables is not predicted by the other theories.\(^{16}\)

**IV. Evidence**

**A. The Data**

The data are presented in the Appendix.

The data on red tape are taken from Mauro (1995), and were compiled by Business International. The measure is ranked from 0 to 10, with 10 as the highest level of red tape (in Mauro, 1995, the scale is inversely related to red tape).\(^{17}\)

The duration of the cooling-off period differs across governmental agencies, and international data are not readily available. In pursuit of consistency, we chose to concentrate

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\(^{15}\) In Germany, for instance, a cooling-off period was initially ruled as unconstitutional, and thus not legislated (GAO Report, 1978). This ruling was later changed.

\(^{16}\) If, however, we interpret red tape as the corruption level, then Brezis and Weiss (1997) yields the same prediction. However, as discussed in the Introduction, there is good reason to differentiate between these concepts.
on the regulation of the banking industry, which was chose because we observed from the available data that if $T=0$ in the sensitive banking industry, then the cooling-off period in the other industries tends to also be zero. The data presented in the Appendix are not published elsewhere, but were obtained mainly through personal correspondence with the Central Banks. Some data points are missing due to the lack of response to our inquiries.

The data on the duration of the regulatory period were taken from the Morgan Stanley Dean Witter Central Bank Directory (1999, Table 4). We also make a distinction between developed and developing countries, using the designation in World Development Report based on GNP per capita expressed in current U.S. dollars.

### B. Results

The simple correlation between the duration of the cooling-off period and the amount of red tape is -0.385, with a 96% significance level. Note, however, that the duration of the cooling-off period is a truncated variable since it cannot be negative, the number of observations is small, and there may be errors in the measurement of red tape (see Mauro, 1995). Under these conditions, it is preferable to analyze these correlations using a distribution-free contingency analysis. Toward this end, we bifurcated the data in each category, and transformed the quantitative variables into qualitative ones (dummy variables). For the tests we wish to conduct, it is best to choose the dividing point between “high” and “low” in any category as the median value, so that the number of countries in each category will be as equal as possible. In the case of the cooling-off period, however, more than half the countries have no cooling-off period, so we instead differentiated between countries with a cooling-off period and those without.

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17The measure we use equals 10 minus Mauro's (1995) measure.
18 These data are not used in the analysis, and are presented solely for informational purposes. As discussed above, the theory does not yield any prediction about the correlation between this variable and the amount of red tape (see the Lemma) or other variables, so no hypothesis is available pertaining to these data.
19 Note that in the Table, there is some ambiguity regarding the duration of the cooling-off period in several countries. The correlation reported in the text used a 2-year cooling-off period for Belgium, 1-year for Germany, and no cooling-off period for the UK. Using, instead, a 1.5-year period for Belgium and a 2-year cooling-off period for the UK (as per the GAO report) increases the correlation to –0.408, and the significance level to 97%.
**Contingency Table Between Red Tape and the Cooling-Off Period**

<table>
<thead>
<tr>
<th>Cooling-Off Period</th>
<th>Red tape</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High (&gt;3.25)</td>
<td>Low (≤3.25)</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>$T=0$</td>
<td>13</td>
<td>6</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>$T&gt;0$</td>
<td>1</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>15</td>
<td>29</td>
<td></td>
</tr>
</tbody>
</table>

As shown in the table, there are more observations on than off the main diagonal, as predicted by the model. The negative contingency between the amount of red tape and the cooling-off period is significant at the 99.6% level, as calculated by Fisher’s one-tail exact test. The point correlation coefficient is –0.56 and the contingency coefficient is –0.49.

One reservation with this test is that since the countries in the study are vastly different from one another, there may be alternative explanations for these results. In fact, a glance at the data shows that cooling-off periods only exist in developed countries, suggesting that the existence of such legislation might be related to the level of development. To assuage such concerns, we redid our analysis using only developed countries, with the categorization taken from the World Development Report (1996). This report classifies countries into four categories, and we re-ran our analysis using only the 17 countries included in the highest category.

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21 A "point correlation" is a correlation between two dummy variables in which the high value is indicated by unity and the low value by zero. The point correlation squared also equals the value of $\chi^2$ (with one degree of freedom) divided by the number of observations, i.e., $r^2 = \chi^2/n$. The contingency coefficient is considered more appropriate for measuring contingency, and is defined in the case of a 2X2 table as $C = (r^2/(1 + r^2))^{0.5}$, where the sign of $C$ is determined by the sign of $r$.
22 The countries for which we have data that fall into this category are Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Israel, Japan, Kuwait, The Netherlands, Portugal, Spain, Sweden, Switzerland, U.K., and The U.S.
### Contingency Table Between Red Tape and the Cooling-Off Period

For Developed Countries Only

<table>
<thead>
<tr>
<th>Cooling-Off Period</th>
<th>Red tape</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High (≥2.25)</td>
<td>Low (&lt;2.25)</td>
<td>Total</td>
</tr>
<tr>
<td>T=0</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>T&gt;0</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>8</td>
<td>17</td>
</tr>
</tbody>
</table>

The expected correlation continues to exist, but the significance level is lower than before. The Fisher exact test shows a significance level of 78.21%. While this is not highly significant, it is still more than one standard deviation from randomness, and definitely compatible with our theory. Including category-2 countries (Argentina, Brazil, Greece, Mexico, South Korea and South Africa) into the analysis, the Fisher exact test (using a red tape dividing line of 2.5 to maintain equally sized groups) would indicate a significance level of 97.4%.

In summary, these data lend support to our hypothesis.

### III. Conclusions

In this paper we presented a model of regulation, in which a legislator sets the duration of a cooling-off period for a regulator, which affects the latter’s behavior. The regulator has his own agenda: he takes actions to enhance his economic power and create rents, on which he can cash in after passing through the revolving door into the regulated industry. He does this by creating red tape, which is similar from his perspective to investing in specific human capital.

The interaction between the regulator’s and the legislator’s actions determines the amount of red tape in the economy. The model yields predictions regarding correlations between some of the variables. For instance, our model suggests that there should be a negative correlation between the amount of red tape and the duration of the cooling-off period. This was tested empirically, and shown to hold.

This paper showed that red tape could result from the bureaucrat’s desire for economic
power. We demonstrated that even if the legislator's interests and desire to minimize it are taken into account, red tape is still created in equilibrium, since the cost to the legislator of preventing the regulator from creating red tape is too great – it comes at the expense of reduced effectiveness in regulation. Hence, the legislator acquiesces to the creation of a certain amount of red tape by the regulator, which, in some ways, is not all that different from sanctioning corruption.
References


## Appendix

### Model Variables by Country

<table>
<thead>
<tr>
<th>Country</th>
<th>T (Cooling-off period)</th>
<th>τ (years as regulator)</th>
<th>Red tape*</th>
<th>Ln Y/L 1970-1995</th>
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<tbody>
<tr>
<td>Argentina</td>
<td>0</td>
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<td>X’</td>
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<td>Zaire</td>
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<td>5.7921</td>
</tr>
</tbody>
</table>

Note: Missing entries indicate lack of data.

*The values in this column equal 10 minus Mauro’s (1995) values.

**The legal department of the Deutsche Bundesbank stated that: “There is a "cooling-off" period during which the governor is not permitted to work in the private banking sector. However, details cannot be disclosed, since they are part of the contract between the governor and the Central Bank Council which is not available to the public.”

***According to the Bank of England, “The act does not contain any specific provisions in this respect. Whether any other provisions might be relevant in practice would need to be assessed on a case-by-case basis, taking into account such factors as the nature of any prospective appointment and the timing thereof.” The GAO report (1978) attributes a cooling-off period of 2 years to the UK.

Source: See text.