Two dimensions of regulatory competition

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Abstract

   This paper recasts current theories of regulatory or legislative competition. Building on the recent contribution of Buchanan and Yoon (2000) [Buchanan, J., & Yoon, R. Symmetric tragedies: Commons and anticommons. *The Journal of Law and Economics*, *43*(1), 1–14], we consider alternative ways in which decision-making competence can be allocated among multiple legislative or administrative bodies. The general model is used to consider the equilibria obtained under different allocations of competence and to formulate some policy considerations.
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1. Introduction

   There are two important dimensions of regulatory[1] competition when multiple decision-making bodies are involved. The first dimension concerns the effects of the action. In some cases, the action *grants* rights or privileges to individuals or firms. In other cases, the action *restricts* the rights and privileges already possessed by such private parties. In simple terms, this amounts to a distinction between *positive* and *negative* effects of the regulatory

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   [1] We construe regulation broadly. In our discussion, regulation includes legislative activities undertaken to permit or restrict any given action.

intervention. The second dimension concerns the relationship between different regulatory bodies that share decision-making competence on the matter. In some cases such bodies (e.g. administrative agencies or legislative committees) have *concurrent* competence. In these situations, the concurring action of the various bodies is required for the effectiveness of the regulatory act. In other cases, the various organs have *alternative* competence, such that the action of one of those bodies is sufficient to give life and full effects to a regulatory or legislative act. In economic terms, the actions of the relevant bodies can be viewed as complements (concurrent action) or substitutes (alternative action) in the production of a final result. In the case of a single regulator, or when the multiple regulators act with perfect coordination, these distinctions are irrelevant. However, in this paper we show that in the case of independent regulators, the interaction between these two dimensions of regulatory action takes on great significance.

The paper is structured as follows. In Section 2, we provide an introduction to regulatory competence in multi-body administrative settings. In Section 3, we distinguish our two dimensions of regulation. In Section 4, we provide an economic model of regulatory competition. The economic implications of these basic distinctions are developed with the aid of recent models of common and anticommons in property governance (Buchanan & Yoon, 2000; Parisi, Schulz, & Depoorter, 2002). In Section 5, we use the results of the economic model to examine the important interrelationship between the two dimensions of regulatory action and provide implications for regulatory design and Section 6 concludes.

2. Two dimensions of regulation

In a world of overlapping jurisdictions, it is useful to abstract the regulatory process into its two primary dimensions: positive versus negative actions and concurrent versus alternative competence. In the case of a single regulator, or when the multiple regulators cooperate, these distinctions are irrelevant.[2] However, in the case of independently acting (i.e. competitive) regulators, these distinctions take on great significance.

2.1. Type of regulatory activity: positive versus negative actions

Regulatory activity, generally speaking, takes two forms. A regulator who is charged with allowing a certain activity that otherwise is not permitted undertakes a positive regulatory action. That is, if an individual wishes to partake in a given activity, he must acquire permission from the regulator. The issuance of permits and licenses would fall under this category of regulatory action. Effectively, in these cases, there is a general prohibition against an activity that can be overcome through the regulator's positive action. Negative regulatory action involves the restriction of an otherwise permissible activity. The issuance of prohibitions or regulatory guidelines would fall under this category of regulatory activity.

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[2] Huber (1983), however, makes the point that, in practice, there may be systematic differences between positive and negative regulation owing to differences in constituencies. These systematic differences lead to diverging incentives for the regulator.

In those areas where a single regulatory body controls an activity, there is little distinction between positive and negative regulation. Failing to permit an activity is equivalent to prohibiting it, just as the absence of a restriction is tantamount to permission, conditional on what the status quo is.

2.2. Allocation of regulatory competence: concurrent versus alternative

When a single regulatory authority wields authority of a particular activity, an individual simply acquires the necessary regulatory input to undertake that activity. However, when the regulatory landscape includes multiple bodies with jurisdictions that overlap to some degree regarding the desired activity, an individual might be required to secure multiple regulatory inputs or might be able to choose among alternative regulatory inputs.

These alternatives depend on the relationship between the formative administrative or regulatory actions. In some cases, the competence of the various administrative bodies is concurrent, in the sense that an affirmative action of multiple administrative bodies is required for the effectiveness of a regulatory act. In other cases, the competence of the administrative bodies is alternative, in the sense that the action of one among multiple bodies is sufficient to give effects to a regulatory act.

In the extreme case of strictly complementary regulatory inputs for a positive (negative) regulatory action, all of the regulators must choose to permit (restrict) the activity for the individual to undertake the activity.[3] While strict complementarity of regulatory inputs is perhaps easiest to discuss, it is certainly possible to imagine situations of partial complementarity in which increasing the input from one regulatory agency reduces the input needed from another agency. This is occasionally seen in modern legislative processes, where lack of agreement of one organ may be overcome by a higher majority of another supporting organ. Overcoming a presidential veto in the US system, which requires that a measure secure a higher majority in the legislative branch, serves as an example. Alternately, the combination of complementary regulatory inputs might vary depending upon the level of the activity undertaken by an individual. Strict substitutability is likewise an easy case to consider.[4]

3. Mapping the two dimensions of regulatory competition

In this section, we shall develop an economic model to study the interaction between our two dimensions of regulatory competition. In one dimension, we consider the relationship between the actions of two regulatory bodies, which can be one of *complementarity* (i.e. *concurrent* administrative or regulatory action) or *substitutability* (i.e. *alternative* administrative or regulatory action). In the other dimension, we consider the content of the action, which can be *positive* (e.g. grants the right to undertake a particular activity) or *negative* (e.g.

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[3] Suppose two agencies controlled entry into the profession of barbering—the Ministry of Beards and Mustaches (MBM) and the Bureau of Mustaches and Beards (BMB). In the case of complementary regulatory inputs (and positive regulatory action), a prospective barber must secure licenses from both the MBM and the BMB.

[4] In this instance, a prospective barber need only acquire a license from either the MBM or the BMB.

impose restrictions on a currently permissible activity). The intuition for our model resembles the strategic complements and substitutes model of oligopoly presented by Bulow, Geanakoplos, and Klemperer (1985). While the earlier model focuses on products markets, the general intuition also applies in the present context.

3.1. Externalities in the regulatory process

The dimensions of regulatory competition acquire practical and economic relevance when multiple agencies with overlapping competence are involved. In this context, the boundaries of positive and negative regulation might not coincide. The difference in such cases is the result of the externalities created by one agency's actions with respect to other agencies.

For the purpose of this paper, it is thus important to note that in all cases of overlapping competence, regulatory bodies can impose an externality on others. This externality can be positive or negative according to whether the competing regulatory bodies have concurrent or alternative powers. Our two dimensions of regulatory competition allow us to map four possible combinations of regulatory action. In two such regions, the regulatory action of one agency creates positive externalities on the other. In the remaining two regions the externalities will be negative.

3.1.1. Positive externalities in regulatory competition

We can start considering the two situations of regulatory action with positive externalities: (a) concurrent and positive regulatory action, and (b) concurrent and negative regulatory action. In the case of concurrent and positive action, the activity of one agency increases the value and the exploitable rent of the other. As an example, imagine that two administrative approvals are necessary for operating a business. The grant of the first approval increases the value of the second approval for the applicant and thus increases the exploitable rent for the second administrative agency. In this case, the action by the first agency generates a positive externality on the other.

A positive externality can also be found in a second group of cases, where the regulatory activity is concurrent and negative. Here, we can imagine the case of one agency taking a first action towards a regulatory restriction. Since the competence is concurrent, such action constitutes a necessary, but not sufficient, step towards the prohibition of the activity. By taking the initial step towards the negative regulation, the first agency creates a positive externality for the other. Given the fact that the first step towards the negative regulation has been taken, the subsequent agency has full and final control over the final regulation. This increases the exploitable rent for the second agency.

3.1.2. Negative externalities in regulatory competition

The same logic can be used to illustrate the remaining two cases, both characterized by negative externalities: (a) alternative and positive, and (b) alternative and negative. First consider the case of alternative and positive regulatory action. In this case, the action of one agency destroys the value and exploitable rent for the other. As an example, imagine that two agencies have alternative power to grant a license to operate a business. The grant of a license by one agency dissipates the value of a potential license by the other agency,

since only one license is necessary to operate the business. In this case, the action by the first agency generates a negative externality on the other, since it decreases the exploitable rent for the other administrative agencies.

A negative externality can also be found in a second group of cases: those where the regulatory activity is alternative and negative. Here, a regulatory restriction by one agency creates a negative externality for the other. As an example, consider the case in which two agencies have alternative power to prohibit one business activity. One agency's action destroys the exploitable rent of the other, since a second prohibition can add no further loss to the prohibited enterprise. The threat of adding a prohibition to an already prohibited activity leaves no rent-extraction opportunities.

The results also hold in the case of imperfect substitutability or complementarity. In those cases the ability of one agency to extract rent is reduced if an applicant either must secure additional regulatory clearances (concurrent competence case) or can substitute another regulator's permission (alternative competence case).

3.2. A dual model of regulatory competition

For simplicity, we consider the case of two regulators whose competence overlaps on a given activity. In the scenario, the regulators can be of the type that grants the right to undertake a particular activity (i.e. positive action), such as granting a license or a permit. Conversely, the regulators might have power to impose restrictions on a currently permissible activity (i.e. negative action). We denote such regulatory power as x_i. The interpretation of such variable depends on the specific context. Specifically, in positive action cases, x_i denotes the extent to which regulator i allows a given activity, while in negative action cases it denotes the extent to which the regulator restricts the activity. Clearly, as pointed out below, there exists a duality, since permitting an activity implies a lack of restricting it.

In the case of regulatory action by a unified regulatory body, our dimensions of regulatory competition collapse into one. However, in the case of fragmented and uncoordinated regulatory action, these dimensions acquire great significance. This is due to the presence of the above-discussed externalities in the regulatory process. In the following, we will develop a formal model to explore the implications and effects of such regulatory externalities.

In our model the externalities created by one agency's actions affect the other agency's payoff $V_i(x_i, x_j)$. This payoff is the shorthand for the regulatory rent or benefit derived from the regulatory or legislative action.[5] Generally, this externality implies that the payoff to i is affected by an increase in x_j.

For simplicity, we make the following assumptions:

Assumption 1. Symmetry $V_1(x_1, x_2) = V_2(x_2, x_1)$.

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[5] For descriptive purposes, it is easiest to think of this payoff as rent extraction by the regulators. Alternately, it could be seen as a function of the degree to which each regulator achieves his regulatory mission (such as efficiency in the given activity or some notion of equity regarding the activity). In this latter conception, the intuition is similar, though the exposition needs to be augmented slightly to achieve our result. Specifically, we would need to stipulate that the multiple regulators had conflicting missions for our result to hold formally. At a less formal level, the intuition of our result holds as long as the regulators' missions do not completely coincide.

Assumption 2. x_i can be chosen from a compact and convex set X.

Assumption 3. V_i is differentiable and strictly concave in x_i.

Assumption 4. $V_1 + V_2$ is differentiable and strictly concave in x_i.

Assumption 5A. $(\partial V_i/\partial x_j) > 0$ for $i \neq j$ in the case of *concurrent* competence.

Assumption 5B. $(\partial V_i/\partial x_j) < 0$ for $i \neq j$ in the case of *alternative* competence.

Assumptions 2 and 3 guarantee that a game between agents with X as a strategy space and V as a payoff function will have a Nash equilibrium in pure strategies (Mas-Colell, Whinston, & Green, 1995; Nash, 1950). Assumption 4 guarantees the existence of a maximizing choice of $V_1 + V_2$ on $X_1 \times X_2$. Assumptions 5A and 5B capture the negative and positive externalities, respectively, present in the cases of concurrent and alternative regulatory competence.

We contrast three regulatory situations: (a) cases where the regulators have *concurrent* regulatory competence and act independently (i.e. competitively). In these cases, the symmetric Nash equilibrium strategy of x^c represents the predicted strategy; (b) cases where the regulators have *alternative* regulatory competence and act independently (i.e. competitively). In these cases, the symmetric Nash equilibrium strategy of x^a represents the predicted strategy; (c) cases where the regulators cooperate or act as a unified regulatory body. In these cases, the maximization of $V_1 + V_2$, denoted by x^* provides the predictive instrument.

Thus, we are in a position to state our primary result: Independently acting regulators tend to exercise their regulatory power (positive or negative) to a larger (lesser) extent than is optimal from the point of view of the regulators' joint interests in alternative (concurrent) competence situations.

Theorem 1 (Concurrent Regulatory Power). *Let Assumptions 1–5A be satisfied. If the Nash equilibrium and the maximizer of $V_1 + V_2$ are unique and in the interior of $X_1 \times X_2$, then $x^c < x^*$*

Proof. Due to Assumption 1, the equilibrium and the maximizer must each be symmetric. It is therefore sufficient to analyze the intersection of the best response function implicitly defined by

$$\frac{\partial V_i}{\partial x_i}(x_i, x_j) = 0 \quad (*)$$

and the locus of

$$\frac{\partial V_i}{\partial x_i} + \frac{\partial V_j}{\partial x_i} = 0 \quad (**)$$

with the 45-degree line. For fixed x_j, consider the solution of (*), $x_i(x_j)$. Due to Assumption 5A, it is obvious that (**) is not satisfied at such a solution of (*). As $(\partial V_i/\partial x_i) + (\partial V_j/\partial x_i)$ is strictly concave, the solution of (**) is smaller than $x_i(x_j)$. This implies that the locus of (**) is strictly below the locus of $x_i(x_j)$. Therefore, the intersection point of (*) with the 45-degree line is above the respective intersection point with (**), proving the theorem.

Theorem 2 (Alternative Regulatory Power).   *Let Assumptions 1–4 and 5B be satisfied. If the Nash equilibrium and the maximizer of $V_1 + V_2$ are unique and in the interior of $X_1 \times X_2$, then $x^a > x^*$.*

Proof.   The proof of this theorem follows as a corollary of Theorem 1. As indicated above, Assumption 1 implies that the equilibrium and the maximizer must each be symmetric. It is therefore sufficient to analyze the intersection of the best response function implicitly defined by (*) above and the locus of (**) with the 45-degree line.

For fixed x_j, consider the solution of (*), $x_i(x_j)$. Due to Assumption 5B, it is obvious that (**) is not satisfied at such a solution of (*). As $(\partial V_i / \partial x_i) + (\partial V_j / \partial x_i)$ is strictly concave, the solution of (**) is smaller than $x_j(x_j)$. This implies that the locus of (**) is strictly above the locus of $x_i(x_j)$. Therefore, the intersection point of (*) with the 45-degree line is below the respective intersection point with (**), proving our corollary theorem.

Our result generalizes Buchanan and Yoon's (2000) result. Their example describes a parking lot owned by two individuals. In order to park in the lot, an individual must secure permits from each owner. The example fits well within our general theory of regulation. Buchanan and Yoon's use of prices as the control mechanism can be translated into our general concept of regulatory power. In their illustration, the price represents the power to restrict individuals from engaging in an activity (parking) since raising the price effectively excludes some of the potential parkers. In our framework, it would be reasonable to interpret x_i as the price charged by the owner for a permit to park in the lot. As the price increases, the owner further exercises his regulatory power to exclude. The profit function employed in Buchanan and Yoon's article can be rewritten as an example of our payoff function where $V_1(x_1,x_2) = x_1(1 - x_1 - x_2)$. Clearly, this function fulfills all of the assumptions required for our theorem. Specifically, Buchanan and Yoon's example represents an illustration of concurrent regulatory power (i.e. potential users need to obtain two permits to access the parking lot). Their result is thus generalized in our Theorem 1. Converse results would obtain in the case of alternative regulatory power (i.e. potential users would only need to obtain one permit alternatively obtained from one of two issuers). Such a scenario would fall under our corollary Theorem 2.

4. Rethinking regulatory competition

In this section, we will attempt to illustrate the practical significance of the axiomatic model presented above. Specifically, we describe what level of regulation will be undertaken under each combination of actions and competence, relative to unified regulation. Further, we discuss the welfare implications of each regulatory form.

4.1. Regulatory externalities and the theory of regulatory competition

In cases where multiple agencies can issue permits, and a permit from one agency substitutes for that of another, the power of an agency to allow an activity is not the flip side of an ability to restrict the activity. Similarly, in settings where prohibition requires

Table 1
Regulatory activity under different allocations of competence

	Alternative competence (regulatory substitutes)	Unified competence	Concurrent competence (regulatory complements)
Positive competence	Activity over-permitted $X^a > X^*$	Rent-maximizing level X^*	Activity under-permitted $X^c < X^*$
Negative competence	Activity over-restricted $X^a > X^*$	Rent-maximizing level X^*	Activity under-restricted $X^c < X^*$

that multiple agencies all restrict the activity, the boundaries of permission and prohibition do not conform. There is the potential for too much of the activity to take place from the perspective of each individual agency, assuming the agencies act independently.

Symmetrically, this non-conformity of boundaries can generate problems in the case of concurrent regulation.[6] If permits from multiple agencies serve as complements in the regulatory process or if multiple regulators can each unilaterally prohibit an activity, there is potential for regulators to induce too little of the activity relative to each agency's desired level of activity, again disregarding the possibility of coordination among the agencies.[7]

Essentially, both of these problems emanate from the presence of externalities. In both cases, if the regulators act independently, the resulting level of the regulated activity will diverge from the level each would choose if it had sole decision-making authority, or if the several agencies worked in concert.[8] Table 1 relates this divergence.

4.2. Welfare and policy implications for assigning regulatory competence

From a welfare perspective, our discussion of the "distortions" introduced by fragmented regulatory authority is not complete. In some sense, whether regulatory fragmentation represents an increase or a decrease in total welfare is a valuation problem that depends upon the assessment of the value of the underlying regulatory mission. Clearly, if regulators are assumed to act benevolently and with full information, unified regulatory powers (or the coordination among multiple regulators) represent the value maximizing regulatory structure. Fragmented regulatory power (alternative or concurrent) would generate suboptimal outcomes.

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[6] Klick and Parisi (2005) model a similar problem when tax authorities share a tax base. As implied by the present model, each tax authority will generate externalities, specifically deadweight losses, for the other tax authorities, leading to an aggregate tax rate that exceeds the revenue maximizing rate.

[7] In some cases, regulators or legislators may be able to coordinate and maximize their joint interests. However, often times, the number of regulators may be too large or there may be too much of a mismatch between the various regulators' tenures to generate the conditions for effective collusion.

[8] Buchanan and Yoon (2000), in their formal description of the symmetry of commons and anticommons problems, suggest the usefulness of their analysis in analyzing overlapping bureaucracies. However, their presentation of the problem allows only for strict complementarity or substitutability of powers. While such an extreme case is useful for descriptive purposes, our more robust analysis allows for varying degrees of complementarity or substitutability. This more general analysis encompasses the extremes of strict complementarity and strict substitutability as limit points along a continuum centered at the point where the powers to permit and to prohibit are unified. Parisi et al. (2002) provide a general model of commons and anticommons for property which likewise relaxes this reliance on strict complementarity.

However, if regulators are assumed generally to behave as rent extractors, the theorem here provides some insight as to what structure will temper the use of their power. Specifically, in cases of positive regulatory action the allocation of alternative regulatory competence may be preferable, since it would induce individual regulators to exert lower levels of regulatory power (e.g. issue more permits), generating higher total surplus. A system of concurrent competence would instead exacerbate the inefficiencies of a single regulator. The converse holds for the case of negative regulatory activity. A system of concurrent regulatory competence may help mitigate the abuse, generating higher total surplus. A system of alternative competence would instead exacerbate the inefficiencies of a single regulator.

Opposite conclusions would be reached for the case where regulatory agencies are assumed to be inefficient for lacking the proper incentives to intervene effectively (e.g. shirking bureaucrats, etc.). In this group of cases, combining the proper allocation of competence with the appropriate instrument of intervention may reduce the inefficiencies generated by ineffective government.

We can thus summarize these intuitions showing the different ordering of welfare outcomes, W, under each regulatory regime (marked with the corresponding subscript) relative to the baseline of unified regulatory competence, marked as W_0.

It is worth noting the dual direction of our policy consideration. In different regulatory settings, some dimensions of regulatory competence are, for all policy matters, exogenously determined. Other regulatory choices conversely enjoy a greater degree of flexibility. Table 2 provides an intuitive framework for the institutional design of the regulatory process under different scenarios. For example, the first two rows provide a framework for the choice of the type of regulatory activity, when the allocation of regulatory competence is exogenously set. These results suggest that if the institutional environment is set as one of alternative competence (e.g. two parallel licensing boards), the creation of positive regulatory authority is to be preferred. Conversely, in an environment characterized by concurrent competence (e.g. a bi-cameral system), negative authority is preferable. The third and fourth rows provide a similar framework for the choice of allocation of regulatory competence, when the type of regulatory activity is exogenously set. These results suggest that, if the regulatory environment requires positive regulatory action (e.g. granting licenses), the creation of an institutional setting of alternative competence is to be preferred. Conversely, in a regulatory environment requiring negative regulatory action (e.g. restrictions on commercial activities), the creation of an institutional setting of concurrent competence is likely to yield superior results.

Table 2
Allocation of regulatory competence: welfare implications

	Welfare results		
	Rent-seeking agencies	Benevolent agencies	Shirking agencies
Alternative competence	$W_P > W_0 > W_N$	$W_0 > W_P W_0 > W_N$	$W_N > W_0 > W_P$
Concurrent competence	$W_N > W_0 > W_P$	$W_0 > W_P W_0 > W_N$	$W_P > W_0 > W_N$
Positive action	$W_A > W_0 > W_C$	$W_0 > W_A W_0 > W_C$	$W_C > W_0 > W_A$
Negative action	$W_C > W_0 > W_A$	$W_0 > W_A W_0 > W_C$	$W_A > W_0 > W_C$

Determining whether a regulator is likely to shirk or to be a rent seeker is an empirical question, though we might be able to draw some inferences ex ante from the institutional constraints that are in place. The existence of effective protections against rent seeking such as strong limitations on salaries and perquisites, as well as tenure security, might imply that regulators are likely to be shirkers, while the absence of limitations on official and unofficial compensation could imply that the regulator will be a rent seeker. This determination will be highly context dependent and could very well change over time.

5. Illustration

Our model presents an alternate framework for analyzing the effects of regulatory federalism. A particularly powerful illustration of this model can be found in the contrasting situations of China and Russia. The transition economies of China and Russia represent starkly different growth trajectories. During the 1990s, China had what was among the fastest growing economies in the world, while Russia's economy was among the lowest. The difference between the two countries' growth rates came primarily from differences in the growth of the private sector. While China's private sector flourished, Russia's did not (Blanchard & Shleifer, 2000).

Blanchard and Shleifer attribute this difference in performance to differences in political structure. While both countries represent federalist systems, China's system is politically centralized and Russia's is not. Under the centralized system, rent extraction is tempered as the Chinese government coordinates the regulatory activities of local government officials, using its removal powers to limit excessive regulation that harms the governments' joint interests. A system of revenue sharing then further serves to coordinate the interests of the various levels of government.

In Russia, on the other hand, local governors are chosen democratically and the upper-level government is largely unable to remove them. Further, the lack of political centralization makes a well-organized revenue sharing scheme difficult to implement. In fact, Shleifer and Treisman (1999) suggest a clear tax base division between upper and lower level governments as a remedy to this problem.[9] Essentially, in the absence of the ability to coordinate, they suggest that Russia abandon its over-lapping regulatory structure so as to avoid the over-regulation that our model implies in the case of concurrent positive regulation.

Our model might provide insight into why these different forms of federalism perform so differently. The coordination possible under the centralized Chinese system might allow the regulators to solve the externality problem that is at the center of the two dimensions of regulatory competition, while the non-coordinating Russian system might generate results consistent with our model's predictions. Excessive rent extraction, or regulation, presumably leads to a lower activity level in Russia, while the coordinated regulation in China would seem to induce more activity.

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[9] While our model subsumes taxes as part of regulation and the work of Blanchard and Shleifer (2000) is discussed here in tax terms, similar examples exist where the rent extraction takes place through non-tax regulation. For example, Frye and Shleifer (1997) present evidence suggesting that Russia's disorganized over-lapping governments make activities such as obtaining a business permit difficult.

6. Conclusion

When regulatory authority is shared among multiple bodies, the ultimate degree of intervention depends upon two dimensions of regulatory activity. In this context, regulation can take the form of positive or negative actions, and the regulators' authority will be either concurrent or alternative. In this article we present generalized theorems describing the level of regulation undertaken within each possible regulatory form, relative to the case of unified regulatory power, as well as a discussion of the welfare implications of the various regulatory forms.

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