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### **ABSTRACT**

This paper develops a model of the competition among states in providing corporate law rules. The analysis provides a full characterization of the equilibrium in this market. Competition among states is shown to produce optimal rules with respect to issues that do not have a substantial effect on managers' private benefits but not with respect to issues (such as takeover regulation) that substantially affect these private benefits. We analyze why a Dominant state such as Delaware can emerge, the prices that the dominant state will set and the profits it will make. We also analyze the roles played by legal infrastructure, network externalities, and the rules governing incorporations. The results of the model are consistent with, and can explain, existing empirical evidence; they also indicate that the performance of state competition cannot be evaluated on the basis of how incorporation in Delaware in the prevailing market equilibrium affects shareholder wealth.

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# 1. Introduction

This paper develops a model of the market for corporate incorporations and uses it to study the outcome and performance of this market. A central feature of the US corporate environment is the presence of competition among jurisdictions. Companies are free to choose their state of incorporation, and they are governed by the corporate law of the state they choose. Whether and to what extent this competition works well has been one of the most hotly debated subjects in corporate scholarship in the last quarter of a century. As the European Union has been moving toward giving European companies some freedom to choose their country of incorporation, this subject has become important there as well.

The large existing literature on state competition has focused on two questions. One question concerns the quality of the incentives produced by competition. According to the dominant view among corporate law scholars, competition generally pushes states, including Delaware, to adopt rules that benefit shareholders (see Winter (1977, 1989), Easterbrook and Fischel (1991), Fischel (1982) and Romano (1993a, 1993b, 1998)). An alternative view holds that state competition pushes states to adopt rules benefiting managers, not shareholders, with respect to an important set of corporate issues (see Cary (1974), Bebchuk (1992) and Bebchuk and Ferrell (1999, 2001)).

The other subject that has attracted much attention concerns the structure of the incorporations market. The market has been long characterized by one dominant player. Among publicly traded non-financial firms, Delaware is the domicile of 58% of the publicly traded companies, 59% of the Fortune 500 companies, and 67% of the companies that went public during 1996-2000 (Bebchuk and Cohen (2002)). In the face of this market structure, researchers have discussed what explains the emergence and persistence of a dominant state (Romano (1985), Black (1990), Klausner (1995), Kamar (1998)) and how the desire to maintain and take advantage of such dominance affects the behavior of this dominant state (Ayres (1995), Kamar (1998), Kahan and Kamar (2001)).

Although a great deal has been written on state competition in the past three decades, there has been surprisingly little effort to develop a formal framework that would enable a rigorous study of the subject. The present paper seeks to fill this void. It develops a model of the market for corporate law, and it uses this model to study the questions long discussed informally with the discipline provided by a formal model. The model enables us to resolve significant debates in the literature, to confirm some informally made claims while rejecting others, and to identify issues that have been thus far overlooked.

In our model, each state chooses its strategy – what rules to offer, whether to invest in creating a legal infrastructure, what prices to charge, and so forth. Companies then make incorporation decisions. Clearly, states choose their strategies in anticipation of the reactions to them by other states and by companies. We solve for the equilibrium outcome and study its features.

When a company is incorporated in a given state, payoffs to shareholders and managers are determined by (i) the substantive content of the state’s corporate law rules, (ii) the institutional texture of the state’s corporate environment, including the existence (or absence) of legal infrastructure (e.g. a specialized judiciary) and the presence (or absence) of beneficial network externalities, and (iii) the price charged by the state – either directly (e.g. franchise taxes) or indirectly (e.g. fees paid to the local bar).

As far as the substantive content of corporate rules is concerned, we shall distinguish (following Bebchuk (1992)) between two categories of rules. The first category includes rules that have little or no effect on the ability of managers to extract private benefits of control. With respect to these rules – which can be labeled insignificantly redistributive rules – both the managers and the shareholders of existing companies prefer rules that maximize cash flows to shareholders. The second category of rules includes those that might have a significant effect on managers’ ability to extract private benefits. Rules governing takeovers, self-dealing, and taking of corporate opportunities are examples of such rules. With respect to these rules – which might be called significantly redistributive rules – managers of existing companies might prefer rules that would increase their private benefits even if such rules would not maximize the cash flows to shareholders.

We allow payoffs to depend not only on the substantive content of legal rules but also on “institutional” factors such as the existence of a legal infrastructure and network externalities. Because Delaware’s investment in a specialized judiciary might provide benefits to Delaware companies (see Romano (1985), Black (1990) and Fisch (2000)), we assume that cash flows may increase from the presence of a legal infrastructure. Following the arguments that companies benefit from having many other companies incorporated in the same state (see Klausner (1995) and Kahan and Klausner (1997)), we allow for network externalities. Such externalities include the benefits that a company may enjoy from having more precedents to rely on and from being subject to rules and practices with which capital market participants are well familiar.

We also allow payoffs to depend on the price charged by the state of incorporation. More importantly, we include the price charged by states as an endogenous element of states’ strategies. The literature had largely assumed that states can maximize profits from incorporations by maximizing the number of

incorporated companies, implicitly assuming that the price paid by companies is exogenously fixed. As Kahan and Kamar (2001) pointed out, however, Delaware also makes choices with respect to the prices it charges.<sup>1</sup> In our model, in setting the prices charged, the dominant state takes into account the effects of the price it sets both on Delaware's revenues and on the incentives of other states to mount a challenge to Delaware's dominance.

We will focus in the first part of our analysis on the (re)incorporation decisions of existing publicly traded companies. We then extend our analysis to allow for IPOs. We show that our results largely apply to the case in which the stock of publicly traded firms is increased in any given period by new IPOs as long as the number of such IPOs is not too large relative to the existing stock of non-Delaware companies. When analyzing reincorporation decisions, we take as given the long-standing rules of US corporate law, under which reincorporation of an existing company requires board initiation followed by a vote of shareholder approval.

As to the payoffs of states, we shall assume that states seek to maximize revenues. A state's revenue (or payoff) is the product of the price it charges incorporated companies multiplied by the number of such companies. Also, for any given level of revenues, we assume that a state prefers more incorporation to less. In making its decisions, each state will take into account how companies as well as other states will react to it. The dominant state will also consider whether its decisions will create an incentive for other states to expend resources to challenge its dominance.

Using the above building blocks, we derive the equilibrium in the state competition game. One main result is that state competition works differently for rules that do and do not have a significant effect on managers' private benefits of control. When a corporate issue does not have a significant effect on managers' private benefits of control, state competition will push states to adopt rules that would best serve shareholders. However, with respect to rules that have a substantial effect on managers' private benefits of control, such as rules governing corporate takeovers or managerial conflicts of interests, states might adopt rules that make shareholders worse off. In particular, the dominant state will have to do so in order to attract reincorporations from other states and in order to prevent other states from being able to beat it in attracting companies willing to leave their "home" state. In this respect, our results support the view taken by Bebchuk (1992)

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<sup>1</sup> Kahan and Kamar (2001) focus on the possibility that, facing heterogeneous companies that differ in the benefits they derive from the advantages offered by Delaware, Delaware will seek to charge different prices to different companies. In contrast, we focus on a strategic role that the setting of price has regardless of whether such heterogeneity is present.

and Bebchuk and Ferrell (1999, 2001) that state competition might produce rules tilted in favor of managers' interests with respect to significantly redistributive issues.

State competition might lead to the adoption of rules that excessively favor managers not just by the dominant state but also by other states. In the identified equilibrium, all states seeking to maximize their success in the incorporation market will adopt the same rules. In this equilibrium, companies moving to the dominant state would make shareholders better off. Even though the dominant state has rules that are not optimal for shareholders with respect to some issues, so do other states, and the dominant state at least offers companies advantages in terms of legal infrastructure and network externalities. Thus, in equilibrium, even though state competition does not perform well with respect to issues that are significantly redistributive, companies will benefit from reincorporation in Delaware. Therefore, the performance of state competition cannot be assessed based on examining how a move to Delaware affects corporate value, which has been the standard approach in the empirical analysis of the subject.

Our analysis highlights the importance of the established procedure for "switching" from state to state for the equilibrium in the market for corporate law. Under this procedure, managers have a veto power over reincorporations. Moreover, whereas the shareholders also have a veto power, managers must initiate the vote on reincorporation, which essentially gives them the power to make a take-it-or-leave-it offer to the shareholders regarding reincorporation. Thus, if a move from a company's home state to either one of two states would benefit shareholders, the managers would be able to determine the state to which the company would move. Faced with a choice between remaining in their home state and reincorporating to whichever one of the two states managers favor, shareholders can be expected to approve the reincorporation. This feature of the situation strengthens the incentives of the dominant state to choose certain rules that are favored by managers but not shareholders.<sup>2</sup>

Our model explains how a state that has moved first to invest in legal infrastructure will be able to obtain, and subsequently maintain, a dominant position. The initial advantage that the state might have due to its legal infrastructure will be reinforced by network externalities, as companies will (correctly) anticipate that other companies also will be drawn to the dominant state. Furthermore, the dominant state will set its rules and prices in such a way as to

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<sup>2</sup> For an analysis of the general problems arising from managers' control over the corporate agenda, and their ability to make take-it-or-leave-it offers to shareholders, see Bebchuk (2001).

provide no incentive for other states to make similar investments in legal infrastructure.

Finally, our model explains how the dominant state will be able to make profits from the incorporation business but will not be able to capture the full benefits to companies incorporated in the dominant state from the legal infrastructure and network externalities they enjoy by incorporating in this state.<sup>3</sup> The model thus can explain the phenomenon recently highlighted by Kahan and Kamar (2001) – that Delaware seems to make a high return on its investments but that it does not raise its prices to the highest level that companies would likely be willing to pay for Delaware incorporation. Indeed, Bebchuk and Hamdani (2002) calculate that Delaware obtains tax revenues from the incorporations business on the order of \$2,000 for each family of four. We show that the advantage that a dominant state has can enable it to make positive profits without inducing a rival to challenge its dominance. To prevent such a challenge, however, the dominant state will not raise its prices to fully capture the benefits companies would gain from incorporating in it.

The remainder of the paper is organized as follows. Section 2 presents the framework of the analysis. Section 3 solves the model and presents the resulting equilibrium in the market for corporate law. Section 4 studies several extensions to the basic model. Section 5 offers concluding remarks on the positive and normative implications of our analysis.

## 2. Framework of Analysis

### 2.1. Sequence of events

The sequence of events in the model is as follows:

T = 0: There is a set of states  $N = \{1, \dots, n\}$  where  $n \geq 2$ , including a dominant state, named “Delaware,” and other states; and a (large) number of companies,  $m \gg n$ , whose initial incorporations are distributed among the  $n$  states.

T = 1: The states choose their strategies, which include: whether they invest in creating a legal infrastructure; which legal rules they adopt; and what price they will charge companies incorporated in the state.

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<sup>3</sup> Thus, our model may explain why Delaware’s franchise tax seems low compared with any reasonable estimate of the value generated by Delaware’s legal infrastructure and the network externalities it provides to large publicly traded companies. While the value of the median company in Delaware is approximately \$237 million (Daines (2001)), Delaware’s franchise tax does not exceed \$150 thousand a year. This is the maximum tax even for companies whose stock market capitalization is in the dozens of billions of dollars.

T = 2: Companies choose where to (re)incorporate.

T = 3: All payoffs – to shareholders, managers and states – are realized.

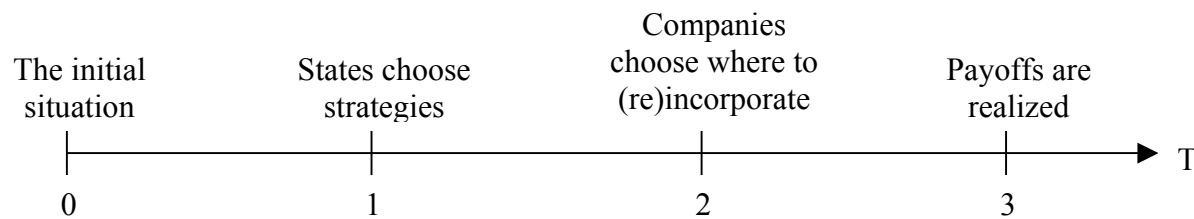


Fig. 1: Sequence of Events

The assumptions about each of the stages are described in detail below.

## 2.2 T = 0: The Initial Situation

We assume that, at  $T = 0$ , one state—which we call Delaware—has a legal infrastructure that may improve cash flows for companies incorporated in that state. The said infrastructure can be thought of as a specialized judiciary. As will be shown later on, network externalities will complement and reinforce Delaware’s initial infrastructure advantage.

We assume that each one of the  $m$  companies has a “home” state, i.e. the state in which the company’s headquarters is located. At  $T = 0$ , each company is assumed to be incorporated either in its “home” state or in Delaware. (In the case of companies located in Delaware, the “home” state and Delaware will be of course the same.) In particular, among the local companies of any given state, some (at least one) are incorporated “at home” and some (at least one) are incorporated in Delaware. We assume that at  $T = 0$  Delaware already enjoys a significant number of incorporations.<sup>4</sup>

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<sup>4</sup> It is further assumed that, even though Delaware starts with a significant number of incorporations, there is at  $T=0$  a significant number of companies incorporated outside Delaware. The fraction of companies that are initially out-of-state is assumed to be sufficiently large to make Delaware interested in luring companies from their “home” states rather than pursuing a strategy focusing solely on companies that are already incorporated in Delaware. Footnote 28 in Appendix A further elaborates on the analytical underpinnings of this condition. It also describes the equilibrium in the case in which Delaware focuses solely on the companies which it has at  $T=0$ ; this case is of lesser importance, of course, in understanding the existing state competition in the US.



Note that reincorporation does not affect the location of a company's headquarters or its place of operation—but only the corporate law system to which the company will be subject. We initially assume that all of the companies have gone public prior to  $T = 0$ . This assumption will be relaxed in Section 4.2. Each company is assumed to have dispersed ownership, with managers holding only a small fraction  $\alpha$  of the company's shares.

### **2.3 T=1: States Choose their Strategies**

At this stage, states choose, and make public, strategies consisting of three elements: (1) whether they make a special investment in legal infrastructure (of course, since Delaware already has such an infrastructure, this choice is relevant only for the other states), (2) which rules they adopt, and (3) what price they will charge incorporated companies.

The states select and announce their strategies sequentially, with Delaware moving first and the order in which the remaining states move being chosen randomly. A state announcing its strategy cannot amend its strategy later on; but, of course, states will choose their strategy in anticipation of what other states will do. We next specify the assumptions about each of the three elements of the strategy each state chooses.

#### **2.3.1 Legal Infrastructure**

We assume that, by investing  $K$ , a state can establish a legal infrastructure—similar to Delaware's infrastructure—that would operate to improve cash flows for companies incorporated in the state. Formally, each state, other than Delaware, chooses its investment in infrastructure,  $k$ , from the set  $\{0, K\}$ . The infrastructure can be thought of as including a specialized judiciary and the various other services and institutions needed to have an experienced, smooth, and fast system for litigating cases.

#### **2.3.2. Rules**

Each state must choose its rules with respect to each corporate issue. We characterize a legal rule by its effects on (1) the company's cash flows,  $Y$ , and (2) the level of private benefits that managers can extract from the company,  $B$ . Issues can be divided into two categories: (i) issues that do not have a significant effect on private benefits, which are labeled "insignificantly redistributive issues," and (ii) issues that have such a significant effect, which are labeled "redistributive issues."

Whereas shareholders and managers have overlapping interests and preferences with respect to issues of type (i), their interests and preferences diverge with respect to issues of type (ii).

(i) *Insignificantly redistributive issues*: We assume that there is one issue, denoted NR, which belongs to this category. With respect to this issue, states must choose between the  $L^{NR}$  rule and the  $H^{NR}$  rule. We normalize the effect of the  $L^{NR}$  rule on cash flows to zero, and denote the effect of the  $H^{NR}$  rule on cash flows by  $Y^{NR} > 0$ . Hence, shareholders will be better off under  $H^{NR}$  than under  $L^{NR}$ . The choice between the two rules will have no or little effect on managers' private benefits, and managers thus also prefer  $H^{NR}$  over  $L^{NR}$ .

Our results generally carry over to the case in which the choice between the two rules has an effect on managers' private benefits but this effect is small enough that managers prefer  $H^{NR}$  because of its positive effect on cash flows.<sup>5</sup> The main point is that, with respect to the insignificantly redistributive rules, there is no conflict of interests, and both shareholders and managers prefer  $H^{NR}$  over  $L^{NR}$ . For simplicity of exposition, and without loss of generality, we assume that both the  $L^{NR}$  rule and the  $H^{NR}$  rule have an identical effect on managers' private benefits, and we normalize this effect to zero.

An example of an insignificantly redistributive rule is the rule requiring directors to attend board meetings. Although the rule imposes some small private cost on managers, this cost might be sufficiently small (relative to the cash flow benefits of having directors attend board meetings) that managers would not favor absenteeism.

(ii) *Redistributive issues*: This category includes rules with respect to which the interests of shareholders and managers diverge, because the rule that would increase cash flows would also significantly reduce private benefits, thus making it disfavored by managers. For example, shareholders might favor a takeover rule that managers would disfavor because of its effect on the managers' private benefits, or shareholders might prefer a rule concerning conflict of interests that managers would disfavor. We do not claim, of course, that any reduction in managers' private benefits would benefit shareholders. Some provision of private benefits is desirable in many cases. But once the optimal level of private benefits is reached, there is still commonly a choice between a rule that establishes this level and a rule that would go beyond it to provide managers with higher benefits. It is this choice that we focus on.

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<sup>5</sup> Specifically, suppose that, compared with  $H^{NR}$ ,  $L^{NR}$  increases managers' private benefits by  $B^{NR} > 0$ . As long as  $\alpha \cdot Y^{NR} - B^{NR} > 0$ , managers will have the same preferences regarding this issue as shareholders and will also prefer  $H^{NR}$  over  $L^{NR}$ .

Specifically, we assume that there is one issue that belongs to this category,  $R$ , and states can choose with respect to this issue  $R$  between the  $L^R$  rule and the  $H^R$  rule. We normalize the effect of the  $L^R$  rule on cash flows to zero, and denote the effect of the  $H^R$  rule on cash flows by  $Y^R > 0$ . Hence, shareholders prefer  $H^R$  over  $L^R$ . Similarly, we normalize the effect of the  $H^R$  rule on managers' private benefits to zero, and denote managers' private benefits under the  $L^R$  rule by  $B^R > 0$ .

We also assume, contrary to the assumption in the category of insignificantly redistributive rules, that  $\alpha \cdot Y^R - B^R < 0$ , so that managers prefer  $L^R$  over  $H^R$ . The main point is that, with respect to the significantly redistributive rules, there is a conflict of interests between shareholders and managers. While shareholders prefer  $H^R$  over  $L^R$ , managers prefer  $L^R$  over  $H^R$ .

We further assume that while  $\alpha \cdot Y^R - B^R < 0$ ,  $Y^R - B^R > 0$  -- namely, the  $L^R$  rule is inefficient. Managers still prefer the inefficient  $L^R$  rule, since they capture the increase in private benefits produced by the rule but bear only a small fraction  $\alpha$  of the reduction in cash flows created by it. The interesting question is whether state competition will result in the adoption of the efficient  $H^R$  rule, as supporters of state competition believe, or rather the inefficient  $L^R$  rule will be adopted, as critics contend. The claim that we seek to examine does not assert that competition would produce big inefficiencies but rather that its outcomes would be biased in their favor. To explore the possibility of such bias, we will assume that the inefficiency costs of the  $L^R$  rule are not too large in a sense to be more precisely defined below.

### 2.3.3. Price

A state's strategy will also include the price  $P \geq 0$  that each company incorporated in the state will have to pay. The price consists of the incorporation tax and all other payments to institutions and citizens of the state as a result of the incorporation - including court fees, fees paid to members of the local bar, and so forth. Prior literature, which has assumed that maximization of profits from incorporations is synonymous with maximization of the number of incorporations, has implicitly assumed that the revenue to the state from each company is exogenously fixed. A complete analysis of our subject, however, should not take price to be exogenous, and we shall therefore include price as an element of each state's strategy. At the same time, we shall allow for the possibility that political forces might impose an exogenous bound on the price.<sup>6</sup>

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<sup>6</sup> Our analysis can be extended, with little change in the results, to the case in which the price cannot go below a certain positive level because, even if the franchise tax is set at zero, the state's lawyers will make some profits from the presence of incorporations.

## 2.4 T = 2: Incorporation Decisions

At  $T = 2$ , the  $m$  companies choose their state of incorporation, making a choice between remaining where they were initially incorporated and reincorporating in another state. The companies move sequentially in a randomly selected order. Let  $t = 1, \dots, m$  denote the rounds within period  $T = 2$ , in which the  $m$  companies choose their state of incorporation (in random order), and let  $t = 0$  denote the period before the first company moves. At  $t = 0$ , the companies are assumed to know the strategies chosen by the different states at  $T = 1$ .<sup>7</sup>

It is assumed that reincorporation involves no transaction costs. The procedure for reincorporation is assumed to be the one that has been long established under US corporate law. The managers must initiate a reincorporation, making a proposal to the shareholders; if the shareholders approve, the company will move. Thus, reincorporation will occur *if and only if* both managers and shareholders wish to reincorporate. Furthermore, managers have the power to make take-it-or-leave-it offers to the shareholders. As a result, if reincorporation in either one of two states is superior to the present incorporation, the managers can direct reincorporation to the state that the managers prefer.

We make several tie-breaking assumptions. When managers are indifferent between incorporating in the company's home state and another state, they will prefer the home state. If managers are indifferent between reincorporating in two states none of which is the company's home state, they will choose each one of the two states with a probability of fifty percent. Finally, we assume that, if shareholders are indifferent between accepting and rejecting a proposal by management, they will accept it.

## 2.5 T=3: Payoffs

At this stage, all players will receive their payoffs. The cash flows of a company that chooses to incorporate in state  $i$  will be:

$$Y_i = Y_0 + \delta_j \cdot E(k_i, m_i) + Y_i^{NR} + Y_i^R - P_i,$$

where  $Y_0$  represents the element of a company's cash flows that is independent of the legal system;  $Y_i^{NR}$  and  $Y_i^R$  represent the effects of the non-distributive and the distributive rules, respectively;  $P_i$  represents the franchise tax and other charges;

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<sup>7</sup> As explained in section 2.5 below, there are two types of companies - those that benefit from a legal infrastructure and from network externalities and those that do not derive such benefits. It is assumed that at  $t = 0$  the companies know their type.

and  $E(k_i, m_i)$  represents the benefits flowing from the state's legal infrastructure and network externalities.

Companies do not benefit equally from a legal infrastructure or from network externalities. In particular, to some companies, the benefit of remaining incorporated in their "home" states may outweigh the increased cash flows generated by another state's legal infrastructure and network externalities. For simplicity, we capture this effect by assuming that a company  $j$  is characterized by a parameter  $\delta_j \in \{0,1\}$ , which determines whether or not the company benefits from infrastructure and network externalities. It is assumed that the share  $\delta$  of companies that do not benefit from infrastructure and networks, i.e. companies with  $\delta_j = 0$ , is smaller than 0.5.

Legal infrastructure increases the cash flows of  $\delta_j = 1$  companies incorporated in a state with such an infrastructure. Hence,  $\frac{\partial E(k_i, m_i)}{\partial k_i} > 0$ .<sup>8</sup> The effect of the legal

environment in Delaware is denoted  $E(K, m_D)$ , even though Delaware's investment in establishing an infrastructure is considered sunk in the present framework. However, potentially more important than the legal infrastructure are network externalities, which arise when many companies choose to incorporate in one specific state. These positive externalities include familiarity of the legal community and the participants in capital markets with the rules of that state, as well as the generation of a larger body of precedents, both of which can operate to increase the value of the company's securities to investors (see Klausner (1995) and Kahan and Klausner (1997)). Formally, we assume that the network externalities effect in state  $i$  is increasing in the number of companies, which are incorporated in state  $i$ ,  $m_i$ , i.e.

$\frac{\partial E(k_i, m_i)}{\partial m_i} > 0$ .<sup>9</sup> Finally, let  $\bar{E} = E(K, (1-\delta) \cdot m)$  denote the maximal level of benefits

from a legal infrastructure and network externalities -- i.e., the level that would be enjoyed by companies that benefit from such institutional advantages if all such companies were incorporated in the same state (which, as we shall see, is what would happen in equilibrium). Given our interest in exploring the possibility of the adoption of rules somewhat (rather than hugely) tilted in favor of managers, we will assume that  $\bar{E}$  outweighs the potential inefficiency on the R rule dimension,  $Y^R$ .

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<sup>8</sup> We assume that a legal infrastructure is efficient to establish, i.e. the per-company value of an infrastructure exceeds the per-company cost of establishing an infrastructure (at least if all of the  $\delta_j = 1$  companies benefit from the infrastructure):  $E(K, (1-\delta) \cdot m) - E(0, (1-\delta) \cdot m) > \frac{K}{(1-\delta) \cdot m}$ .

<sup>9</sup> We assume that the number of  $\delta_j = 0$  companies incorporated in any non-Delaware state at  $T=0$  is insufficient to produce a positive level of network externalities.

The shareholders will receive their fraction of the company's cash flows,  $(1 - \alpha) \cdot Y_i$ . The manager will receive the private benefits of control in addition to their fraction of the cash flows, and they will thus get  $\alpha \cdot Y_i + B_i^R$ .

Each state will receive the revenues, if any, from the incorporations it will have at the final T=3 stage. The state will get the price it set for incorporated companies,  $P$ , multiplied by the number of companies which end up incorporated in the state at the end of the T = 2 stage of (re)incorporation decisions.

## 2.6 States' Objectives

With respect to the decision whether to establish a legal infrastructure, as well as with respect to the pricing strategy, states are assumed to seek to maximize their T = 3 revenues. Also, as a tie-breaking assumption, we assume that between two outcomes that provide the state with the same revenues, the state will prefer to have an outcome in which more companies are incorporated in that state.

With respect to the legal rules, states will also be assumed to maximize revenues (and, as a tie-breaker, maximize the number of incorporations). However, we shall also explore below the possibility that the choice of legal rules in some states is not based on the above objective but rather on some historical, political, cultural, or ideological factors. In order to capture this potential heterogeneity, we will allow for states that deviate from the equilibrium revenue maximizing R rule (there is no reason to expect heterogeneity in the NR category). Specifically, we assume that if such deviations occur they are adopted by at least two (non-Delaware) states. We refer to such states as "deviating states". Even when we permit for such deviations, we shall assume that Delaware maximizes revenues from incorporations.

## 3. The Market Equilibrium

This section presents our results concerning the equilibrium outcome in the market for corporate law and the intuition underlying these results. The following proposition describes the equilibrium in the market:

**Proposition 1:** *The market for corporate law has a unique equilibrium that has the following features:*

(1) *All of the states choose the rule favored by shareholders with respect to the insignificantly redistributive issue (NR)--  $H^{NR}$ .*

(2) The dominant state of Delaware chooses the inefficient  $L^R$  rule with respect to the significantly redistributive issue (R).

(3) With respect to the significantly redistributive issue (R), any state other than Delaware that chooses rules in order to attract incorporations chooses the inefficient  $L^R$  rule. (By assumption, if there are deviating states that do not choose legal rules this way, these states will choose the efficient  $H^R$  rule).

(4) The dominant state of Delaware sets the highest possible price that (i) preempts a potential rival from entering and establishing a competing legal infrastructure, (ii) makes reincorporation to it still profitable for all the companies that benefit from a legal infrastructure and from network externalities (i.e. companies with  $\delta_j = 1$ ), and (iii) does not exceed the politically imposed price cap,  $\bar{P}$ . Formally:

$$P_D = \min \left\{ \frac{K}{(1-\delta) \cdot m}, \bar{E} - Y^R, \bar{P} \right\}.$$

(5) Delaware makes a positive profit from its incorporation business.

(6) Delaware does not capture the full value of the benefits it confers on companies incorporated in it.

(7) States that at  $T=0$  do not have a legal infrastructure, i.e. all states other than Delaware, do not invest in establishing a legal infrastructure, i.e.  $k_{i \neq D} = 0$ .

(8) All states, other than Delaware, set a price of zero, i.e.  $P_{i \neq D} = 0$ .

(9) All of the companies that benefit from a legal infrastructure and network externalities will be incorporated in Delaware.

(10) The companies that reincorporate in Delaware enjoy an increase in their share value.

(11) Among non-Delaware states, if there are deviating states, then the states that choose the rule favored by managers with respect to the significantly redistributive issue (R),  $L^R$ , will enjoy more incorporations than the deviating states that choose the rule favored by shareholders with respect to the significantly redistributive issue (R),  $H^R$ .

The results stated in proposition 1 are proved in appendix A. Below we describe the underlying intuition for each of the eleven features of the identified equilibrium and discuss the implications of the results.

### 3.1 Efficient Choice of Rules concerning Insignificantly Redistributive Issues

Since both managers and shareholders prefer  $H^{NR}$  over  $L^{NR}$ , a state that sets  $L^{NR}$  will have no company incorporated in it at  $T = 3$ . Consider two states that differ only on the NR dimension with the first state setting  $L^{NR}$  and the second state setting  $H^{NR}$ . Any company that is initially incorporated in the first state will reincorporate into the second state. Moreover, if a company that is initially incorporated in a third state considers reincorporation into one of the two states, it will surely choose the second state with the  $H^{NR}$  rule.

### 3.2 Delaware's Inefficient Choice concerning Redistributive Issues

Delaware must set the pro-manager redistributive rule,  $L^R$ , in order to lure reincorporations. Otherwise (if Delaware sets  $H^R$ ), a rival state would establish a competing infrastructure, set  $L^R$ , and lure all of the  $\delta_j = 1$  companies that benefit from a legal infrastructure and from network externalities. What is critical here is that, if reincorporation to more than one state would benefit shareholders, the managers will have the power to direct the incorporation to the state they prefer. Moreover, since managers must initiate reincorporation, if Delaware does not set  $L^R$ , it will not be able to lure companies from states that do set  $L^R$ , even if these states do not establish a legal infrastructure.

By setting  $L^R$ , Delaware ensures its ability to lure  $\delta_j = 1$  companies from any state that does not establish a competing infrastructure. Delaware can clearly lure  $\delta_j = 1$  companies from no-infrastructure states that also choose  $L^R$ . Delaware can also lure  $\delta_j = 1$  companies from the deviating states that set  $H^R$ , since the inefficiency of the  $L^R$  rule is outweighed by Delaware's infrastructure and network externalities advantage ( $\bar{E} > Y^R$ ).

### 3.3 The Inefficient Choices of Non-Delaware States concerning Redistributive Issues

States other than Delaware cannot attract  $\delta_j = 1$  companies that benefit from a legal infrastructure and from network externalities. Therefore, the non-Delaware



states that choose their legal rules to maximize revenues and incorporations will focus on the  $\delta_j = 0$  companies. By choosing the inefficient  $L^R$  rule these states can retain their local  $\delta_j = 0$  companies that were incorporated in-state at  $T=0$ . By setting  $L^R$  (as well as  $H^{NR}$  and  $P=0$ ), a state prevents managers from initiating reincorporation. This strategy further allows states to regain  $\delta_j = 0$  local companies that were incorporated in Delaware at  $T=0$ .

Note that a state can retain its local  $\delta_j = 0$  companies that were incorporated in-state at  $T=0$  by setting  $H^R$  (as well as  $H^{NR}$  and  $P=0$ ), which would prevent shareholders from approving reincorporation. But setting  $L^R$  enables the state not only to retain the local companies which were initially incorporated in the state but also to attract the incorporations of  $\delta_j = 0$  local companies that were incorporated in Delaware at  $T=0$ . (Otherwise, these companies will remain in Delaware or reincorporate to non-Delaware state that offers  $L^R$ .)

The results presented in sections 3.2 and 3.3 are consistent with the proliferation of antitakeover statutes and other takeover defenses among states (see Gartman (2000)). The body of academic opinion has largely viewed state takeover law as providing excessive protections against takeovers. Researchers who generally support state competition have been among those viewing state antitakeover statutes as excessive (see, e.g., Easterbrook and Fischel (1991), Romano (1993a, 1993b)). The many scholars who believe that antitakeover statutes do not serve shareholders find support for their view in the empirical evidence on the effects of such statutes. The overwhelming majority of the event studies done on the adoption of state antitakeover statutes found either no price reactions or negative price reactions (see Karpoff and Malatesta (1989) and Gartman (2000)). Furthermore, researchers have also found evidence that state antitakeover statutes have operated to increase agency costs (Bertrand and Mullinathan (1998, 1999)). The result under consideration can explain why takeover law has nonetheless developed in this direction.

### 3.4 Price Charged by Delaware

Delaware will set the highest possible price that still satisfies three goals/constraints. Let us explain in turn the reason for each one of them:

(1) Preempting Rivals: In setting the price, Delaware will seek to make it unattractive for rivals to mount a challenge on its dominance. To compete for dominance in the market for corporate law, a rival would need to establish an equivalent legal infrastructure. Delaware will therefore seek to discourage potential rivals from establishing such an infrastructure. Thus, Delaware will not set a price

above  $\frac{K}{(1-\delta)\cdot m}$ , which is the per-company (focusing on  $\delta_j = 1$  companies) cost of establishing an infrastructure. This price ensures that all of the  $\delta_j = 1$  companies will choose to incorporate in Delaware, even if another state establishes an infrastructure and sets the lowest possible price (without losing money),  $\frac{K}{(1-\delta)\cdot m}$ .<sup>10</sup> If Delaware sets a higher price, a second state will establish a competing infrastructure and lure all  $\delta_j = 1$  incorporations.<sup>11</sup>

(2) Luring reincorporations from other states: Another goal of Delaware is to lure companies from states without a legal infrastructure. Delaware must make sure that the overall package it offers is preferred by companies that benefit from a legal infrastructure and from network externalities, over the package offered by the other states. Delaware can achieve this goal by setting a price not higher than  $\bar{E} - Y^R$ . Namely, Delaware cannot price above the value of its infrastructure and potential network externalities minus the disadvantage to shareholders from its pro-manager redistributive rules. This price takes into account that all states offer the same insignificantly redistributive rule,  $H^{NR}$  (see part (1) of proposition 1), but that states may attempt to prevent shareholders of local companies from approving reincorporation in Delaware by offering the redistributive rule  $H^R$  (this price also takes into account that other states will set  $P = 0$  - see part (8) of proposition 1).

Note that as long as Delaware prices below  $\bar{E} - Y^R$  (and given the previous constraint on Delaware's pricing strategy), it will lure all the companies that benefit from a legal infrastructure and from network externalities. Because Delaware's luring all of these companies can be anticipated by each one of them in advance, the constraint on Delaware's pricing strategy presumes the full extent of network externalities (recall that  $\bar{E} = E(K, (1-\delta)\cdot m)$ ).

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<sup>10</sup> If Delaware sets a price of  $\frac{K}{(1-\delta)\cdot m}$ , a second state can hope to attract any incorporations only if

it establishes a competing infrastructure and sets a price of  $\frac{K}{(1-\delta)\cdot m}$ . Given our tie-breaking assumption, the second state will enjoy all incorporations with a probability of 50%, and will thus lose money on average. Therefore, no state other than Delaware will establish an infrastructure.

<sup>11</sup> Theoretically, a no-infrastructure state with  $L^R$  can attempt to lure the  $\delta_j = 1$  companies. To prevent this, Delaware must abide by another constraint on its pricing strategy. It cannot price above the value of its infrastructure advantage, i.e.  $P_D \leq E(K, (1-\delta)\cdot m) - E(0, (1-\delta)\cdot m)$ . However, since  $E(K, (1-\delta)\cdot m) - E(0, (1-\delta)\cdot m) > \frac{K}{(1-\delta)\cdot m}$  (see note 8 above), this constraint is never binding.

(3) The political constraint: The final relevant consideration for Delaware's pricing strategy is the political constraint, if any, on the range of acceptable prices. First, note that if there is no effective political constraint, i.e.  $\bar{P}$  is very large, then Delaware's price will be determined by the two previous goals/constraints. However, if the political constraint is binding, it may force Delaware to price below the price levels dictated by the two previous goals/constraints.

### 3.5 Delaware's Profits

In a market that is perfectly competitive, producers will break even, making no net profits. But the market for corporate law is not perfectly competitive. The benefits from legal infrastructure imply that there are economies of scale. And the presence of network externalities provides another departure from the perfect competition case. Because of the imperfect competition, the dominant state will be able to make positive profits from its incorporation business.

As we have seen, Delaware will set a positive price. Since it will be successful in luring all of the  $\delta_j = 1$  companies (see part (9) of proposition 1), this means that Delaware will make a positive profit. (Recall that we are assuming, for now, that Delaware's investment in establishing its legal infrastructure is sunk.)

### 3.6 Delaware's Inability to Capture the Full Value of its Institutional Advantages

As shown above, Delaware will make a positive profit. Generally, however, Delaware will not capture the full value to companies of the benefits they receive from incorporating in the state. To begin with, the desire to preempt other states from challenging its dominance will keep a lid on Delaware's price (see part (4)(i) of proposition 1). Additionally, further price capping might or might not be introduced by the political constraint (see part (4)(iii) of proposition 1).

Lastly, Delaware will generally not capture the full value it provides, even if the decisive consideration in its pricing strategy is Delaware's desire to lure companies from other states (see part (4)(ii) of proposition 1). Recall, that in order to lure companies from other states Delaware must offer an overall package that is attractive to the shareholders of the target companies. As explained in section 3.4 above, this overall package must include a price not higher than the value of Delaware's infrastructure and potential network externalities minus the disadvantage to shareholders from its pro-manager redistributive rules ( $\bar{E} - Y^R$ ). In particular, this price takes into account the fact that states may attempt to prevent shareholders of local companies from approving reincorporation in Delaware by

offering the redistributive rule  $H^R$ . However, at equilibrium these other states will offer  $L^R$ , just like Delaware, and not  $H^R$  (see part (3) of proposition 1). Hence, again Delaware's price does not reflect the benefits it provides to companies. This result is consistent with the observations of (Kahan and Kamar (2001) that Delaware's actual prices seems to fall below a reasonable estimate of the infrastructure and network benefits flowing from Delaware incorporation.

### 3.7 No Competing Investments in Infrastructure

As stated in part (4) of proposition 1, and as explained above, Delaware will set a price that would preempt any other state from establishing a competing infrastructure. In particular, Delaware's pricing strategy ensures that if a rival state establishes a legal infrastructure, that state will not be able to cover the costs of establishing the infrastructure.

This result is consistent with the empirical observation that no state other than Delaware offers a legal infrastructure such as a specialized court (Kahan and Kamar (2001)).

### 3.8 Prices Charged by States other than Delaware

States other than Delaware do not offer a legal infrastructure or network externalities (see parts (7) and (11) of proposition 1). These states do not offer anything unique. There are at least two revenue-maximizing states (or states that maximize the number of incorporations) that offer the exact same "product". Similarly, there are at least two deviating states (with  $H^R$ ) that offer the exact same "product". Competition within each of these two groups of states forces the price to the competitive level of zero. In particular, these states can only hope to retain their local companies that do not benefit from a legal infrastructure or from network externalities (companies with  $\delta_j = 0$ ).<sup>12</sup> If a non-dominant state sets a price of zero, it will be able to retain its local  $\delta_j = 0$  companies, due to our tie-breaking assumption that captures a limited "home"-bias. However, if a non-dominant state sets a positive price, it will lose even its  $\delta_j = 0$  companies to another non-dominant state that sets a lower price. As a result, at equilibrium all of these states will set a price of zero.

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<sup>12</sup> Revenue-maximizing states (or states that maximize the number of incorporations) can also regain their local  $\delta_j = 0$  companies that at  $T=0$  were incorporated in Delaware.

These results are consistent with observed patterns. Delaware seems to be the only state to derive meaningful revenues from its incorporation business (see Kahan and Kamar (2001)). While Delaware charges a significant, though still relatively low, franchise tax, no state other than Delaware charges a meaningful franchise tax.

As just explained, states other than Delaware would not be able to charge companies incorporated in them a positive price. But there is another feature of the equilibrium suggesting that these states might not be interested in doing so anyway. At equilibrium, the companies incorporated in each such state will be the state's local companies<sup>13</sup> (see part (11) of proposition 1 and section 3.11 below). While we have assumed that states seek to maximize the revenues from incorporated companies, an alternative and perhaps more appealing assumption would be that each state seeks to maximize revenues from out-of-state incorporations. The reason is that the state has many other means of securing revenues from local companies (e.g. through standard taxes), and it has no reason to resort to the franchise tax with respect to such companies.

### 3.9 The Delaware Incorporation of all Companies that Benefit from Legal Infrastructure and Network Externalities

Delaware will be successful in attracting all of the companies that enjoy the benefits of a legal infrastructure and of network externalities (companies with  $\delta_j = 1$ ), and will thus become the dominant state. As shown above, no other state will establish a competing infrastructure (see parts (4) and (7) of proposition 1). Hence, by setting  $L^R$  (see part (2) of proposition 1) and an appropriate price (see part (4) of proposition 1), Delaware ensures its ability to lure all  $\delta_j = 1$  companies. Delaware clearly lures  $\delta_j = 1$  companies from no-infrastructure states that also choose  $L^R$ . Delaware also lures  $\delta_j = 1$  companies from the deviating states that set  $H^R$ , since the inefficiency of its  $L^R$  rule is outweighed by Delaware's infrastructure and network externalities advantage ( $\bar{E} > Y^R$ ).<sup>14</sup>

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<sup>13</sup> And perhaps some of the  $\delta_j = 0$  companies, whose "home" state is one of the deviating states.

<sup>14</sup> That all  $\delta_j = 1$  companies incorporate in Delaware is a feature of the *unique* equilibrium due to our assumption that the companies' (re)incorporation decisions are made sequentially. In a model with simultaneous (re)incorporation decisions, there may exist additional equilibria where Delaware does not enjoy such dominance. In particular, if for some reason all of the  $\delta_j = 1$  companies decide to (re)incorporate in Ohio, then Ohio will provide network externalities that may outweigh Delaware's infrastructure advantage, thus sustaining the Ohio-dominance equilibrium. (The *uniqueness* of the Delaware-dominance equilibrium is also maintained in a model where (re)incorporation decisions are made cooperatively.)

### 3.10 The Equilibrium Benefits of Incorporating in Delaware

As stated in parts (1) and (2) of proposition 1, and as explained above, in equilibrium, all of the states, except for the deviating  $H^R$  states, set the same rules with respect to both the insignificantly redistributive and the redistributive issues. Thus, all of these states stand on equal ground with respect to the legal rules themselves, but Delaware also offers the benefits of a legal infrastructure and of network externalities – benefits for which Delaware does not charge a price equal to their full value (see part (6) of proposition 1). As shown above, this will lead companies that benefit from a legal infrastructure and from network externalities (i.e.  $\delta_j = 1$  companies) to incorporate in Delaware. These companies will benefit in terms of their share value, and the share value of Delaware companies will be higher than the share value of non-Delaware companies.<sup>15</sup>

This implication of the model is worth highlighting in light of the approach taken by much of the empirical work on state competition. Substantial work has focused on the effects of reincorporation to Delaware and has concluded that such reincorporation produces increases in stock market prices (see Bhagat and Romano (2001), and Bebchuk, Cohen, and Ferrell (2002) for a survey). In addition, some recent work has focused on differences in Tobin's Q among states, and has concluded that incorporation in Delaware increases Tobin's Q compared with incorporation in other states (see Daines (2001)). The analysis here indeed predicts that Delaware incorporation will have a positive effect on shareholder value.

The analysis also implies, however, that a positive effect of Delaware incorporation on shareholder value would not imply in any way that state competition works well, as past empirical work has assumed. As demonstrated, evidence that Delaware incorporation or a move to Delaware raises share value would be perfectly consistent with competition providing adverse incentives with respect to an important set of issues. This is the case because, in equilibrium, states would offer similar rules, but one state would also offer the benefits of legal infrastructure and network externalities. Thus, the performance of state competition, and the quality of the rules it produces, cannot be assessed by studying – in the prevailing market equilibrium – the relative differences between Delaware and non-Delaware incorporations.<sup>16</sup>

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<sup>15</sup> If Delaware's second price constraint is binding (see part (4) of proposition 1), then the share value of Delaware companies will not be higher than the share value of companies in deviating states.

<sup>16</sup> Note also that, in our model, the firms going to Delaware are different from those remaining in their home state. This suggests that empirical studies comparing Delaware and non-Delaware firms should pay close attention to problems of selection.

### 3.11 The Relative Performance of Deviating States that Choose Efficient Rules

As shown above Delaware will be successful in attracting all of the companies that benefit from an infrastructure and from network externalities (i.e. the  $\delta_j = 1$  companies). Hence, non-Delaware states can only hope to attract companies that do not enjoy the benefits of a legal infrastructure and of network externalities (companies with  $\delta_j = 0$ ), since these companies will not be willing to pay the positive price charged by Delaware.

Starting with the non-Delaware states that choose their legal rules in order to attract incorporations, since all of these states set the same rules (see parts (1) and (3) of proposition 1) and a price of zero (see part (8) of proposition 1), each  $\delta_j = 0$  company that is originally incorporated in a non-Delaware state will remain in its home state (recall our tie-breaking assumption); and companies of this kind that are originally incorporated in Delaware will reincorporate to their home state. The non-Delaware deviating states that set  $H^R$  will succeed in retaining their local  $\delta_j = 0$  companies that are originally incorporated in-state, but will not be able to bring home the local companies that were originally incorporated in Delaware. Therefore, deviating states will be relatively less successful as compared to states that choose their legal rules in order to attract incorporations.

These results are consistent with the observed patterns. More than 90% of the firms are incorporated either in Delaware or in their home state (Bebchuk and Cohen (2002)). Furthermore, among non-Delaware states, recent evidence in Bebchuk and Cohen (2002) and Subramanian (2002) suggests that states offering fewer antitakeover statutes are less successful in retaining their local companies. This evidence is consistent with the model's prediction that states offering pro-shareholder  $H^R$  rules will end-up with fewer local incorporations, as compared to states that offer the pro-manager  $L^R$  rules.

## 4. Extensions

### 4.1 The Emergence of a Dominant State

Thus far we have assumed the existence of a dominant state, Delaware. Delaware's initial advantage has been characterized by the existence of a legal infrastructure, a specialized judiciary, and by a greater number of initial incorporations compared to the other states. In the present section, we drop these assumptions, and demonstrate how a dominant state may emerge endogenously. In particular, we take away from Delaware any initial advantage that it previously

had. Now, without an initial legal infrastructure, we allow Delaware, as well as all other states, to establish such an infrastructure. Also, we now assume that all states, including Delaware, enjoy the same number of initial incorporations,  $m(t = 0)$ . The outcome in the market for corporate law under these assumptions is derived below.

**Proposition 2:** *Assuming that the cost of establishing a legal infrastructure is not too high compared to the benefits that companies may derive from such an infrastructure, so that the emerging dominant state can cover the cost of establishing a legal infrastructure ( $K$ )<sup>17</sup>, then the market for corporate law will have the following unique equilibrium:*

- (1) *The first state to move, Delaware, establishes a legal infrastructure; and*
- (2) *The results stated in proposition 1 hold, with the first-mover state taking the place of the (pre-determined) dominant state in proposition 1.*

**Remark:** The intuition for this result, whose detailed proof is omitted, is as follows. The first state to move, Delaware, will establish a specialized judiciary because, given that it can be expected to be the only state to do so, it will be able to attract all of the companies that benefit from a legal infrastructure and from network externalities, and thus cover the costs of its investment,  $K$ . (While only covering its investment, it will be willing to do so since states are assumed to prefer having more companies, *ceteris paribus*.) After the first-mover establishes an infrastructure, and since all other states are preempted from entering with a competing infrastructure, the remainder of the analysis exactly parallels the analysis summarized in proposition 1.

## 4.2 IPOs

Section 4.2 extends the analysis to allow for the possibility of IPO-stage incorporations. As was done in Section 3, we continue to assume the initial existence of a dominant state with a legal infrastructure. Suppose that a number  $m_{IPO}$  of companies go public after the legal strategies are chosen by the states. Specifically, assume that at period  $T = 2$ , after the  $m$  publicly held companies (henceforth “existing companies”) make their (re)incorporation decisions, a number  $m_{IPO}$  of companies (henceforth “IPO companies”) are taken public by a “founder,” who also

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<sup>17</sup> This condition can be formally stated as follows:

$$\min \left\{ \frac{K}{(1 - \delta) \cdot m}, \bar{E} - Y^R, \bar{P} \right\} = \frac{K}{(1 - \delta) \cdot m}.$$



chooses their initial state of incorporation. After the initial incorporation of the IPO companies, and before period  $T = 3$ , the IPO companies, which by then are assumed to have a manager with a fraction  $\alpha$  of the company's shares, can reincorporate into another state. The outcome in the IPO extension can be summarized by the following proposition.

**Proposition 3:** *As long as the number of IPO-stage companies,  $m_{IPO}$ , is sufficiently small compared to the number of existing companies which are not incorporated in Delaware at  $T = 0$ ,  $\sum_{i \neq D} m_i(t=0)$ ,<sup>18</sup> then the market for corporate law will have the following unique equilibrium:*

(1) *The results stated in proposition 1 hold, except for the following adjustment in Delaware's pricing strategy:*<sup>19</sup>

(2) *Delaware sets the highest possible price that: preempts a potential rival from entering and establishing a competing legal infrastructure; secures the reincorporation (into Delaware – even from states with  $H^R$  and  $P = 0$ ) of all the companies that benefit from a legal infrastructure and from network externalities (i.e. companies with  $\delta_j = 1$ ); and does not exceed the politically imposed price cap,  $\bar{P}$ . Formally:*

$$P_D = \min \left\{ \frac{K}{(1-\delta) \cdot (m + m_{IPO})}, E(K, m + m_{IPO}) - Y^R, [E(K, m + m_{IPO}) - E(K, m_{IPO})] - Y^R + \frac{K}{(1-\delta) \cdot m_{IPO}}, \bar{P} \right\}$$

**Remarks:** The intuition for this result, which is generalized and proved in appendix B, is as follows:

Under the condition specified in proposition 3, the outcome in the market for corporate law is not altered by the inclusion of IPO-stage incorporations, subject to the following adjustment in Delaware's pricing strategy. Delaware will set the highest possible price that still satisfies the following three goals/constraints:

(1) **Preempting rivals:** Delaware seeks to preempt rival states from establishing a competing infrastructure. To prevent a rival state from establishing an

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<sup>18</sup> The precise condition is derived in appendix B. The outcome, when this condition is not satisfied, is also derived in appendix B as part of a more general analysis of the IPO model.

<sup>19</sup> The results stated in proposition 1 should also be supplemented by specifying the equilibrium states of incorporation of the IPO companies, which do not enjoy the benefits of a legal infrastructure or of network externalities (companies with  $\delta_j = 0$ ). These companies will initially incorporate in any one of the non-dominant states, and will remain there.

infrastructure and luring all of the companies with  $L^R$  and  $P = \frac{K}{(1-\delta) \cdot (m + m_{IPO})}$ ,

Delaware cannot price above  $\frac{K}{(1-\delta) \cdot (m + m_{IPO})}$  (as compared to  $\frac{K}{(1-\delta) \cdot m}$  in the no-

IPO model – see proposition 1). In a model with IPOs, Delaware must also preempt a rival state from establishing an infrastructure and luring only IPO-stage

companies with  $H^R$  and  $P = \frac{K}{(1-\delta) \cdot m_{IPO}}$ . Therefore, Delaware cannot price above

$[E(K, m + m_{IPO}) - E(K, m_{IPO})] - Y^R + \frac{K}{(1-\delta) \cdot m_{IPO}}$ . (2) Luring reincorporations from other

states: Delaware will also wish to ensure that shareholders of companies located in other states will approve reincorporation in Delaware. Therefore, Delaware cannot price above  $E(K, m + m_{IPO}) - Y^R$ .

(3) The political constraint: Delaware cannot exceed the exogenous (political) price-cap,  $\bar{P}$ .

Proposition 3 assumes that the number of IPO-stage companies is not too large relative to the number of existing firms not initially incorporated in Delaware. If this condition was not satisfied, Delaware could prefer to set  $H^R$  and focus on the IPO-stage companies and on the existing companies, which are already incorporated in Delaware. With such a strategy Delaware lures fewer companies, but can set a higher per-company price. In this case, the second-mover state will establish an infrastructure, set  $L^R$  and lure the existing companies that are not already incorporated in Delaware.<sup>20</sup> The fact that such an outcome—one with two leading states, one focusing on attracting IPO incorporations and one focusing on reincorporations by existing publicly traded companies—has not been observed suggests that the conditions for the emergence of this equilibrium do not prevail. For this reason we have chosen to focus on the equilibrium characterized in proposition 3.

### 4.3 Home-State Bias

In our model, the only reason for some companies to incorporate in their home state was that they did not derive benefits from legal infrastructure and network

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<sup>20</sup> If the number of IPO-stage companies is small, but the number of existing companies, which are already incorporated in Delaware, is large, Delaware may choose a third strategy. It may set  $L^R$  and focus only on the existing companies, which are already incorporated in it. Again, with such a strategy Delaware lures fewer companies, but can set a higher per-company price.

externalities. Consequently, they would derive no benefits from incorporating in Delaware and would only have to pay the positive incorporations charges levied by Delaware. In the equilibrium, companies not going to Delaware were indifferent among the other states, and it was the tie-breaking assumption that resulted in their incorporation in their home state in the analyzed equilibrium.

There are reasons why companies might have a preference for incorporating in their home state (see Bebchuk and Cohen (2002) and Daines (2002) for an empirical investigation of these reasons). For example, handling legal business at a distance might be more costly, and incorporating in the home state might signal the company's loyalty to the state and help the company in its dealings with the state.

In any event, the model can be extended to allow for home preferences of different magnitude. Suppose that for each company there is a cost  $C \geq 0$  to incorporating outside its state of headquarters, and suppose that  $C$  has a positive support in  $[0, \bar{C}]$ . Then companies that in equilibrium will incorporate in their home state will not be only those that derive no benefits from legal infrastructure and network externalities but also those companies for which  $C$  is sufficiently large. Note that, if the state that is home to such companies had an interest in doing so, it would be able to charge such companies a positive price for incorporation in them. However, as discussed, since states are already taxing in other ways companies headquartered in them, it is far from clear that they would have an interest in deriving revenues from them via incorporation charges as well.

#### **4.4 Stickiness and the Power of Network Externalities**

In our model, we assume that at  $T=2$  all  $m$  companies consider reincorporation. It is, however, somewhat unrealistic to assume that all companies find it equally easy to alter their state of incorporation. Presumably, a certain level of stickiness accompanies the  $T=0$  incorporation endowment. To capture this stickiness effect assume that at  $T=2$  only a proportion  $\theta$  of all companies can seriously consider reincorporation, while the complementary proportion  $1-\theta$  of all companies remain in their  $T=0$  state of incorporation.

The stickiness effect further reinforces Delaware's dominance by invoking the power of its initial network externalities. Recall that in the basic model at  $T=0$  a significant percent of all companies were incorporated in Delaware, but nothing prevented these companies from leaving Delaware at  $T=2$ . Hence, Delaware could not exploit the potential network externalities generated by these companies in its pricing strategy. However, when stickiness is accounted for, a proportion  $1-\theta$  of Delaware's  $T=0$  incorporations will necessarily remain in Delaware. Thus, Delaware

can reflect the network effect generated by these companies in its pricing strategy (as if it were part of Delaware's legal infrastructure).

In particular, in order to preempt other states from establishing a competing infrastructure Delaware no longer needs to limit its price to the per-company value of the legal infrastructure,  $\frac{K}{(1-\delta) \cdot m}$ . Delaware can raise its price by the value of the network externalities generated by companies that due to the stickiness effect are known to remain in Delaware. Moreover, the power of these network externalities will help Delaware in any potential competition with a no-infrastructure state that wishes to lure incorporations.

#### 4.5 Price Responses by Delaware to Undercutting by a Rival

In our model, Delaware is not allowed to alter its price after observing other states' pricing strategies. Thus, if Delaware sets an excessively high price, another state can choose a slightly lower price, lure all companies away from Delaware, and emerge as the dominant state. Of course, as shown above, Delaware can still discourage such challenges from other states by appropriately choosing its pricing strategy. However, clearly Delaware's inability to undercut a rival's price limits its market power and forces it to lower its initial (and, in the basic model, final) price. Since arguably counter-moves by Delaware are often possible, it is interesting to examine an alternative assumption that allows for price undercutting.

Allowing for price undercutting would further strengthen Delaware's dominant position and its ability to discourage challenges. In such a case, an entrant might be concerned about how Delaware would respond and, in particular, that a matching by Delaware of what it offers would leave it with no profits. In particular, if Delaware initially prices above  $\frac{K}{(1-\delta) \cdot m}$  (contrary to part (4)(i) of proposition 1), a rival state will still be discouraged from establishing a competing infrastructure. This potential rival would know that if a competing infrastructure is indeed established, Delaware would lower its price below  $\frac{K}{(1-\delta) \cdot m}$  and thus lure all  $\delta_j = 1$  companies, leaving the rival state with a net loss. Consequently, the first constraint on Delaware's pricing strategy (see part (4)(i) of proposition 1) is alleviated by the possibility of price undercutting. The other two constraints (see parts (4)(i) and (4)(ii) of proposition 1), however, remain effective.<sup>21</sup>

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<sup>21</sup> For further discussion on how investments by challengers might be discouraged when counter-moves by Delaware are allowed - see Bebchuk and Ferrell (2001) and Bebchuk and Hamdani (2001).

## 5. Concluding Remarks

The market for corporate law is hardly a simple market. On the supply side, the value of the product offered by states depends partly on choices that do not involve costs (states' choices among rules), partly on choices that require a fixed investment with little or no variable cost (choices to invest in legal infrastructure), and partly on network externalities. On the demand side, the market suffers from an agency problem due to the private interests of corporate managers, who have a considerable influence on incorporation decisions.

This paper has developed an analytical framework that enables a fuller and more rigorous examination of this unique market than has been thus far possible. This framework has enabled us to derive a full characterization of the equilibrium in this market. In particular, we have identified how the market performs with respect to different categories of corporate rules, the factors that might lead to the emergence and persistence of a dominant state, the division of the market, the strategies and profits of the dominant state, and the effects that incorporation in (or reincorporation to) the dominant state have on corporate value.

Our analysis has highlighted the significance of the agency problem on the demand side of the market. Managers' veto power over reincorporations, and their power to make take-it-or-leave-it offers to shareholders with respect to reincorporations, substantially affect the equilibrium. The market for corporate law can be expected to perform well with respect to rules that do not have a significant effect on private benefits, where the interests of shareholders and managers are aligned. However, with respect to rules that do have such an effect on private benefits, where the interests of shareholders and managers might conflict, competition drives states to offer some rules that managers, but not shareholders, favor. Because the prevailing procedures for switching from state to state play a critical role in creating this problem, proposals for changing these rules, in a way that would eliminate or diminish managers' power over switching, are worth considering.<sup>22</sup>

Our analysis has implications for the empirical assessment of the performance of state competition. Competition might drive all states to adopt the same inefficient rules with respect to rules that have significant effects on private benefits of control. In equilibrium, moving to the dominant state that provides network and legal infrastructure advantages will benefit shareholders, even though the competition as

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<sup>22</sup> See Bebchuk and Ferrell (2001) for an analysis of the possibility of allowing shareholders to switch to another jurisdiction, even against the wishes of managers, with respect to some or all of the rules governing the company.

a whole is not performing well with respect to rules that significantly affect private benefits. Thus, inferences concerning the overall performance of state competition cannot be drawn, as past empirical work has done, from studying the effects that Delaware incorporation has on stock prices or Tobin's Q.

Our analysis has also contributed to understanding the "industrial organization" structure of the market. Our model explains how investments in legal infrastructure (even if not large) combined with network externalities can enable a state to establish a dominant position in this market. Furthermore, the analysis explains how this dominant state can maintain its position over time, and how the desire to maintain this dominance will influence the pricing and rule selection decisions of this state.

An overlooked aspect of the corporate law market, which our analysis has identified, concerns the interaction between quality-based competition and price-based competition in the market for corporate law. We have shown how the dominant state, using the fact that it offers unique advantages in terms of legal infrastructure and network externalities, can price higher than other states. Nevertheless, in order to discourage rival states from challenging its dominance, the dominant state will not extract the full value to companies of its relative advantages. Our conclusions in this regard can explain the observed pricing patterns in the market for corporate law.

## APPENDIX A

### **Proof of Proposition 1:**

(1) Delaware will set  $H^{NR}$ . Otherwise, a rival state will establish a legal infrastructure, set  $H^{NR}$  and lure the  $\delta_j = 1$  companies, or Delaware will be forced to lower its price to preempt such a rival. All other states will set  $H^{NR}$  to retain their local companies.

(2) Delaware will set  $L^R$ , otherwise managers will not initiate reincorporation into Delaware (recall the assumption that  $\alpha$  is sufficiently small so that managers will always prefer a state with  $L^R$  over a state with  $H^R$ ).

(3) States other than Delaware that choose their legal rules to maximize revenues and incorporations will set  $L^R$  in order to retain their local  $\delta_j = 0$  companies. By setting  $L^R$  (as well as  $H^{NR}$  and  $P = 0$ ), a state prevents managers from initiating reincorporation. This strategy further allows states to regain  $\delta_j = 0$  local companies that were originally incorporated in Delaware. Note that a state can retain its  $\delta_j = 0$  local companies by setting  $H^R$  (as well as  $H^{NR}$  and  $P = 0$ ), which would prevent shareholders from approving reincorporation. But, since the state also wants to regain its  $\delta_j = 0$  local companies that were originally incorporated in Delaware, it will choose  $L^R$ . (Otherwise, these companies will reincorporate in another non-Delaware state.)

(4) Consider the three scenarios implied by part (4) of the proposition:

$$(i) \min \left\{ \frac{K}{(1-\delta) \cdot m}, \bar{E} - Y^R, \bar{P} \right\} = \frac{K}{(1-\delta) \cdot m}$$

Delaware chooses its pricing strategy to ensure that all the  $\delta_j = 1$  companies incorporate in it. In particular, Delaware sets a price of  $P_D = \frac{K}{(1-\delta) \cdot m}$  in order

to preempt other states from establishing a competing infrastructure and luring the  $\delta_j = 1$  companies.<sup>23</sup> Note that a state that decides to establish a legal

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<sup>23</sup> If no other state could establish a competing infrastructure, Delaware would be able to secure a dominant position by setting  $P_D = E(K, (1-\delta) \cdot m) - E(0, (1-\delta) \cdot m)$ . Recall the assumption that

$$E(K, (1-\delta) \cdot m) - E(0, (1-\delta) \cdot m) > \frac{K}{(1-\delta) \cdot m} \text{ (see note 8, } \textit{supra}\text{)}.$$

infrastructure will not price below  $\frac{K}{(1-\delta)\cdot m}$ ; otherwise it will surely lose money.<sup>24</sup>

$$(ii) \min\left\{\frac{K}{(1-\delta)\cdot m}, \bar{E} - Y^R, \bar{P}\right\} = \bar{E} - Y^R$$

To ensure that shareholders of  $\delta_j = 1$  companies located in other states will approve reincorporation in Delaware, Delaware must make sure that the overall package that it offers is more beneficial to shareholders than the package offered by the other states (see parts (1), (7) and (8) of the proposition), even if these states offer  $H^R$ :

$$\bar{E} - Y^R - P_D \geq 0$$

or

$$P_D \leq \bar{E} - Y^R.$$

Note that the constraint presumes that Delaware is successful in luring all the  $\delta_j = 1$  companies, and therefore provides substantial network externalities. Delaware's success derives from the preemption of any potential rival, as guaranteed by the previous constraint. In the absence of a contender, each one of the  $\delta_j = 1$  companies anticipates Delaware's dominance and the resulting network effect (see also proof of part (9) below).

$$(iii) \min\left\{\frac{K}{(1-\delta)\cdot m}, \bar{E} - Y^R, \bar{P}\right\} = \bar{P}$$

An exogenously imposed constraint prevents Delaware from pricing above  $\bar{P}$ . Thus, to maximize its profits, Delaware will price at  $\bar{P}$ . (Recall that, by assumption, in this scenario a price of  $\bar{P}$  satisfies the constraints imposed by the two previous considerations).

(5) Immediate from the proof of part (4), given that Delaware succeeds in luring incorporations (see the proof of part (9) below).

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<sup>24</sup> Delaware can preempt other states from establishing a competing infrastructure by setting a price of  $P_D = \frac{K}{(1-\delta)\cdot m}$ , and it need not set a price below  $P_D = \frac{K}{(1-\delta)\cdot m}$ . To see this, consider the case

in which Delaware sets  $P_D = \frac{K}{(1-\delta)\cdot m}$ , and a second state establishes an infrastructure and sets a

price of  $\frac{K}{(1-\delta)\cdot m}$ . The two states are equally appealing to companies, and therefore according to

our tie-breaking assumption each state will enjoy all incorporations with a probability of fifty percent. However, this means that the second state will lose money on average, and therefore will not establish an infrastructure.



(6) Delaware's ability to extract value is limited by the constraints on its pricing strategy (see part (4) of proposition 1). Consider first the case where the second constraint on Delaware's pricing strategy (see part (4)(ii) of proposition 1) is binding, i.e.  $P_D = \bar{E} - Y^R$ . This price takes into account the fact that states may attempt to prevent shareholders of local companies from approving reincorporation in Delaware by offering the redistributive rule  $H^R$ . However, at equilibrium these other states will offer  $L^R$ , just like Delaware, and not  $H^R$  (see part (3) of proposition 1). Hence, again Delaware's price does not reflect the benefits it provides to companies. (This price will reflect the benefits provided by Delaware, as compared to the deviating states that set  $H^R$ .) If Delaware does not capture the full value of the benefits it confers when the second constraint is binding, as explained above, then clearly it will not capture the full value of these benefits if either the first or third constraints (see parts (4)(i) and (4)(iii), respectively) are binding.

(7) Immediate from the proof of part (4).

(8) As explained above, all states that choose their legal rules to maximize revenues and incorporations will set identical legal rules. Therefore, if a non-dominant state sets a positive price, it will lose even its  $\delta_j = 0$  companies to another non-dominant state that sets a lower price. Moving on to the deviating  $H^R$  states, again since there are at least two such states that offer an identical "product", competition will drive the price to zero.

(9) Since all of the states (except for the deviating  $H^R$  states that cannot lure companies anyway) set identical rules, and in particular  $L^R$ , all of the  $\delta_j = 1$  companies will reincorporate (or remain) in the state with the most attractive overall package, including the full network advantage (created when all  $\delta_j = 1$  companies incorporate in that state).

Consider competition between two states with  $H^{NR}$  and  $L^R$ , Delaware and another state, say Ohio. It will be clear that the proof can be readily extended to multi-state competition. Let  $m_D(t)$  and  $m_O(t)$  denote the number of companies that have made a decision to incorporate in Delaware and in Ohio, respectively, after round  $t$ . Also, let  $V_D(m_D(t)) = E(K, m_D(t)) - P_D$  and  $V_O(m_O(t)) = E(k_O, m_O(t)) - P_O$  denote the value provided for  $\delta_j = 1$  companies by Delaware and Ohio, respectively (excluding the effects of the legal rules which are identical in both states). We now show that all the  $\delta_j = 1$  companies will reincorporate in Delaware *if and only if*  $V_D(m) > V_O(m)$ .<sup>25</sup> As shown above (see part (4) of proposition 1), at equilibrium this

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<sup>25</sup> Recall the tie-breaking assumption that if both Delaware and Ohio are equally appealing, companies will reincorporate in each of the two states with a probability of fifty percent. In the

condition is satisfied. The proof is by backward induction. For simplicity of exposition, the proof assumes that all companies are  $\delta_j = 1$  companies.

In the final round,  $t = m$ , a company will choose to reincorporate in Delaware *if and only if*  $V_D(m_D(t-1)+1) > V_O(m_O(t-1)+1)$ . In round  $t = m - 1$ , a company will choose to reincorporate in Delaware *if and only if*  $V_D(m_D(t-2)+2) > V_O(m_O(t-2)+2)$ . To see this, two cases should be distinguished. First, consider the case in which the company has no effect on the  $t = m$  reincorporation decision. If  $V_D(m_D(t-2)+1) > V_O(m_O(t-2)+2)$ , the  $t = m$  company will reincorporate (or remain) in Delaware, regardless of the choice made by the  $t = m - 1$  company. In this scenario, the  $t = m - 1$  company will clearly choose Delaware as well. ( $V_D(m_D(t-2)+1) > V_O(m_O(t-2)+2)$  implies that  $V_D(m_D(t-2)+2) > V_O(m_O(t-2)+1)$ ).). Similarly, if  $V_O(m_O(t-2)+1) > V_D(m_D(t-2)+2)$ , both the  $t = m$  company and the  $t = m - 1$  will reincorporate (or remain) in Ohio. Now consider the case, where the  $t = m - 1$  company determines the  $t = m$  reincorporation decision, namely  $V_D(m_D(t-2)+2) > V_O(m_O(t-2)+1)$  but  $V_D(m_D(t-2)+1) < V_O(m_O(t-2)+2)$ , or  $V_O(m_O(t-2)+2) > V_D(m_D(t-2)+1)$  but  $V_D(m_D(t-2)+1) < V_O(m_O(t-2)+2)$ . In this case, the  $t = m - 1$  company will choose to reincorporate (or remain) in Delaware *if and only if*  $V_D(m_D(t-2)+2) > V_O(m_O(t-2)+2)$ . Combining the two cases, the  $t = m - 1$  company will choose to reincorporate (or remain) in Delaware *if and only if*  $V_D(m_D(t-2)+2) > V_O(m_O(t-2)+2)$ . We have also established that if the  $t = m - 1$  company will choose to reincorporate (or remain) in Delaware, then also the  $t = m$  company will reincorporate (or remain) in Delaware.

To complete the backward induction argument, we now show that if  $V_D(m_D(i-1)+m-(i-1)) > V_O(m_O(i-1)+m-(i-1))$  induces all  $t \geq i$  companies to reincorporate (or remain) in Delaware, then  $V_D(m_D(i-2)+m-(i-2)) > V_O(m_O(i-2)+m-(i-2))$  induces all  $t \geq i-1$  companies to reincorporate (or remain) in Delaware (a parallel argument can be made for Ohio).

First consider the case where  $V_D(m_D(i-2)+m-i+1) > V_O(m_O(i-2)+m-i+2)$ . In this case, even if the  $i - 1$  company chooses Ohio, in the next round we will still have  $V_D(m_D(i-1)+m-(i-1)) > V_O(m_O(i-1)+m-(i-1))$ . Namely, all  $t \geq i$  companies will reincorporate (or remain) in Delaware. And, consequently, the  $i - 1$  company will also choose Delaware. Next, consider the case where  $V_D(m_D(i-2)+m-i+2) > V_O(m_O(i-2)+m-i+2)$  (but

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remainder of the proof we abstract from cases in which two states are equally appealing and thus use strict inequalities. The analysis can be readily extended to allow for cases in which two states are equally appealing using the tie-breaking assumption.

$V_D(m_D(i-2) + m - i + 1) < V_O(m_O(i-2) + m - i + 2)$ ). If the  $i - 1$  company chooses Delaware, then in the next round we will have  $V_D(m_D(i-1) + m - (i-1)) > V_O(m_O(i-1) + m - (i-1))$  and all  $t \geq i$  companies will reincorporate (or remain) in Delaware. On the other hand, if the  $i - 1$  company chooses Ohio, then in the next round we will have  $V_D(m_D(i-1) + m - (i-1)) < V_O(m_O(i-1) + m - (i-1))$  and all  $t \geq i$  companies will reincorporate (or remain) in Ohio. The  $i - 1$  company thus compares  $V_D(m_D(i-2) + m - i + 2)$  and  $V_O(m_O(i-2) + m - i + 2)$ , and if  $V_D(m_D(i-2) + m - i + 2) > V_O(m_O(i-2) + m - i + 2)$  it will choose to reincorporate (or remain) in Delaware. Combining the two cases, if  $V_D(m_D(i-2) + m - i + 2) > V_O(m_O(i-2) + m - i + 2)$ , then all  $t \geq i - 1$  companies to reincorporate (or remain) in Delaware.

Going back to the first round, all of the companies will choose to reincorporate (or remain) in Delaware if  $V_D(m) > V_O(m)$ .<sup>26</sup>

(10) Immediate from the proof of part (6).

(11) Companies with  $\delta_j = 0$  will not reincorporate in Delaware, since they do not enjoy Delaware's infrastructure and network advantages, and thus will not be willing to pay Delaware's high price. Since all non-dominant states that choose their legal rules to maximize revenues and incorporations adopt the same strategy (see parts (1), (3), (7) and (8) above), then due to our tie-breaking assumption each of these states will retain its local companies (and regain its local  $\delta_j = 0$  companies that were initially incorporated in Delaware). Non-dominant deviating states that set  $H^R$  will retain their existing  $\delta_j = 0$  companies, but will not regain their local  $\delta_j = 0$  companies that were initially incorporated in Delaware. These latter companies will reincorporate into one of the non-dominant states that choose their legal rules to maximize revenues and incorporations.<sup>27</sup>

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<sup>26</sup> The same result would be obtained if all the companies made their incorporation decisions cooperatively, rather than non-cooperatively and sequentially.

<sup>27</sup> The equilibrium characterized in proposition 1 relies on the assumption that the fraction of companies that are initially incorporated outside Delaware is sufficiently large (see note 4, *supra*). Under this assumption, Delaware is interested in luring companies from their "home" states rather than pursuing a strategy of focusing solely on companies that are already incorporated in Delaware. However, if the fraction of companies that are initially incorporated outside Delaware is small, Delaware may choose a different strategy. It may prefer to focus on its existing companies instead of luring all of the  $\delta_j = 1$  companies. Although Delaware ends up with fewer companies, it may be able to charge a higher per-company price. A related issue concerns Delaware's strategic choice to preempt other states from establishing a competing infrastructure. Theoretically, Delaware can focus on its existing companies (rather than lure companies from other states), with and without a preemption strategy. If Delaware chooses to preempt, it will have to limit its price accordingly. If

A technical refinement is required to support the equilibrium described in proposition 1. If  $\min\left\{\frac{K}{(1-\delta)\cdot m}, \bar{E} - Y^R, \bar{P}\right\} = \frac{K}{(1-\delta)\cdot m}$  (see part (4) of the proposition), at least one state must adopt a strategy by which it will establish an infrastructure and set  $H^{NR}$ ,  $L^R$ , and  $P = \frac{K}{(1-\delta)\cdot m}$  if Delaware deviates from  $H^{NR}$  or  $L^R$  or prices above  $\frac{K}{(1-\delta)\cdot m}$ . Without this refinement, Delaware would be able to raise its price (i.e. the stated price would not be a best response). Of course, such a higher price cannot be sustained at equilibrium, since another state would step in and lure all incorporations.

Similarly, if  $\min\left\{\frac{K}{(1-\delta)\cdot m}, \bar{E} - Y^R, \bar{P}\right\} = \bar{E} - Y^R$  (see part (4) of the proposition), at least one state must adopt a strategy by which it will set  $H^{NR}$ ,  $H^R$ , and  $P = 0$  if Delaware prices above  $\bar{E} - Y^R$ . Without this refinement, Delaware would be able to raise its price (i.e. the stated price would not be a best response). Of course, such a higher price cannot be sustained at equilibrium, since the other states will be able to adjust their strategies and retain their companies. QED

## APPENDIX B

Appendix B contains the complete analysis of the IPO extension. The analysis assumes  $\delta \rightarrow 0$  for expositional simplicity. It can be readily extended to accommodate larger values of  $\delta$ .

**Lemma B.1:** (i) Delaware can employ strategy  $\sigma_1^D(H^{NR}, L^R, P_1)$ , with  $P_1 = \min\left\{\frac{K}{m}, E(K, m) - Y^R, \bar{P}\right\}$ , lure only existing companies, and make a profit of  $\Pi_1^D = m \cdot P_1$  if and only if

$$(1) \quad P_1 > [E(K, m + m_{IPO}) - E(K, m_{IPO})] - Y^R + \frac{K}{m_{IPO}}.$$

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Delaware chooses not to preempt, another state, say Nevada, may establish a legal infrastructure and focus on  $\delta_j = 1$  companies outside Delaware. Still, Delaware will have to make sure that Nevada will not attempt to attract Delaware's existing companies. For this purpose, Delaware again will have to limit the price it charges. The limited price, coupled with the smaller number of incorporations that Delaware enjoys, suggests that under reasonable assumptions Delaware would rather preempt the establishment of a competing infrastructure and lure all  $\delta_j = 1$  companies, rather than focus on its existing companies.

If condition (1) is not satisfied, strategy  $\sigma_1^D$  cannot be part of an equilibrium.

(ii) Delaware can employ strategy  $\sigma_2^D(H^{NR}, L^R, P_2)$ , with

$$P_2 = \min \left\{ \frac{K}{m + m_{IPO}}, E(K, m + m_{IPO}) - Y^R, [E(K, m + m_{IPO}) - E(K, m_{IPO})] - Y^R + \frac{K}{m_{IPO}}, \bar{P} \right\},$$

lure all of the companies, and make a profit of  $\Pi_2^D = (m + m_{IPO}) \cdot P_2$  if and only if

$$(2) \quad [E(K, m + m_{IPO}) - E(K, m_{IPO})] - Y^R + \frac{K}{m_{IPO}} \geq 0.$$

If condition (2) is not satisfied, strategy  $\sigma_2^D$  cannot be part of an equilibrium.

(iii) Delaware can employ strategy  $\sigma_3^D(H^{NR}, H^R, P_3)$  with

$$P_3 = \min \left\{ \frac{K}{m_{IPO}}, \frac{K}{m - m_D(t=0)} + Y^R - [E(K, m - m_D(t=0) + m_{IPO}) - E(K, m_D(t=0) + m_{IPO})], \bar{P} \right\},$$

lure only IPO-stage companies, and make a profit of

$$\Pi_3^D = (m_D(t=0) + m_{IPO}) \cdot P_3$$

if and only if

$$(3) \quad \frac{K}{m - m_D(t=0)} + Y^R - [E(K, m - m_D(t=0) + m_{IPO}) - E(K, m_D(t=0) + m_{IPO})] \geq 0.$$

If condition (3) is not satisfied, strategy  $\sigma_3^D$  cannot be part of an equilibrium.

*Proof:*

(i) Strategy  $\sigma_1^D$ , the equilibrium strategy from the no-IPO model, was shown to bring all the existing companies to Delaware in the absence of IPOs. With IPOs, the question is whether this strategy will also lure IPO-stage incorporations to Delaware. If so, then this strategy can no longer be part of an equilibrium, since a rival state would be able to establish a competing infrastructure, set  $L^R$ , and lure all the companies—both existing companies and IPO-stage companies—with a lower price. This lower price will now cover the costs of the rival state, since there are more incorporations. The question is, therefore, whether strategy  $\sigma_1^D$  lures IPOs. Clearly, if no other state establishes an infrastructure, then strategy  $\sigma_1^D$  will lure IPO-stage companies (even if these companies initially incorporate outside Delaware). But, with IPOs, strategy  $\sigma_1^D$  might not lure IPO-stage companies, as a rival state may establish an infrastructure, set  $H^R$ , and lure the IPO-stage companies (the rival will set a price of  $\frac{K}{m_{IPO}}$  in order to cover its costs and preempt other states

from targeting IPOs in a similar fashion). Such an IPO-targeting rival will be successful in drawing the IPO-stage companies away from Delaware if and only if

$$E(K, m + m_{IPO}) - P_D < E(K, m_{IPO}) + Y^R - \frac{K}{m_{IPO}}$$

or

$$P_D > [E(K, m + m_{IPO}) - E(K, m_{IPO})] - Y^R + \frac{K}{m_{IPO}}.^{28}$$

(ii) Strategy  $\sigma_2^D$  is aimed at luring all companies. Therefore, Delaware cannot set a price higher than  $\frac{K}{m + m_{IPO}}$ . Otherwise, a rival state will establish an infrastructure, set  $L^R$ , and lure all the companies. Also, since a rival state may establish an infrastructure, set  $H^R$ , and target IPO-stage companies (with a price of  $\frac{K}{m_{IPO}}$ ),

Delaware will be able to preempt such a rival *if and only if*

$$E(K, m + m_{IPO}) - P_D \geq E(K, m_{IPO}) + Y^R - \frac{K}{m_{IPO}}, \quad \text{i.e.}$$

$$P_D \leq [E(K, m + m_{IPO}) - E(K, m_{IPO})] - Y^R + \frac{K}{m_{IPO}}. \text{ Hence, strategy } \sigma_2^D \text{ is feasible if and only}$$

$$\text{if } [E(K, m + m_{IPO}) - E(K, m_{IPO})] - Y^R + \frac{K}{m_{IPO}} \geq 0.$$

(iii) As a third possibility, Delaware can forego existing companies (except for those which are initially incorporated in it) and focus on the IPO-stage companies by employing strategy  $\sigma_3^D$ . When targeting IPOs, Delaware cannot set a price higher

than  $\frac{K}{m_{IPO}}$ .<sup>29</sup> Otherwise, a rival state will establish an infrastructure, set  $H^R$ , and lure

all the IPO-stage companies. Also, since a rival state may establish an infrastructure, set  $L^R$ , and target existing companies (with a price of  $\frac{K}{m - m_D(t=0)}$ ), Delaware will

be able to lure the IPO-stage companies *if and only if*

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<sup>28</sup> Theoretically, a third state might try to establish an infrastructure and lure companies from both Delaware and its IPO-targeting rival. However, in order to offer companies a package that is better than the ones offered by the two other infrastructure states (Delaware with  $L^R$  and the IPO-targeting state with  $H^R$ ) this third state would have to offer an extremely low price - a price that would likely be too low to cover the costs of establishing an infrastructure.

<sup>29</sup> We assume that  $E(K, m_{IPO}) - E(0, m_{IPO}) > \frac{K}{m_{IPO}}$  (compare to the assumption stated in note 8

*supra*). Therefore,  $P_D < \frac{K}{m_{IPO}}$  implies  $P_D < E(K, m_{IPO}) - E(0, m_{IPO})$ , which means that IPO-stage

companies will prefer Delaware over states without an infrastructure (and with  $H^R$ ).

$$E(K, m_D(t=0) + m_{IPO}) + Y^R - P_D > E(K, m - m_D(t=0) + m_{IPO}) - \frac{K}{m - m_D(t=0)}$$

or

$$P_D \leq \frac{K}{m - m_D(t=0)} + Y^R - [E(K, m - m_D(t=0) + m_{IPO}) - E(K, m_D(t=0) + m_{IPO})].$$

Hence, strategy  $\sigma_3^D$  is feasible if and only if

$$\frac{K}{m - m_D(t=0)} + Y^R - [E(K, m - m_D(t=0) + m_{IPO}) - E(K, m_D(t=0) + m_{IPO})] \geq 0.$$

QED

**Lemma B.2:** If condition (1) is not satisfied, then condition (2) is necessarily satisfied, i.e.  $\neg(1) \Rightarrow (2)$ . Therefore, at least one of the two strategies,  $\sigma_1^D$  and  $\sigma_2^D$ , is always feasible.

*Proof:* If condition (1) is not satisfied, then  $P_1 < [E(K, m + m_{IPO}) - E(K, m_{IPO})] - Y^R + \frac{K}{m_{IPO}}$ ,

which, given  $P_1 \geq 0$ , implies condition (2). QED

**Proposition B.1:** If a number  $m_{IPO}$  of IPO-stage companies choose their states of incorporation at the end of period  $T = 2$ , then:

(i) If condition (1) is satisfied but conditions (2) and (3) are not satisfied, then Delaware will choose strategy  $\sigma_1^D$ , i.e.

$$(1) \cap \neg(2) \cap \neg(3) \Rightarrow \sigma^D = \sigma_1^D.$$

(ii) If condition (1) is not satisfied – which implies that condition (2) is satisfied – and condition (3) is not satisfied, then Delaware will choose strategy  $\sigma_2^D$ , i.e.

$$\neg(1) \cap \neg(3) \Rightarrow \sigma^D = \sigma_2^D.$$

(iii) If conditions (1) and (2) are satisfied but condition (3) is not satisfied, then Delaware will choose strategy  $\sigma^D = \arg \max_{\sigma_i^D} \{\Pi_1^D(\sigma_1^D), \Pi_2^D(\sigma_2^D)\}$ , i.e.

$$(1) \cap (2) \Rightarrow \sigma^D = \arg \max_{\sigma_i^D} \{\Pi_1^D(\sigma_1^D), \Pi_2^D(\sigma_2^D)\}.$$

(iv) If conditions (1) and (3) are satisfied but condition (2) is not satisfied, then Delaware will choose strategy  $\sigma^D = \arg \max_{\sigma_i^D} \{\Pi_1^D(\sigma_1^D), \Pi_3^D(\sigma_3^D)\}$ , i.e.

$$(1) \cap \neg(2) \cap (3) \Rightarrow \sigma^D = \arg \max_{\sigma_i^D} \{\Pi_1^D(\sigma_1^D), \Pi_3^D(\sigma_3^D)\}.$$

(v) If condition (1) is not satisfied – which implies that condition (2) is satisfied – and condition (3) is satisfied, then Delaware will choose strategy  $\sigma^D = \arg \max_{\sigma_i^D} \{\Pi_2^D(\sigma_2^D), \Pi_3^D(\sigma_3^D)\}$ , i.e.

$$\neg(1) \cap (3) \Rightarrow \sigma^D = \arg \max_{\sigma^D} \{\Pi_2^D(\sigma_2^D), \Pi_3^D(\sigma_3^D)\}.$$

(vi) If all three conditions, (1), (2) and (3), are satisfied, then Delaware will choose strategy  $\sigma^D = \arg \max_{\sigma^D} \{\Pi_1^D(\sigma_1^D), \Pi_2^D(\sigma_2^D), \Pi_3^D(\sigma_3^D)\}$ , i.e.

$$(1) \cap (2) \cap (3) \Rightarrow \sigma^D = \arg \max_{\sigma^D} \{\Pi_1^D(\sigma_1^D), \Pi_2^D(\sigma_2^D), \Pi_3^D(\sigma_3^D)\}.$$

*Proof:* Immediate from the previous two lemmas.



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