

Decentralization in Firm and State

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Abstract

Recent contributions insert the insights of industrial and economic organization into public economics to shed new light on the vertical organization of the public sector, especially in matters of fiscal federalism. Here, we look at the other side of the coin. We consider the decentralization problem in public economics and in organizational economics by showing how the Decentralization Theorem can complement the M-form Hypothesis. Taking a Public Choice perspective, we describe how the Theorem and the Hypothesis complement each other through both verbal description and mathematical models. The result is a simple but comprehensive account of decentralization. (97 words.)

Key Words

Decentralization Theorem, M-form Hypothesis, Second Generation Theory of fiscal federalism, Theory of the Firm

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Session selection

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This paper reviews two public choice models that shed light on the theory of the firm branch of industrial organization. In particular, we discuss Tullock's rent seeking model in the context of vertical integration, and Oates' decentralization model in the context of the multidivisional firm. Finally, we offer some initial thoughts on how theory of the firm logic can shed light on public choice questions.

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Proposals for papers and panel sessions (accompanied by the \$25 deposit fee) should be submitted by **Tuesday, December 15, 2009**, with final papers being due by **Friday, February 19, 2010**.

1. Introduction

Recent contributions to the field of fiscal federalism (e.g., Yingyi Qian and Barry Weingast, 1997; Wallace Oates, 2005; Barry Weingast, 2009) underline how industrial and economic organization theories can offer new insights for the analysis of the “vertical structure of the public sector” (Wallace Oates, 1999, p. 1120).² For example, if one interprets the nexus among tiers of government as bound by incomplete contracts, then the insights from the theory of the firm can shed some light on the optimal extent of delegation (e.g., Paul Seabright, 1996).

So far, these contributions have considered what organizational economics can offer public economics to study decentralization. This paper tackles the question from the opposite stance. It considers what insights public economics can offer organizational economics to study decentralization.

When organizational economists consider decentralization, they most often associate the notion with the multidivisional firm or M-form Hypothesis. The M-form Hypothesis is interpreted by Alfred Chandler (1962) as an organizational innovation of the 1920s that substituted the “quasi-autonomous operating divisions (organized mainly along product, brand, or geographic lines) for the functional divisions of the” unitary firm or “U-form structure as the principal basis for dividing up the task and assigning responsibility” (Oliver Williamson, 1975, p. 136).

Public economists instead associate decentralization with the Decentralization Theorem (Wallace Oates, 1972). The Theorem is a normative proposition (Wallace Oates, 1999, p. 1122) prescribing that “in the absence of cost-savings from the centralized provision of a good and of interjurisdictional external effects, the level of welfare will always be at least as high (and typically higher) if Pareto-efficient levels of consumption of the good are provided in each jurisdiction than if *any* single, uniform level of consumption is maintained across all jurisdictions. In this way the theorem establishes, in the absence of other kinds of offsetting benefits from centralized control, a presumption in favor of decentralized finance” (Wallace Oates, 1972, p. 54, original emphasis; see also p. 35). The Decentralization Theorem tries to improve the matching between preferences and public good supply at the cost of not locally internalizing interjurisdictional externalities and of loss of economies of scale.

Today, the description of the M-form most familiar to the economist appears to be the one filtered through the textbook (e.g., Jean Tirole, 1988). In this description, the M-form comes about to facilitate utilization of performance incentives that help mitigate the moral hazard problem between upper and lower levels of management. However, similarly to the Decentralization Theorem, the cost of the M-form is the loss of economies of scale (e.g., Eric Maskin, Yingyi Qian, and Chenggang Xu, 2000). Be that as it may, the upshot is that the textbook description typically only considers incentive issues tied to “self-interest seeking with guile” or “opportunism” (Oliver Williamson, 1985, p. 47), not incorporating other aspects of Williamson’s original theory.

² These contributions combining local public finance with industrial and economic organization theories go under the heading of Second Generation theory of fiscal federalism. For reviews of this literature, see Giampaolo Garzarelli (2004) and Wallace Oates (2005). Early precursors, besides the Public Choice school in general, include: Vincent Ostrom, Charles Tiebout, and Robert Warren (1961), Herman Boschken (1982), Albert Breton (1987), and Pierre Salmom (1987).

In general, in fact, Williamson's theory of internal organization, especially the earlier one of *Markets and Hierarchies*, is not just about how vertical integration can solve deadweight losses from opportunistic behavior tied to sunk costs (cf. Richard Langlois and Nicolai Foss, 1999). Rather, the basic outlook is that recourse to internal organization "permits adaptations to uncertainty to be accomplished by administrative processes in a sequential fashion. Thus, rather than attempt to anticipate all possible contingencies from the outset, the future is permitted to unfold. Internal organization in this way economizes on the bounded rationality," or, more precisely, the cognitive limitation "attributes of decision makers in circumstances in which prices are not 'sufficient statistics' and uncertainty is substantial" (Oliver Williamson, 1975, p. 9).³

This paper shows that when combined with the textbook description of the M-form Hypothesis the internalization of externalities and preference matching aspects of the Decentralization Theorem provide a fuller representation of the decentralization problem, and indeed a better mathematical description of the theory Williamson intended in describing the M-form. While the textbook model accounts for attenuating opportunism, the model of fiscal federalism can be used to illustrate both the "strategic" and "day-to-day" implication of limited cognition in a simple, yet powerful way. This is useful, because, as David Kreps (1996, p. 562) writes, "mathematics-based theory still lacks the language needed to capture essential ideas of" limited cognition that "are central to Williamson's concepts of transaction costs and contractual form."

More generally, our exploration into how the M-form Hypothesis and the Decentralization Theorem complement each other helps to differentiate among the many different aspects of the decentralization problem, providing a model that is both more comprehensive and applicable to a wider variety of settings. It also suggests another way of conceptualizing the two aspects of decentralization: incentive alignment and knowledge use (Giampaolo Garzarelli, 2006). Rather than conceive of the different aspects of decentralization as falling into the incentive-versus-knowledge dichotomy, by keeping knowledge issues still central our formalization suggests thinking about the two aspects of decentralization through an objective-function-versus-cost-function framework. The M-form Hypothesis is told through a cost function, whereas the Decentralization Theorem is told through an objective function.

But beyond the exercise in formalism, clarifying the original intention of the M-form Hypothesis also sheds light onto those properties of the decentralization problem that have business relevance, and can be found, for example, in management books. For instance, Charles Koch (2007, pp. 132-133) describes 'optimal' decentralization as follows. "Proximity to a problem or process does not determine who is in the best position to make a decision. ... Those with local knowledge are often in a better position to solve the problem at hand ... but universally decentralized decision-making has its own problems. Some decisions, if made at the local level, can be unprofitable because a broader perspective is required." Differently phrased, there is a tension between

³ Arguably conceding to the original argument of Richard Langlois (e.g., 1984) and possibly others, now Williamson (e.g., 1999, p. 316; 2005, pp. 7-10) interprets the crux of bounded rationality as the limited cognition or knowledge limitations of forward-looking agents rather than as the general calculation limitations of the human brain in the face of a well-defined problem, as Herbert Simon originally proposed. Here, we take bounded rationality to be synonymous with cognitive limitations as well.

optimally using local knowledge and ‘global knowledge.’⁴ Having global knowledge simply means knowing something about how the different parts of the organization fit together. It is often those at the top that will have global knowledge, but not always.

It is useful to begin by spending some words on the two governance structures of interest, viz., firm and state, to see how they relate to each other as well as to (de)centralization more generally (Section 2). This comparative institutional analysis will ease the more specific one between the Decentralization Theorem and the M-form Hypothesis (Sections 3 and 4). For the idea is to bring questions of comparability within the boundaries of the decentralized organization so that we may have criteria of comparability that do not just consider the hidden action problem and opportunism as suggested by the textbook description of the M-form, but also the knowledge issues that Williamson also implied

2. From Market versus State to Firm versus Market to Firm versus State

The starting point for any economic theory of decentralization is Friedrich Hayek (1948, Chs). In his studies about the adaptive properties of the market vis-à-vis central planning emanating from the socialist calculation debate, Hayek famously asserted that knowledge is dispersed, and that, by difference, we all have cognitive limitations. Thus, if the genuine economic problem is a knowledge one, then it is only natural that decentralization be interpreted as a more effective governance mechanism than centralization. “The problem which we pretend to solve is how the spontaneous interaction of a number of people, each possessing only bits of knowledge, brings about a state of affairs in which prices correspond to costs, etc., and which could be brought about by deliberate direction only by somebody who possessed the combined knowledge of all those individuals” (Friedrich Hayek, 1948, Ch. 2, pp. 50-1).

However, the Hayekian standpoint is not directly to mean that, by analogy, decentralized public good provision is ‘more’ welfare-enhancing than its centralized alternative. That is to say that Hayek is not asserting that what works in the private sphere (the market) automatically works in the public one (the state) (e.g., Friedrich Hayek, 1997[1939], p. 194; Vernon Smith, 2003). Hayek implies that decentralization is usually best suited for spot contract relations, not for more complicated ones. Hayek was indeed well-aware of the difficulties associated with implementing decentralized public systems, and of intentionally creating institutions mimicking the market more generally. In particular, he knew that such institutions could not replace the market or be just like the market. At best, such institutions could aid the role of the market. In his discussion of supranational federalism, he in fact tells us that in “a federation economic policy will have to take the form of providing a rational permanent framework within which individual initiative will have the largest possible scope and will be made to work as

⁴ Koch (2007, p. 133) provides an illustration of this. “The mindless application of either approach – universally centralized or completely decentralized decision rights – is not the answer. For example, decisions about how to gain optimum throughput from a refinery at any given time probably are best made by people on site. On the other hand, people further removed, but with broader knowledge, may be better positioned to make a decision on what the most profitable product mix will be in five years.” Compare also, e.g., Ken Kollman, John Miller and Scott Page (2000) that, by using dynamic programming and computational models, suggests that centralization may be more appropriate to address problems of either great difficulty or great ease; while decentralization may be best suited to search for the solution of problems of intermediate difficulty.

beneficently as possible; and it will have to supplement the working of the competitive mechanism where, in the nature of the case, certain services cannot be brought forth and be regulated by the price system” (Friedrich Hayek, 1948, Ch. 12, pp. 268-9).

Hayek essentially juxtaposes the working of the market to that of a fully centralized state concluding that the market allows for better use of dispersed knowledge, and hence has an adaptive edge over a fully centralized state. At about the same time that Hayek developed his ideas about the relative benefits of decentralization due to most knowledge being unevenly distributed, Ronald Coase (1937) developed his ideas about the relative benefits of centralization in the context of the firm. The basic Coasean viewpoint is as simple as the Hayekian one: the use of the market is not free. The market itself presents costs of use, which others would later term transaction costs.⁵ By seriously considering transaction costs it is possible to do two things, says Coase. First, we are able to understand why firms exist in the first place. If there are costs of using the price system, then sometimes these costs may be so high that founding a firm may economize on them. Second, we are able to identify the firm-market boundary by making use of familiar Marshallian comparative statics. If the marginal costs of carrying out a transaction within a firm are inferior to those of carrying out that same transaction on the market, then we internalize the transaction in question within the firm.

So, what is the Coasean firm? The Coasean firm is an organization that replaces many short term market contracts with a longer term one of employment. As a result, the firm too has an adaptive edge, but over the market. Owing “to the difficulty of forecasting, the longer the period of the contract is for the supply of the commodity or service, the less possible, and indeed, the less desirable it is for the person purchasing to specify what the other contracting party is expected to do.” The “service which is being provided is expressed in general terms, the exact details being left for a later date. All that is stated in the contract is the limits to what the person supplying the commodity or service is expected to do. The details of what the supplier is expected to do are not stated in the contract but are decided later by the purchaser. When the direction of resources (within the limits of the contract) becomes dependent on the buyer in this way, that relationship which I term the ‘firm’ may be obtained” (Ronald Coase, 1937, pp. 391-2, footnote omitted).

Therefore, Coase and Hayek are making an identical claim, but in two different contexts. Hayek writes about the superior versatility properties of the price system over a fully integrated state. Coase writes about the superior versatility properties of the firm over the market when a transactional relationship may be long as opposed to short term. And the approaches of both scholars can be justified on incomplete contract grounds, albeit of a different kind: short term contracts for Hayek, long term ones for Coase. Market and firm are both “marvels” in their own right.⁶

Notice that we have one comparison missing: the firm and the state. The firm and the state are both instances of nonmarket decision-making. Both are means to pursue some ends through collective action (Mancur Olson, 1965), that is, both are conscious organizations composed of individuals with limited cognition that in one way or another,

⁵ On the notion, see the recent Matthias Klaes (2000), Douglas Allen (2000), and Richard Langlois (2006).

⁶ Updating Hayek’s well known dictum about the market from “The Use of Knowledge in Society.” See also Chester Barnard (1938) and Williamson (2005, p. 4).

and more or less at efficient cost, produce. Through mostly non-voluntary income transfers, the state, in particular, offers goods and services from a set of income transfer receiving individuals to a set of income transfer providing individuals (where the sets are not mutually exclusive). “The income of the state represents payment by individuals out of their economic resources in exchange for services provided. In the provision of these services the state is, in most cases, in a perfectly monopolistic position. However, it does not seek to maximize net revenue. Services are offered at cost. The supply curve of public services is an average-cost curve, not a marginal-cost curve” (James Buchanan 1949, p. 498).

Yet as some of us like to point out already in our first year economics classes, we know that firm and state are bound by different constraints (János Kornai, e.g., 1979). State constraints are softer because responsibility is separated from action; whereas firm constraints are harder because the separation is less loose.⁷ Moreover, a state often faces no competition whereas firms often do. And yet, though much is often lost in the process (e.g., Harvey Leibenstein, 1966; Gordon Tullock, 1967; Douglass North, 1990), in most cases most states deliver the minimum expected (e.g., James Buchanan, 1975). States are at best second best organizations that we may justify on the basis of the “remediableness criterion,” which “holds that an extant mode of organization for which no superior *feasible* alternative can be described and *implemented* with expected net gains is *presumed* to be efficient” (Oliver Williamson, 1999, p. 316, original emphasis).

Nonetheless – and perhaps especially in light of the remediableness criterion – nothing stops us from experimenting with different organizations of the state as such. In this regard, conceiving the state as a kind of firm may hold heuristic value, so long as we are clear about what element allows us to suggest that such conception may hold.

To adapt to contingencies – to generate knowledge – both the firm and the market, we saw, rely on contractual incompleteness, even if the nature of the contract in question may be different. Can we say the same for the state?

The state, similarly to the firm, is an organizational design problem. But the design problem (in both cases) is not always well-defined: we cannot always optimally choose between given organizational designs as the logic of choice dictates, because we do not always know the menu of organizational alternatives to choose from. Thus there arises the need to try out different organizational designs to pursue some more or less well-defined objectives. But we need to look outside the logic of choice to do so: we need to look to the logic of contract.

In the case of the state, we can look at the logic of contract from the perspective of Public Choice and Constitutional Economics (Oliver Williamson, e.g., 2002). Here, no matter the organizational context – public or private – what matters is exchange rather than optimization, because a contract is seen as a way to create gains from trade and predictability through a reciprocal and credible limitation of the choice set. As Geoffrey Brennan and James Buchanan (2000[1985], p. 77) write, the recognition “of the temporal dimensionality of choice provides one ‘reason for rules’ – rules that will impose binding constraints on choice options after the rules themselves have been established. That is to say, in either a private-choice or a public-choice role, persons may choose to restrict their

⁷ On “system constraints” more generally, see Roger Koppl (2000, pp.).

own futures, and such behavior may be wholly rational.”⁸ The substantive point is that contracts both restrain and enable action: they are as much about controlling perverse incentives as they are about stimulating production ones. If the role of contracts were solely to control perverse incentives, perhaps we would witness *the most* orderly governance structures, but not necessarily the most efficient ones (Gordon Tullock, 1969, p. 29).

The logic of contract suggests that the firm and the state are organizationally related.⁹ At the state level the most general of contracts is the constitution; other examples of public incomplete contracts include political mandates and legislation in general. But it is the constitution (or in some cases a comparable public law) that originally determines whether a state is federal (or decentralized) in kind or not. Still, public decentralization in kind is not synonymous with a constant degree of decentralization through time. The extent of verticalization of the public sector can change according to type of contingency: state organization is not a problem with just two polar solutions (centralize or decentralize?). We “can envision a spectrum of structures of the public sector along which the difference is essentially one of degree rather than kind. At one end of the spectrum is a unitary form of government with all decisions made by the central authority, and at the opposite pole is a state of anarchy. Aside from the two polar points themselves, the other positions on the spectrum represent federal organizations of the public sector moving from a greater to a lesser degree of centralization of decision-making” (Oates 1972, p. 18). This is similar to the Coasean approach, and its derived Williamsonian one where we have the market, the firm and a variety of hybrid governance structures in between.

A constitution or other comparable public law therefore can strategically determine if a state is federal (i.e., decentralized) in kind. But what kind of incomplete contract determines how in its day-to-day operation a federal state can be more or less decentralized in degree?¹⁰

The contracts that govern daily intergovernmental relations are grants. A grant can be considered as an open-ended bargaining instrument, for a grant is often just an instrument of compromise in anticipation of future reciprocal gains. Much like a traditional contract, a grant can be interpreted as a preference revelation mechanism. The selection of type of grant by the donor can send a message to the recipient that to basic price-and-allocation theory would break down, assuming it were possible for such theory to articulate it at all in terms of a sufficient statistic: by specifying the type of grant the donor is (implicitly or otherwise) communicating a preferred spending pattern to the recipient. The flexibility nature of incomplete contracts here enters the stage in its most familiar way: a grant is often just an implicit manifestation of exchange – it embodies a *quid pro quo* message not otherwise expressible.

The amount of grant incompleteness – analogously to the case of the contract for the firm – is not monolithic, but can, within the natural bounds dictated by our limited

⁸ Compare also Douglass North and Barry Weingast (1989) and the later work of Friedrich Hayek (e.g., 1982[1973]).

⁹ Adam Gifford, Jr (1991) and Viktor Vanberg (1992) reach the same conclusion, but from the opposite starting point to the one here.

¹⁰ The answer to this questions relies on Giampaolo Garzarelli (2006).

cognition, be varied. Grants, like contracts, are not all the same. Just like the extent of incompleteness differs for type of contract, so too it differs for type of grant. One for example expects a constitution to be more vague than a spot contract and an unconditional block grant to be more vague than a detailed conditional one. If this is so, then it is only rational to attempt to make productive use of extent of incompleteness. The extent of grant incompleteness can indeed serve as a policy tool: it can be used by a central government in a federation to induce different levels of (de)centralization from its local governments. Such objective can be achieved by a higher level of grant incompleteness (less conditionality) as opposed to a higher level of grant completeness (more conditionality).

This interpretation of grants as policy tools that can engender more or less decentralization is not different from Williamson's interpretation as to why the M-form came about. The U-form allows for economies of scale but at the cost of "control loss" (p. 133). But through devolution – through the M-form – the control loss can be seen as an option (Alfred Chandler, 1962). The M-form came about because of a change in "decomposition rules" that allowed "both to economize" on limited cognition "and attenuate opportunism" (Oliver Williamson, 1975, pp. 133 and 137).

Now that we have established that the firm and the state are comparable thanks to the common thread of contractual incompleteness, the purpose of the next sections is to more precisely illustrate – first verbally and then mathematically – how the M-form and the Decentralization Theorem are comparable. Such comparison will involve issues of production and incentives as well as the tension between local and global knowledge.¹¹

3. The Decentralization Theorem and the M-form Hypothesis

A key assumption of Oates' Decentralization Theorem is that centralized systems must provide a uniform level of service to the federated states. This assumption also seems to capture Williamson's notion of confounding operating decisions, as follows. A CEO, say of a two division firm, may not know enough about the conditions on the shop floor to make optimal operating decisions for both divisions; if the CEO is required to make operating decisions for both divisions, his only recourse may be to a uniform policy.

Policy uniformity often arises under centralized systems, and this is a feature of centralization that has long been recognized. "In great centralized nations the legislator is obliged to give a character of uniformity to the laws, which does not always suit the diversity of customs and of districts; as he takes no cognizance of special cases, he can only proceed upon general principles; and the population are obliged to conform to the requirements of the laws, since legislation cannot adapt itself to the exigencies and the customs of the population, which is a great cause of trouble and misery" (Alexis de Tocqueville, 1990[1835], Ch. 8, p. 163). Regarding this quotation, Wallace Oates (2005, p. 353) writes that one "might read this historic passage as placing primary emphasis on

¹¹ The term "global knowledge" is used here differently than in much of the management and strategy literature, where it is used to refer to knowledge spillovers in a national, or economy-wide setting. Here, global knowledge means knowledge of the spillovers, and the context is the corporate.

the political constraints on centralized provision, although this may reflect incomplete knowledge as well.”

Thus decentralization that leads to greater matching of operating decisions to conditions on the shop floor can be viewed as suiting the diversity of divisions, to paraphrase de Tocqueville. The possibility of this type of matching is the upside to decentralization in Oates’ Theorem. The downside to decentralization in Oates’ Theorem, however, can be viewed as what Williamson referred to as an inability to make strategic decisions. In Oates (1972), this comes through the notion of cross-district spillovers. Government leaders (executives) are often in the best position to internalize inter-district (-departmental) externalities. For example, they build a park that benefits citizens of two districts, as they are more likely to be aware of the existence of such need. In other words, because of their vantage point, executives are more likely to have the appropriate knowledge to act.¹²

Just as externalities exist between governments, inter-departmental externalities exist between divisions of a firm. This is especially true because the divisions in M-form organizations are related businesses; taking advantage of these externalities has been recognized as one of the great advantages of the M-form, by Williamson and others, over holding companies. Daniel Spulber (2007, p. 237) provides a modern example. Wal-Mart takes advantage of externalities (spillovers) arising through impulse purchases. “The combination of a department store and a supermarket offered customers the convenience of one-stop shopping, an advantage over specialized department stores and over standard supermarkets. Wal-Mart’s supercenter format took advantage of impulse purchasing and in-store promotions. A customer of the department store or the supermarket might be induced to make an unanticipated purchase from the other side of the supercenter.”

Thus if one division of the store advertises, the other may receive a benefit in the form of a spillover. To see how these are underprovided for in the decentralized case, imagine that for some reason, customers who buy pomegranates also make many impulse purchases. Then, if the manager of Wal-Mart’s grocery division can attract these types of customers, say through holding a sale on this fruit, the another department (e.g., clothing or hardware) will benefit from increased sales. However, the grocery manager may not be aware of this, as he has only local, not global knowledge. Moreover, he may not be motivated by externalities if his compensation is based only on his division’s performance.

Internalizing inter-divisional spillovers can be thought of as making strategic decisions in the following sense. Executives that have global knowledge are often in the best position to make strategic decisions, while regional managers may have local knowledge and be in the best position to make operating decisions.¹³ In this way, the fiscal federalism model of Oates (1972) represents a basic tension in strategic decision making, discussed by Williamson (1975) with respect to limited cognition. Textbook descriptions of the M-form Hypothesis tend to capture well Williamson’s notions of “attenuating opportunism” and economies of scale, but they often leave out considerations of interdivisional spillovers. Moreover, while they the textbook depictions typically focuses on moral hazard, they do not explore deeper information issues (what

¹² Of course there are issues of compensation as well, but our aim is to emphasize the knowledge problems.

¹³ Compare Alanson Minkler’s (1992) model of franchising.

some may call knowledge issues) such as matching operating decisions to shop-floor conditions.

The notion that divisions of an M-form are related is at the core of the textbook depiction of how the M-form hypothesis can minimize the motivational problems when worker effort is unobservable. The example of the internal structure of General Motors is illustrative. Eric Maskin, Yingyi Qian, and Chenggang Xu (2000, p. 360) describe the structure of General Motors (GM).

A classic example of the U-form was the Ford Motor Company before the Second World War. In those days, Ford was organized into a number of functionally specialized departments: production, sales, purchasing, and so on. In other words, the various departments carried out complementary tasks; none was independent of the others. By contrast, General Motors under Alfred Sloan became the prototypical M-form; GM comprised (and still comprises) a collection of fairly self-contained divisions, e.g. Chevrolet, Pontiac, and Oldsmobile.

For there to be a theory of the organization of the firm, such theory must explain why firms are sometimes more centralized (U-form) and other times more decentralized (M-form). In the model of Eric Maskin, Yingyi Qian, and Chenggang Xu (2000), fully formalized below, when moral hazard is particularly likely to be high, decentralization may allow for greater control, by providing benchmarks that are internal to the firm to offer indications of divisional performance. In the GM example, the central office is likely to find it easier to compare the performance of Chevrolet with Pontiac. If GM had only one product line, it would have needed to make external comparisons or comparisons across different departments; comparing the production department with the sales department, for example, might be difficult. Therefore, when being able to make comparisons is important, an organization will decentralize. However, the downside of decentralization, in Eric Maskin, Yingyi Qian, and Chenggang Xu (2000) and elsewhere, is the inability to realize economies of scale.

In a nutshell, the M-form Hypothesis rests on the importance of the comparability of divisions versus departments, versus the importance of economies of scale that result from U-form (unitary, or centralized) organizations. In general, organizations structured along M-form lines are more comparable; if the benefit from greater comparability outweighs the benefit of economies of scale under U-form structure, the organization should decentralize its structure (choose the M-form).

While the main purpose of this article is to compare the M-form Hypothesis with the Decentralization Theorem, it is interesting to note that the trade-offs highlighted in a number of other models can represent specific subcases of a joined version of the models presented below. As one example, Alberto Alesina and Enrico Spolaore (1997) incorporate the trade-off of economies of scale versus local control.

4 Models

This section demonstrates Williamson's M-form Hypothesis and Oates' Decentralization Theorem, with the use of formal models. The following subsection contains the demonstration of the M-form Hypothesis, described through production technology. This is a simplified, but fully formalized version of the Eric Maskin, Yingyi Qian, and Chenggang Xu (2000) description of the M-form Hypothesis.¹⁴ The demonstration of the Decentralization Theorem, described through an objective function, is due to Besley and Coate (2003), and is summarized in the second subsection.

3.1 M-form Hypothesis

A unit of output can be produced at cost p , but this subsection describes other cost considerations, and these costs are represented by $c(\Omega)$. These costs depend on organizational structure Ω , which can be either centralized (or U-form, $\Omega = U$), or decentralized (or M-form, $\Omega = M$). In the centralized case, two jurisdictions with heterogeneous citizens exist in a unified political body. In the decentralized case, each jurisdiction operates its own government. The cost function for one jurisdiction is:

$$c(\Omega) = \begin{cases} Eb(U) + \frac{\theta}{2} & \text{for } \Omega = U \\ Eb(U) + \theta & \text{for } \Omega = M \end{cases}$$

¹⁴ However the modeling framework here differs from theirs for two reasons: to formally model economies of scale, and for parsimony.