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THREE ESSAYS ON UNCERTAINTY, RESOURCES AND ORGANIZATIONS

Elsarafy Amro

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UNIL | Université de Lausanne

FACULTÉ DES HAUTES ÉTUDES COMMERCIALES
DÉPARTEMENT STRATÉGIE, GLOBALISATION ET SOCIÉTÉ

**THREE ESSAYS ON UNCERTAINTY, RESOURCES
AND ORGANIZATIONS**

THÈSE DE DOCTORAT

présentée à la

Faculté des Hautes Études Commerciales
de l'Université de Lausanne

pour l'obtention du grade de
Docteur ès Sciences Économiques, mention « Management »

par

Amro ELSARAFY

Directeur de thèse
Prof. Jean-Philippe Bonardi

Jury

Prof. Christian Zehnder, Président
Prof. Guido Palazzo, expert interne
Prof. Ulf Andersson, expert externe

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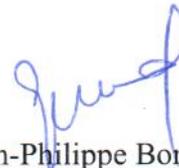
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THREE ESSAYS ON UNCERTAINTY, RESOURCES AND ORGANIZATIONS

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CHAPTER 1: DISSERTATION INTRODUCTION

Resources are at the heart of the most heated discussions within a firm, taking priority in the strategic thinking of top management teams. Resources are not only a lever through which sub-entities within a firm are rewarded and punished, but a lever with which they gain *influence* within the firm (Andersson et al., 2002, Mudambi and Navarra, 2004). A subunit obtains this influence by aiding the Multinational Corporation (MNC) in managing external dependencies. In relationships of economic exchange, dependencies create situations of uncertainty that subject the MNC to capricious actions from counterparties (Pfeffer and Salancik, 1978). The ability to handle uncertainty is paramount to a firm's long-term success, but necessitates an accurate understanding of the environment in which the firm operates; that is because a prerequisite for dealing with environmental uncertainty is controlling resources within that environment (Knight, 1921; Pfeffer and Salancik, 1978). Thus, the extent to which a firm is able to deal with uncertainty, through resource control, is a function of the extent to which it can form accurate assessments or estimates of its uncertain environment.

As such, the overarching focus of this dissertation project is on how organizations use resources to handle uncertainty, the various ramifications thereof, and how attempts to deal with uncertainty are limited by bounded rationality which force tradeoffs. Each dissertation paper will tackle a different ramification, and present it as the result of bounded rationality expressed in varied, yet connected, ways that demonstrate tradeoffs for organizations. While at first glance they may seem to have little in common, two theories employed in this dissertation are in fact similar in how they approach the topic of organizations employing resources to manage uncertainty: Pfeffer and Salancik's *resource dependence theory* and Knight's *theory of profit*.

Pfeffer and Salancik's inquiry focused on resource dependence theory (RDT) which says that, within relationships of economic exchange, those who control critical and scarce resources on which others rely will hold influence/power over them (Pfeffer and Salancik, 1978). Holding influence over someone in a relationship of economic exchange is tantamount to reducing one's uncertainty, which is the degree to which future states of the world cannot be anticipated and accurately predicted (Pfeffer, 2003).

As the MNC can be considered an *interorganizational* network consisting of a HQ and locally embedded subsidiaries (Dörrenbächer and Gammelgaard, 2011; Ghoshal and Bartlett, 1990), RDT is helpful in understanding relationships within the organization (Herbert, 1984). The local environment provides the focal subunit with strategic resources (Andersson et al., 2007; Forsgren et al., 1999; Nohria and Ghoshal, 1997) that are transferred back to the MNC where they are leveraged to build distinct capabilities to best compete (Bartlett & Ghoshal, 1989; Birkinshaw & Hood, 1998; Doz and Prahalad, 1984). This is consistent with the notion that an MNC's competitive advantage is likely to stem from intangible firm-specific knowledge that is value-adding (Dörrenbächer and Gammelgaard, 2006; Spender, 1996). With HQs facing *inherent* problems in linking to subsidiary local business environments, a subsidiary's *exclusive* linkage to its external environment is a source of power that is, in fact, considered rather sustainable (Dörrenbächer and Gammelgaard, 2011).

In the view of RDT, organizational survival depends critically on an accurate *assessment* of the environment in which the organization operates. However, the theory also holds that organizations face complexity emanating from the conflicting and impinging demands of its manifold relationships in the external environment. As such, these assessments can become distorted because managers interpret the environment as a function of their past experiences and this may lead to *systemic* bias in their assessments due to limited cognitive abilities (Pfeffer and Salancik, 1978). One of the strategies put forth in the theory, as a means

for dealing with the conflicting demands of an external environment, was for an organization to *absorb* external constraints by altering its boundaries since *diversification* buffers against environmental uncertainty (Wry et al., 2013).¹

Knight's inquiry was into the 'problem of profit'; specifically, why profits existed when economic theory says that competition should preclude them. For Knight, the key was in the fine distinction between situational hazards of Risk and Uncertainty, and how each hazard affected the technique of business organization, that is, combining a sufficient number of cases such that the potential hazard will be borne in groups large enough to be reduced to substantially negligible proportions (Knight, 1921). It is precisely in situations of *risk* where there exists a substantial number of similar cases such that they can be grouped whereby the outcomes become predictable in a manner consistent with the laws of chance, and any error ascribed to the prediction approaches zero as the number of cases increases. This is the principle of insurance.

By contrast, in situations of *uncertainty*, there is not a sufficient number of similar cases such that one could obtain a *valid* probability distribution of their outcome, and so this situation of uncertainty is not susceptible to elimination through the principle of insurance, that is, diversification (Knight, 1921). Business decisions are largely made under such uncertain circumstances (Knight, 1921) because changes from the variable external environment (Hannan and Freeman, 1977, 1984; Haveman, 1992; Oliver, 1991) often bring about situations that are all too unique for determining valid probabilities. The presence of uncertainty necessitates the need to act on *opinion* rather than on knowledge, subjecting individuals to the liability of erring in an unknowable fashion.

Thus, in situations of risk, errors in estimates tend to zero, whereas in situations of uncertainty the errors are unknowable. Nonetheless, the opportunity for economic actors (e.g.

¹ Absorption of risks through diversification is a central feature of paper 3

firms) to deal with uncertainty through grouping constitutes a strong incentive to extend the *scale* of operations of a business establishment (Knight, 1921). In doing so, one extends the scope of their exercise in judgment over a greater number of decisions or estimates, and the chances rise that accurate estimates will, in aggregate, neutralize bad estimates; this provides for a degree of constancy and dependability in the overall outcome. In fact, the superiority of the *corporation* over other organizational forms is partly in its wide scope of operations that encompass a larger number of individual decisions. This, in essence, is the process of diversification.

Therefore, both RDT and Knight's theory of profit propose diversification as a strategy for dealing with uncertainty, and both theories recognize the limitations of *diversification* in dealing with uncertainty as largely a question of limited cognitive ability. In other words, the extent of a firm's success in dealing with uncertainty will depend on the extent to which its assessments/estimates of the environment are correct. This dissertation thus employs both theories to provide insight into the ramifications for cognitively-constrained organizations using resources to deal with uncertainty.

In the first paper, the ramifications are subsidiary power decline. In the second paper, the ramifications are a subsidiary's diminished interest in internal power dynamics because of increased interest in external power dynamics. In the third paper, the ramifications are that firms, and specifically investors, are punished for assuming risk (i.e. not diversifying idiosyncrasies) but are rewarded for assuming the resulting uncertainty stemming from diversification across the wider market, which is non-diversifiable. Furthermore, each paper tackles the limitation of diversification as a function of limited cognitive ability. In the first paper, it is presented as knowledge-based factors: causal ambiguity, absorptive capacity, and arduous relationships. In the second paper, it is modeled as risk aversion, which is equal to the

inverse of the constraint on information flow. In the third paper, it is presented as the inability to always classify instances of sufficient homogeneity and frequency.

First Paper

Owed to a lack of a sustained program of theory development in the RDT tradition (Wry et al., 2013), the literature has left the theory open to one particularly unsavory prediction: a subunit can *infinitely* increase its power by simply continuing to embed in the local environment. This particularly vulnerable prediction is not, however, consistent with RDT's core tenets. Nevertheless, it is not surprising considering subsidiary decline is little researched (Birkinshaw and Hood, 1998), and even less researched is subsidiary power decline (Ambos et al., 2011), with the extant literature rather focusing on how a subsidiary *gains* power.

This paper's conceptualization provides a more complete picture of MNC power dynamics that has been missing in the literature. In a similar line of argumentation used in the theory's explanation of a rise in subsidiary power, the paper employs RDT's core tenets to explain how subsidiary power can decline within the MNC. The argument is that, as a subsidiary continues to embed externally, the strategic resources it develops, and transfers back to the MNC, become increasingly idiosyncratic. While this idiosyncrasy will initially provide the MNC a competitive advantage, and thus drive the subunit's influence within the MNC, there are factors of this idiosyncrasy that force the boundaries of its management's cognitive ability to become increasingly salient. Specifically, complexity-driven factors such as causal ambiguity, absorptive capacity and arduous relationships make the locally-gained knowledge less and less transferable to the MNC. In essence, there is a threshold of knowledge idiosyncrasy, at a given level of external embeddedness, beyond which knowledge transfers and, subsequently, subunit influence decline. This paper's contribution is necessary because 1) the literature has largely avoided focus on subsidiary decline and 2) because there has been a research-exodus from RDT that has left the theory open to a vulnerable prediction. This

conceptual paper will synthesize the literatures on RDT, embeddedness and sticky knowledge transfer to offer a more reasonable prediction of RDT, a prediction that is also a topic little-researched in the management literature: subsidiary decline.

Second Paper

The second paper picks up from an intriguing phenomenon left unanswered in the first paper: a subsidiary's waning interest in transferring critical knowledge back to the MNC, a source of its power. Indeed, empirical research has shown knowledge development and knowledge transfer to have an inverted U-shaped relationship (e.g. Mudambi et al., 2014b; Song and Shin, 2008). Thus, since RDT regards critical knowledge transfer to the MNC as the impetus to subsidiary influence within the MNC, it would defy the core arguments of RDT for a subsidiary to allow its knowledge transfers to the MNC to be impeded. Such inconsistencies have, over the years, contributed to the marginalization of RDT within the management literature (Casciaro & Piskorski, 2005; Wry et al., 2013). However, rather than the inconsistencies pointing to a flaw in RDT's tenets, paper 2 argues that they point to a flaw in the literature's approach to the theory.

Paper 2 ponders the question "well, if the focal subunit is not interested in maximizing knowledge transfer to the MNC, then what exactly is it interested in maximizing?". In this paper, the key to the phenomenon is that the subsidiary is still indeed interested in maximizing power, just not internal power. As such, the paper takes a more holistic approach in conceptualizing subsidiary power, one that parses it into internal and external power since there is no reason to believe that RDT was meant to be applied non-holistically, with researchers haphazardly discarding certain relations, as sources of power, based on whether they originate in the internal or external network. The subsidiary also has relations outside the MNC, and these relations are sources of idiosyncratic competencies for the subunit. They provide the subunit with *alternatives* to the resources beyond the HQ's fiat reach. That is because resources from

the subunit's local environment are much harder for the HQ to exercise hierarchical power over, and are thus sustainable sources of bargaining power for the subsidiary (Mudambi et al. 2014a). Therefore, it is entirely plausible to postulate that, as a subunit externally embeds, its external relations become increasingly important for it relative to its internal relations. Therefore, the subunit would naturally begin to focus more on power dynamics in those external relations at the expense of the power dynamics within the MNC.

Third paper

In Knight's classic 1921 work, he argued that there was a fatal ambiguity in the terms *uncertainty* and *risk* which must be gotten rid of, and that the use of the term *risk* in connection with the *measurable* probabilities of insurance gave some justification for specializing *risk* as objectively measurable and [true] *uncertainty* as subjectively measurable. However, in much of today's literature, whether in Management, Economics or Finance, there is almost never a distinction made between risk and uncertainty. Klein (2005) pointed out that the literature on the theory of the firm rarely makes a distinction between uncertainty and risk, and uses crude measures of the former such as 'variation of sales.' However, variation (i.e. the standard deviation) of any return to firm is a standard measure of risk, not uncertainty; and uncertainty has been long identified as a construct that is difficult to capture (Downey & Slocum, 1975).

The CAPM model provides an opportunity to capture the elusive construct of uncertainty. That is because the model is built entirely on the notion of a certain type of return - beta - that is earned *above* the risk-free rate. This juxtaposition of a beta return relative to a riskless return is crucial to the arguments of the third paper. Specifically, a risk-free return is theoretically zero, and the only return an investor can expect to have is beta, which is a return tied to the market, from which one cannot diversify away. This is parallel to Knight's argument that risk cannot lead to a return whereas uncertainty would because the principle of insurance (i.e. diversification) cannot guarantee its elimination. Further complementing the CAPM model

is Information Theory, which employs the notion of Entropy to measure uncertainty. The beta and the entropy equations both feature the correlation coefficient, and when this coefficient goes to zero, both equations will equal zero (i.e. no uncertainty). Thus, it can be reasonably argued that beta well proxies the construct of uncertainty, whereas standard deviation of stock returns can be used as a measure of risk, as it traditionally is used in Finance. In operationalizing the constructs of *risk* and *uncertainty*, this paper will gage the extent and fashion of their influence on profits (measured by ROA and ROE). Should there be a distinction in their effects, it would lend credence to the argument, originally put forth by Frank Knight in 1921, that there is a need for all literatures to clearly distinguish between risk and uncertainty since they compensate differently for assuming them.

The rest of this dissertation will be dedicated to the three papers and a detailed conclusion. In the conclusion section, the main arguments and ramifications of each dissertation paper will be recapped, and an overview and holistic synthesis of resource dependence theory and the theory of profit will be offered.

CHAPTER 2: SUBSIDIARY POWER DECLINE—THE TRADEOFFS BETWEEN INTERNAL AND EXTERNAL EMBEDDEDNESS

ABSTRACT

One critical omission in Resource Dependence Theory is a *clear* limitation on the power attainable from within relationships of economic exchange. As such, the theory is subject to acute criticism that power can accrue infinitely to an entity that simply continues to embed. In this conceptual paper, we argue that, as the subsidiary continues to externally embed, the problems associated with sticky knowledge transfer become increasingly exacerbated up until a critical threshold of external embeddedness beyond which knowledge transfer from the focal subunit to the MNC begins to decline and, with it, its influence within the MNC. This paper rekindles the little-researched topic of subsidiary decline by synthesizing the literature on RDT, embeddedness and sticky knowledge transfer. The paper also brings to light the intriguing phenomenon of subsidiary waning interest in critical knowledge transfer to the MNC.

Keywords: Resource Dependence Theory, HQ–subsidiary relationships, Subsidiary embeddedness, Knowledge transfer, Resource allocation, Intraorganizational power

Introduction

A Multinational Corporation (MNC) consists of a group of geographically dispersed and goal-disparate organizations that includes its Headquarters (HQ) and different national subsidiaries (Ghoshal and Bartlett, 1990; Nohria and Ghoshal, 1994). Thus, the MNC itself can be conceptualized as an interorganizational network¹ that is embedded in an external network which includes suppliers, customers, regulators, and competitors; and the structures of these relational networks can be, and often are, very different (Westney, 1989). At the same time, the consideration of the MNC as an interorganizational network² has been grounds for applying resource dependence theory (RDT) in understanding relationships within the organization (Herbert, 1984). RDT is based on the idea that, within an exchange relationship, whoever controls critical and scarce resources, on which others depend, will increase their own power (Doz and Prahalad, 1981). Nevertheless, and owed to a lack of a sustained program of theory development in the RDT tradition (Wry et al., 2013), the literature has left the theory open to one particularly unsavory prediction: a subunit can infinitely increase its power by simply continuing to embed in the local environment.

Relations that the focal subunit develops with local actors in the external network (also known as the local environment) become sources of idiosyncratic strategic resources (Andersson et al., 2007; Forsgren et al., 1999; Ghoshal and Bartlett, 1997). Such resources are transferred back to the MNC where they are leveraged to build distinct capabilities to best compete (Bartlett & Ghoshal, 1989; Birkinshaw & Hood, 1998; Doz and Prahalad, 1984).³ As the subsidiary transfers back these locally-gained idiosyncratic resources, the MNC subsequently becomes dependent on

¹ This is the federative view of the MNC (Kogut, 1983; Provan, 1983). That is, it is important to remember that much of the literature considers even relationships *within* an MNC to be interorganizational. This is the view of this paper.

² Consisting of a HQ and externally embedded subunits, where interdependencies arise among subunits as well as between subunits and the HQ.

³ Consistent with the notion that an MNC's competitive advantage is likely to stem from intangible firm-specific knowledge that is value-adding (Dörrenbächer and Gammelgaard, 2006; Spender, 1996).

the focal subunit for the aforementioned critical resources, rendering the subsidiary powerful within the MNC (Andersson et al., 2002, 2007), because the governance of knowledge transfer is a lever of power (Mudambi and Navarra, 2004; Mudambi et al., 2014b).

However, a subsidiary's relationships with local actors become *increasingly* idiosyncratic, or context-specific (Andersson and Forsgren, 1996; Lane and Lubatkin, 1998; Tavani et al. 2014). Indeed, the literature is abound with arguments that it is difficult to transfer idiosyncratic or tacit knowledge from one unit to another (Andersson et al., 2002; Hansen 1999; Jensen and Meckling, 1992; Spender, 1996; Szulanski, 1996; Zander and Kogut, 1995). Thus, if RDT tells us that the transfer of [critical] knowledge explains a subsidiary's rise in power within the MNC, then it would also follow from RDT that impairments (stickiness) to its transfer can similarly explain a subsidiary's decline in power. Thus, this paper's core argument is in fact that the seeds of a subsidiary's power decline are sown into its ascendancy.

Indeed, subsidiary decline is little researched (Birkinshaw and Hood, 1998), and even less researched is the decline in subsidiary power (Ambos et al., 2011), with the extant literature rather focusing on how a subsidiary *gains* power. Without adequately understanding subsidiary decline, the literature has allowed itself an incomplete understanding of interorganizational relationships and exposed RDT to undue criticism. Therefore, in order to contribute to a more comprehensive and sustainable understanding of interorganizational relationships, the following research question is proposed: *how does resource dependence theory explain not only a subsidiary's rise in power within an MNC but also its decline?*

We argue that as the subsidiary becomes more embedded in the external environment, the problems associated with sticky knowledge transfer become increasingly exacerbated until a certain threshold of subsidiary external embeddedness, beyond which knowledge transfer from the

focal subunit to the MNC is overwhelmed and begins to wane. The empirical findings of more recent literature (e.g. Mudambi et al., 2014b; Song and Shin, 2008), of the existence of a critical threshold of knowledge development beyond which knowledge transfer between the MNC and focal subunit declines, support and drive the argument of this paper. Subsequently, as this paper theoretically argues, the MNC necessarily becomes less dependent on the focal subunit for its competitive advantage and thus, as per RDT, the focal subunit's influence within the MNC would subsequently decline. This theoretical line of reasoning is consistent with the argument of the paradoxical effect of external embeddedness raised in Andersson et al. (2007), and contributes to a more complete view of RDT that precludes the *fatal criticism* that the theory predicts a single all-powerful subunit or firm.

The remainder of this paper is structured as follows. First, we position the paper within the context of resource dependence theory, taking the view of the MNC as an interorganizational network, itself embedded in an external network stocked with critical resources which allow for the possibility of subsidiary intrafirm power. Second, we examine this rise of subsidiary power within the MNC, a notion well-grounded in theoretical arguments and empirical findings. Third, we employ the core arguments of RDT to argue that the theory predicts, in a similar fashion to the chain-of-logic related to its rise, a decline in subsidiary power beyond a critical threshold of external embeddedness. Finally, there is a well-rounded discussion of this paper's conceptualization as well as a delineation of a promising future research direction.

The Federative MNC, External Network Resources, and Power

The external network, which contains a stock of economic, social and cultural capital, provides a platform of exchange between all actors, and this platform is a *source* of subsidiary intrafirm power (Andersson et al., 2007), allowing a subsidiary to move from a subordinate

position to one of leadership (Birkinshaw and Hood, 1998). As a result, the traditional hierarchical view of the MNC, which confers upon subsidiaries little ‘ownership’ of decision-making rights, becomes weaker. The MNC thus came to be viewed as federative, a network system of a HQ and differentiated subsidiaries⁴ (Birkinshaw, 1997; Nohria and Ghoshal, 1994).

As a system of differentiated units, [federative] MNCs often behave like *markets* in the sense that there is competition for power within the MNC (Andersson et al., 2007; Galunic and Eisenhardt, 1996), and this power is a property of social relations rather than an attribute of a particular actor (Emerson, 1962). The locus of power within an exchange relationship can be found with those who control *critical*⁵ resources necessary for the survival (success) of others.⁶ Since power and dependence are obverse of one another (Wry et al., 2013), power explains behavior (Pfeffer and Salancik, 1978) in that actors seek to control resources on which others depend, because dependency engenders uncertainty⁷. This is consistent with the findings of Katila, Rosenberger, and Eisenhardt (2008) showing a tradeoff between access to resources and the potential of being taken advantage of. Thus, it pays to control critical resources, and subsidiaries that do so alter the landscape of power dynamics in the [federative] MNC. Mudambi et al. (2014a) argue that superior subsidiary resources allow the MNC to cope with threats and capitalize on opportunities in the external environment, meaning that the MNC’s geographically-disparate subsidiaries are *differentially critical* in dealing with crucial problems stemming from the external environment (Pfeffer and Salancik, 1978). In fact, the MNC’s survival depends *disproportionately* on subsidiaries having embedded themselves in important locations that confer a significant

⁴Where some subsidiaries continue to function in the traditional competence *exploiting* role while others are competence *creating* (Cantwell and Mudambi, 2005).

⁵“Critical” in this instance measures the extent to which an organization is able to operate in the absence of the resource or in the absence of the market for the output (Pfeffer and Salancik, 1978).

⁶ The skilled process of leveraging resources is called *knowledge* (Spender, 1996), where one subunit is affected by the *experience* of another (Argote and Ingram 2000; Szulanski, 1996). The literature has employed a diverse set of terminology to refer to knowledge: competencies, capabilities, routines, innovations (Argote and Ingram, 2000).

⁷ Uncertainty is the degree to which future states of the world cannot be anticipated and accurately predicted (Pfeffer and Salancik, 1978).

competitive advantage upon the MNC (Forsgren, Holm, & Johanson, 1995). As such, control of critical resources allows a subsidiary the bargaining power necessary to influence resource allocation and overall MNC strategic direction (Pfeffer and Salancik, 1978; Salancik and Pfeffer, 1977).

The concept of power, or influence, is however one involving endless disputes between researchers (Andersson et al., 2007). This paper defines power consistent with most of the research viewing MNCs as an interorganizational network, that is, power is conceptualized as the ability to overcome resistance from others, including sister subunits and the HQ, to achieve desired results. In other words, power means decision making will be operative (Jensen and Meckling, 1992).⁸

Within the federative MNC the HQ is but one player among others involved in a bargaining process (Mudambi and Navarra, 2004), and in order to accurately understand the MNC power structure, it is imperative to account for power bases other than the HQ's formal authority (Andersson et al., 2007). In fact, studies have shown that an HQ is often unable to capitalize on this formal authority (Bartlett, 2002; Barzel, 1997; Mudambi, 2011; O'Donnell, 2000), since HQ *fiat power* in MNCs is not absolute (Andersson et al., 2007; Hedlund, 1980; Hedlund, 1986; Forsgren, 1989; Ghoshal and Bartlett, 1990; Doz and Prahalad, 1993; Ferner and Edwards, 1995; Kristensen and Zeitlin, 2001; Morgan and Whitley, 2003; Mudambi and Navarro, 2004). For example, the North American subsidiary of Philips wielded great power that the HQ was unable to contain (Bartlett, 2002), allowing it to source technology from a competitor rather than from its Dutch HQ. Datakom's Swedish subsidiary also sold its competitor's technology rather than that which its Turkish parent company produced (Bouquet and Birkinshaw, 2008). Thus, studies uniquely modeling HQ fiat power to explain subsidiary control within MNCs face limitations that

⁸ There is indeed a rich literature that has delved into various forms of power (see Bouquet and Birkinshaw, 2008; Dörrenbächer and Gammelgaard 2011), but it is beyond the scope of this paper to dig into the nuances.

could be addressed by recognizing the distinction between ownership rights and property rights (Mudambi et al., 2014a). A HQ's fiat power stems from ownership rights, where intrafirm relationships are hierarchical and subsidiary decision rights are *loaned out* at the discretion of the HQ, and such decision rights can be revoked at any time. In contrast to ownership rights, property rights are concerned with the source of control, in which the owner cannot prevent the non-owner from using the resources that form the basis of its power.

Therefore, since this paper is concerned with resources that form the basis of subsidiary power, it is beyond its scope to consider subsidiary resources over which the HQ can easily enforce its ownership rights since these particular resources are unlikely, as far as the subsidiary is concerned, to be leverageable for power (Ciabuschi, Dellestrand, & Kappen, 2012). Such resources, which would include property, plant and equipment (PPE) and financial assets, would thus not form the basis of subsidiary power (Mudambi et al. 2014a). However, intangible assets, which form some of the MNC's most valuable assets, such as technological or business-related knowledge would make HQ enforcement of ownership difficult because their nature renders their imitation near impossible. Intangible assets also account for about 70-80% of US market value (Sampath et al., 2016). As such, this paper is concerned with the knowledge transfer of idiosyncratic resources that are value-adding, rare, inimitable and non-substitutable (Barney, 1991). We will revisit the notion of resources and power in the discussion section of the paper.

Resource Dependence and the Rise of Subsidiary Power

Evolution of the Subsidiary

The external network itself can be seen as a strategic resource (Dyer and Singh, 1998; Tavani et al., 2014), and one that affects a subsidiary's capabilities (Andersson et al., 2002). This conceptualization of a subsidiary becoming interconnected with an external network, gaining

access to critical resources and thus increasing its power within the MNC is consistent with the notion of a *subsidiary* evolution (Amit and Schoemaker, 1993; Birkinshaw and Hood, 1998; Dörrenbächer and Gammelgaard, 2006). Birkinshaw and Hood (1998) define subsidiary evolution as being ‘the process of accumulation or depletion of resources/capabilities in the subsidiary over time’, consistent with Prahalad and Doz (1981). Subsidiaries were initially regarded as having the role of adapting an MNC’s technology to local preferences and then gaging world demand for it, where advantages were developed at HQ and then leveraged overseas through foreign subsidiaries (Birkinshaw and Hood, 1998). This is also referred to as ‘home-base exploiting’ (Kuemmerle, 1999). However, vital links with customers and suppliers meant that subsidiaries develop their own unique capabilities, and can thus pursue local opportunities, and even leverage them within the MNC as well as globally.⁹ Furthermore, Uzzi (1997) argued that embeddedness procures benefits for organizations such as economies of time (quickly capitalizing on market opportunities), integrative agreements, Pareto improvements, allocative efficiency, and adaptation. Thus, what began as import-substituting units gradually transformed into competence-creating units that are internationally integrated (Cantwell and Mudambi, 2005). Modeling the MNC as an interorganizational network with subunits embedded in an *external network* allows for the incorporation of the reality that a subsidiary can move from a subordinate position, to one of equality or leadership with the HQ (Birkinshaw and Hood, 1998).

Developing Idiosyncratic Knowledge

Embeddedness is generally recognized as having two dimensions: relational and structural. Relational embeddedness involves direct relationships with network participants, from whom the subsidiary learns. The extent of a subsidiary’s embeddedness is positively correlated with a

⁹ It should be noted that the literature has recognized that there are countries that are fundamentally strategic and therefore influence firm decisions, and countries that are peripheral (Prahalad and Doz, 1981).

subsidiary being able to not only identify new technologies but also *developing* them with partners (Andersson et al., 2007) in relationships that develop over time and become based on *adaptation* (Larson, 1992; Uzzi, 1997). The more strongly linked the ties, the more the parties are capable of identifying, adapting and exchanging information (Lane and Lubatkin, 1998; Mowery et al., 1996). Through mutual commitment and dependence, relational embeddedness is conducive to value-creation (Holm et al., 1999). Firms make specific commitments that are unique to their relationship and so mutually adapt the activities of the other to varying degrees (Nell and Andersson, 2012), becoming increasingly exchange-specific and, with that, difficult to imitate or substitute (Andersson and Forsgren, 1996).

More specifically, through these relationships within the external network, a subsidiary can develop their capabilities through business and technical embeddedness (Andersson et al., 2002). In fact, Mudambi et al. (2014a) show that technological and business-related knowledge are resources over which it is particularly difficult for the HQ to exercise their ownership rights, and therefore such resources can and are leveraged by subsidiaries to gain power. Deeper business relationships allow a subsidiary to better understand a changing business environment and adapt its practices accordingly. Similarly, higher technical embeddedness confers upon the subsidiary a greater capacity to absorb new technology and, as such, is critical to its competency development. As more information is exchanged through interactions, the possibility of value creation and innovation increases (Hakansson and Snehota 1995; Tsai and Ghoshal, 1998). Both closer business relationships and higher technical interdependencies with its external network raise the levels of unique competencies within the subsidiary that includes knowledge of specific skills or preferences of individuals, the intricacies of specific machines, knowledge of particular idle resources or inventories, and knowledge of arbitrage opportunities (Jensen and Meckling, 1992).

Knowledge Transfer, becoming critical, and gaining influence within the MNC

In contrast to relational embeddedness, structural embeddedness is concerned with the system of relationships within the network, where it is not information exchange that matters but rather the centrality of the subsidiary within the network. When the focal subunit transfers back to the MNC locally-gained critical competencies, it comes to occupy a central position within the MNC (Ghoshal and Bartlett, 1990). It can be argued that transferring knowledge diminishes the subsidiary's power since it would lose exclusive control over the knowledge assets once they are made available to the MNC. However, Mudambi et al. (2014b) argue that in a *dynamic context*, in which subsidiary and the MNC are involved in a lengthy relationship with repeated dealings, it is also justified to assume that subsidiaries gain power by continuously transferring their knowledge (Foss and Pedersen, 2002), while maintaining the threat of cutting off the flow.¹⁰ The importance of being a source of resource flow to the MNC is illustrated in the case of Canon. Canon HQ wanted its subunit Cannon Research Europe (CRE) to transfer knowledge in standardized form, but CRE went in a different direction, maintaining a process linkage where it would instead “carry over” the knowledge (Asakawa, 2001). The subunit remained a crucial link (process linkage) rather than simply stocking (output linkage) the MNC with knowledge.

Remaining a process linkage is crucial for the subunit since knowledge should be viewed as the *process* of leveraging resources that are embedded within the local environment and the focal unit (Penrose, 1959), and these resources, in the form of technologies, talent or specialized information on local developments, imply strategic ramifications for the entire firm as a whole (Bouquet and Birkinshaw, 2008). As the focal subunit provides such resources to the MNC, the dependence of sister units on the focal subunit grows, increasing the focal subunit's criticality to

¹⁰ The importance of the flow of resources is also emphasized in Freeman (1979)

the MNC as it becomes a main source of competitive advantage for the MNC (Argote and Ingram, 2000; Ghoshal and Nohria, 1989; Nell and Andersson, 2011; Szulanski, 1996; Tavani et al., 2014). As a source of MNC competitive advantage, the focal subsidiary increasingly occupies a critical position within the MNC. Criticality in this sense means that without this knowledge transfer from the focal subunit, the MNC would not be able to survive. One way of looking at the degree of criticality of a subsidiary to the organization as a whole was introduced by Bouquet and Birkinshaw (2008) as the subsidiary's *weight* within an MNC.

However, the subunit's power within an MNC depends on the subsidiary being able to *successfully* transfer back the unique competencies to the MNC (Tavani et al., 2014). The more widely applicable the focal subunit's competencies are within the MNC, the greater its influence over strategic decisions within an MNC (Forsgren and Pedersen, 2000). The local environment is a crucial component of unique knowledge inflows into the MNC, and the greater this knowledge is dispersed and used throughout the organization, the greater the influence of the locally embedded subsidiary (Mudambi and Pedersen 2007).

Sticky Knowledge Transfer and decline in Subsidiary Power

Knowledge Transfer Goal Incongruence within an MNC

Subsidiaries accumulate resources and capabilities that are unique to them which is the result of a unique development path its relations within the local environment confer upon the embedded subsidiary. Thus, the subunit builds an idiosyncratic profile of skills and competencies (Uzzi, 1997). However, the concept of competencies that are "too idiosyncratic" is highly relevant when discussing influence and power within the MNC. This is because it affects the quality of the relationship between the focal subunit and the MNC (or HQ). The quality of the relationship between the HQ and a subsidiary is important for subsidiary and MNC development (Birkinshaw

and Hood, 1998) as well as for subsidiary influence (Andersson et al., 2007; Cook et al., 1983; Mudambi and Navarra, 2004; Yamin and Andersson, 2011). As subsidiary actions are directed at local, as opposed to MNC-wide, objectives (Andersson et al., 2002; Andersson et al., 2007; Mudambi and Navarra, 2004), there certainly exists, within an MNC, a *goal incongruence* with respect to knowledge transfer (Mudambi et al., 2014a). This paper thus argues that this goal incongruence results in the subsidiary becoming more embedded than is optimally necessary to maximize knowledge transfer to the MNC, as it builds ever more idiosyncratic relations with local partners that, in turn, render its knowledge development increasingly non-transferable, a phenomenon known as sticky-knowledge transfer.

Tacit Knowledge

One of the most frequently cited sources of knowledge stickiness is *tacitness* (Andersson et al., 2015), which is a main attribute of knowledge with respect to its transferability (Grant, 1996; Szulanski, 1996), rendering transfer both within and across different organizations increasingly difficult because the knowledge is derived from either unique local competencies or from a firm-specific network (Cantwell and Santangelo, 1999). The difficulty in the transfer of tacit knowledge is owed to its complexity, and the level of complexity in a set of knowledge is, in turn, a function of the level of its codification¹¹ (Kogut and Zander, 1992; Zander and Kogut, 1995) as well as its interdependent components (Hansen, 1999; Teece, 1986; Winter, 1987).¹²

Evidence from the literature has shown sticky knowledge transfer as arising from mainly two reasons: motivational and knowledge-based factors (Andersson et al., 2015; Grant, 1996;

¹¹ Knowledge that is well coded is knowledge that is alienable to whomever created it (Kogut and Zander, 1992). Codification is a set of rules or procedures to communicate the knowledge (Hansen, 1999; Kogut and Zander, 1992). If codification of tacit knowledge is not possible, then its transfer is slow, costly and uncertain (Grant, 1996; Kogut and Zander, 1992).

¹² Polanyi's (1966) notion of tacit knowledge, underlied by problems communicating skills, is an idea akin to complex knowledge (Kogut and Zander, 1992).

Szulanski, 1996). Specifically, there may be an unwillingness to receive or transfer the knowledge, or there might be a hindering of the transfer due to the nature of the knowledge itself.

Motivational Factors

A sender's willingness to send tacit knowledge hinges on the extent of the knowledge's *appropriability*, or a return equal to the value it creates (Grant, 1996). Subunits with greater competencies may be less willing to share knowledge (Mudambi et al., 2014b). This is exacerbated with subunits in competitive or substitutive configurations who would compete for resources as they view one another as rivals (Andersson et al., 2015; Birkinshaw and Hood, 1998; Galunic and Eisenhardt, 1996) and would thus be less motivated to share resources. The sending-subunit may also deem such a transfer to be too resource and time-consuming (Szulanski, 1996).

On the other hand, knowledge transfer can be hindered due to the unwillingness of the recipient entity to welcome such a transfer, in which case it would resist the transfer. This may be related to trust, reliability, or the influence the sender-unit would subsequently have over the receiving unit (Szulanski, 1996). A recipient unit may have the NIH 'not invented here' syndrome (Hayes and Clark, 1985), and may procrastinate, sabotage or simply reject the transfer (Szulanski, 1996). One well known acute case of NIH is that which existed between Canon and its European subunit CRE (Asakawa, 2001). Another example is of German companies, which have also shown a potent bias to "German engineering" that has hindered their ability to absorb promising external R&D solutions (Lüttgens, Antons, Pollok, & Piller, 2014). Similarly, Apple's managers, in the 1990s, rejected good external ideas because they were suspicious of strong external ideas (Burrows, 2000).

Knowledge-based Factors (Causal Ambiguity, Absorptive Capacity, Arduous Relationship)

The inherent nature of the knowledge itself can be a barrier to its transfer. The nature of knowledge is tied to its tacitness and complexity (Tavani et al., 2014). The more tacit the knowledge, the greater the causal ambiguity surrounding the knowledge. With causal ambiguity, it becomes difficult or impossible to recreate the knowledge because it is not understood (Szulanski, 1996); and a lack of understanding is a sufficient condition of uncertainty (Argyres, 1995).

Knowledge transfer is also dependent on the recipient's ability to add new knowledge to existing knowledge (Cohen and Levinthal, 1990; Grant, 1996). The receiving unit may simply lack the capacity to receive and integrate the incoming knowledge into their operations. An MNC's ability to recognize new external information, assimilate it, and commercially apply it, is crucial to the development of its capabilities, and is deemed the *firm's* absorptive capacity (Cohen and Levinthal, 1990). Absorptive capacity is viewed as a source of an MNC's competitive advantage (Song and Shin, 2008), and although it can be directly enhanced through technical training of workers, or indirectly through R&D investments, it is however a function of the preexisting stock of knowledge (Szulanski, 1996). The MNC needs *prior relevant* knowledge to integrate new knowledge, since knowledge is cumulative and learning one task may very well facilitate learning a subsequent, related, task. The MNC as a whole must therefore have at least some overlapping shared knowledge, meaning a certain level of additivity between the sets of knowledge must exist. That is because when knowledge structures of an MNC are highly fragmented, the necessity of *shared knowledge* becomes more acute (Cohen and Levinthal, 1990). Two well-known examples of fragmentation issues are Cargill's diverse markets (Bouquet and Birkinshaw, 2008) and General Motors' automation disasters in the 1980s (Argyres, 1995).

Higher tacitness in the focal subunit's competencies could also spell an arduous relationship with its sister subunits (Szulanski, 1996). Due to the complexity in the knowledge gained by the focal subunit, its transfer may become laborious and tedious, especially if the organizational structure is not conducive to facilitated transfers of such knowledge. In addition, capabilities are usually developed at the margin of existing capabilities (Birkinshaw and Hood, 1998), meaning their complexity increases each time, inherently rendering subsequent transfer processes increasingly more complex. As a consequence, the relationship involves a certain level of hardship that makes it less attractive to both parties.

Knowledge transfer increasingly impaired

It is thus entirely plausible that, as the focal subunit externally embeds, motivational and knowledge-based factors- drivers of sticky knowledge transfer- become more acute because the focal subunit's knowledge is becoming more context-specific. Thus, we argue that as subsidiary external embeddedness increases and its competencies consequently become more idiosyncratic, the absorptive capacity of the sister subunits declines, the causal ambiguity of the locally-gained knowledge increases, the relationship between the focal and sister subunits becomes more arduous, and the motivation, of both parties, to engage in knowledge transfer declines. As a result, knowledge transfer is increasingly impaired at higher levels of subsidiary external embeddedness.

Thus, if RDT predicts that increasing [critical] knowledge transfer to the MNC will increase subsidiary power within an MNC, then the theory would also predict that a subsequent decline in knowledge transfer would, for the same reasons, lead to the atrophy of subsidiary power. Indeed, the literature tackling knowledge transfer has empirically shown important curvilinear relationships that pave the way for this paper's central argument: RDT does not predict an infinitely powerful firm because the relationship between external embeddedness and subsidiary

power exhibits a critical threshold of external embeddedness beyond which subsidiary knowledge transfer subsides. Two such empirical findings are in Song and Shin (2008) and Mudambi et al. (2014b).

Song and Shin (2008) find strong empirical evidence that HQ knowledge-seeking is a curvilinear function of existing technological capabilities. The idea is that units are initially setup abroad to acquire and develop competencies that are complementary to those existing in the home country, and so contribute to the MNC's absorptive capacity. However, at some point, the MNC's capabilities develop their own particular technological trajectory such that the MNC becomes less inclined to continue sourcing knowledge from its locally embedded subunit since such path-dependence engenders a misalignment between the capability profiles of the MNC and the knowledge source, that is, the focal subsidiary. Indeed, the core competencies of subunits must be a source of unique knowledge gains for the MNC as a whole (Galunic and Eisenhardt, 1996).

In addition to these findings are those of Mudambi et al. (2014b) who report a curvilinear relationship between subsidiary innovativeness and knowledge transfer to the MNC, where the subsidiary's role in the creation of knowledge is the degree of subsidiary innovativeness. The authors argue that at very low levels of innovativeness, the subsidiary does not have anything to gain from withholding knowledge from the MNC, but as subsidiary innovativeness increases, the benefits of rent-seeking also increase. In addition, at high levels of innovation, the subsidiary is faced with a *resource allocation problem* in which it would need to dedicate scarce resources to knowledge creation, which comes at the expense of dedicating such resources towards transferring the knowledge back to the MNC. Thus, at high levels of innovation, there is a tradeoff between resources for *knowledge generation* within the subsidiary and *knowledge transfer* to the MNC.

This is consistent with the notion that the forces of the social community and rent-seeking coexist (Mudambi, 2011).

Decline in Subsidiary Knowledge Transfer to the MNC

Sticky knowledge transfer means that there would naturally be fewer interactions between the focal subunit and its sister subunits, that is, lower internal embeddedness. The less frequent the focal subunit interacts with its sister subunits (i.e. lower Internal Embeddedness), the more likely the sister subunits will question the focal unit's trustworthiness, reliability and intentions since internal embeddedness fosters mutual adaptation and linkages by way of decreasing motivational and cognitive problems, and increasing willingness and learning capabilities (Lane and Lubatkin, 1998; Tavani et al., 2014). Therefore, as the focal subsidiary further externally embeds, such benefits from internal embeddedness disappear because it interacts less with sister subunits. This is consistent with Uzzi (1997) who listed the three components of embeddedness as being trust, knowledge transfer, and problem solving. Internal embeddedness can considerably augment the ability of a focal subunit to develop knowledge (Lane and Lubatkin, 1998; Provan, 1983; Tavani et al., 2014). Frost (2001) shows that subsidiaries with both, internal and external embeddedness, are better able to develop new knowledge than subsidiaries with only external embeddedness. In addition, although autonomy and local resource procurement (i.e. external embeddedness) are associated with increased innovation, it results in lower adoption and diffusion (Ghoshal and Bartlett, 1988). In some cases, it can even lead to technical isolation because the interactions between the subsidiary and its local partners become too complex and idiosyncratic that they cannot easily be used by sister subunits (Asakawa, 2001; Birkinshaw, 1996; Forsgren, 1997). As the subsidiary's level of external embeddedness continues to grow, its competencies become increasingly idiosyncratic where the knowledge is less and less adaptable to the MNC (Lane and

Lubatkin, 1998; Tavani et al. 2014). This means that the focal subunit's interactions with its sister subunits will decline and, with it, mutual adaptation, a critical ingredient in the success of knowledge transfer (Leonard-Barton, 1988). As such, the relationship between the level of idiosyncratic capabilities of a subunit and knowledge transfer to the MNC exhibits a *critical threshold* beyond which the initial positive relationship is reversed.

Insert Figure 1 about here.

Decline of Subsidiary Criticality to MNC

Indeed, the value of critical resources depends on the continuous interactions that unite actors (Bouquet and Birkinshaw, 2008), and this inverted relationship between subsidiary idiosyncratic capabilities and knowledge transfer has implications far and wide from an RDT perspective. If the transfer of idiosyncratic capabilities augments a subsidiary's criticality to the MNC, then their decline from eventually being becoming too relationship-specific would have the reverse effect. Fewer critical resource transfers back to the MNC results in the focal subsidiary being less critical to the organization as a source of competitive advantage. Barriers to knowledge transfer reduce organizational flexibility (Kogut, 1985; Szulanski 1996), and flexibility is a source of certainty. Therefore, if a subsidiary is no longer able to help an MNC cope with said uncertainty, then it loses its criticality to the MNC. This implies that subsidiary idiosyncratic capabilities and criticality exhibit an inverted U-shaped relationship.

Insert Figure 2 about here.

Decline of Subsidiary Power within the MNC

To the extent that a subsidiary can transfer back, to the MNC, the competencies it developed locally, RDT predicts the subsidiary becoming more critical, more influential and thus more powerful within the MNC (Tavani et al., 2014). However, as its criticality declines due to further external embeddedness beyond the aforementioned critical threshold, we argue that, per RDT, so too does the subsidiary's ability to influence MNC corporate objectives, that is, its power declines. Power, or influence, is dependent on criticality¹³ which is dependent on being able to transfer those unique resources to the MNC in the first place. If a subsidiary is no longer able to transfer critical knowledge back to the MNC because said knowledge has become too relationship-specific, then the subsidiary itself becomes less critical to the MNC, since the MNC would come to depend less on the focal unit for its survival. Therefore, the focal unit's power within the MNC would begin to wane- a prediction consistent with the core tenets of RDT.

Insert Figure 3 about here.

However, it must be emphasized that the driver of power is not external embeddedness per se. Rather it is the transfer of critical knowledge on which the MNC depends for its competitive advantage or dependency management. Andersson et al. (2007)'s findings suggest that high embeddedness of a subsidiary in and of itself is not necessarily important; rather, what is important is the ability of the subsidiary to transfer, back to the MNC, the unique competencies developed as a result of subsidiary external embeddedness. This is consistent with the findings of Tavani et al. (2014). A subsidiary that is able to leverage critical resources from external embeddedness, rather than just simply being externally embedded, is a subsidiary that is able to gain importance

¹³That is, being central within the MNC (structural embeddedness) and possessing unique resources the MNC needs (relational embeddedness).

and subsequently influence within the MNC. A subsidiary must therefore be a provider of unique competencies to the MNC; knowledge transfer is the anchor of subsidiary power.

Discussion

Revisiting the notion of Resources and Power in the Paper

With HQ facing *inherent* problems in linking itself to the subsidiary's local business environments, the subsidiary's *exclusive* linkage to its external environment is a source of power that is, in fact, considered rather sustainable (Dörrenbächer and Gammelgaard, 2011). That is because critical resources are specific to the host country location and/or specific business networks (Rugman and Verbeke, 2001). These location-bound and business network-specific resources are near impossible to imitate, often being a product of socially complex interactions between the subsidiary and its local environment (Barney, 1991), and it is precisely such resources that this paper focuses on: resources that are rare, inimitable, and non-substitutable. Such resources would form the basis of subsidiary power (Salancik and Pfeffer, 1977, 1978).¹⁴

Furthermore, it is necessary to view the subsidiary as a supplier of resource *flow* to the MNC, not as a provider of resource stock, as continuity is highly important (Argyres, 1995; Foss and Pedersen, 2000; Winter, 2017). As an MNC's external environment demands constant adaption and change (Hannan and Freeman, 1977, 1984; Haveman, 1992; Oliver, 1991), it would not suffice, in the long-run, for an MNC to rely on its current stock of resources which are bound to become obsolete (Bouquet and Birkinshaw, 2008). Necessary is a continuity of resources, from the external environment, that provides the MNC with a competitive advantage. The distinction can be boiled down to short-term gains vs long-term survivability. For the latter, it is important to

¹⁴ Though it has been argued that financial control is a critical lever of power, Mudambi and Navarra (2004) showed that subsidiaries with control over *technological* resources (i.e. intangible knowledge) were able to wield greater control over their financial resources than those that did not possess such control.

have a flow of resources, since an MNC's current stock of knowledge is likely to become less relevant as the demands of the environment change over time. In this respect, a forward-looking MNC will always value resource flow over resource stock, consistent with Nelson and Winter's (1982) classic argument that firms are engaged in a *continuous* search and selection process to upgrade knowledge.

Practical Implications

It is certainly a critical balancing act to build local relationships and competencies while at the same time maintaining connectedness to the MNC, and both subsidiary managers and HQ executives need to heed this. Subsidiary managers must be keenly aware of the impact that such a balance has on both subsidiary growth in the local market and on its influence within the MNC. Datakom Sweden presents a good example of a subsidiary striking a good balance by paying enough attention to its external market to capitalize on growth opportunities that its Turkish HQ did not foresee (Bouquet and Birkinshaw, 2008).¹⁵ By contrast, the subsidiary Philips North America did not strike an appropriate balance. The American subunit marketed competitor technology under Philips US brands in defiance of its Dutch parent company. However, Philips North America was unable to build the efficiency and credibility it needed in order to challenge the dominance of the Japanese VCR business (Bartlett & Ghoshal, 2002). As a result, the HQ bought back a majority of the shares to limit the autonomous moves of the North American affiliate. This case represents a clear rise and fall in influence of a subsidiary that went too far in becoming dissimilar to the capability profile of the MNC such that its influence diminished and allowed the HQ to flex its muscle.

¹⁵ Studies have indeed shown that subunits do balance the pressures of local responsiveness and MNC integration (e.g. Banerjee et al., 2018).

For the HQ, striking the right balance is also vital as there is a tendency for HQ to reject even promising and profit-making subsidiary initiatives, the result of the “corporate immune system” (Birkinshaw and Ridderstrale, 1999, Dörrenbächer and Gammelgaard, 2006). Striking the correct balance requires diligent and continuous evaluation of the benefits and costs of these relationships and, where possible, establishing synergies between the focal subunit’s relationships within the internal and external network. For the HQ, on the one hand, its subsidiaries must be sufficiently embedded in the local environment in order to procure unique capabilities to transfer back to the MNC but, on the other hand, must not be so externally embedded that knowledge becomes so relationship-specific that their transfer back to the MNC is no longer feasible. One stark example of fragmented knowledge sharing is General Motors. GM divisions had a go-it-alone approach to procuring technologies, balking at calls for procurement from a fixed partner supplier network. As a result, by 1987 GM was doing business with 100 firms, almost half of which supplied it with 3 systems or less, and such fragmentation played a role in the technology backlash that spread to other tech areas of GM, leading to automation disasters throughout the 1980s (Argyres, 1995). To be sure, the very notion of ‘striking the correct balance’ implies that there are certainly *tradeoffs* between internal and external embeddedness.

Due to such tradeoffs, organizations must have a holistic approach to relationships-external and internal- because both kinds affect the competency development and competitive advantage of the entire organization. By emphasizing the tradeoffs between internal and external embeddedness, this paper contributes to the theory development of RDT, a theory that has been criticized and on the decline over the years (Casciaro & Piskorski, 2005; Pfeffer, 2003; Wry et al., 2013). In order to address this, it becomes necessary to emphasize tradeoffs inherent in RDT. Bonardi (2008) shows the limitations on corporate influence via political action, which is

significant from an RDT perspective since one of the strategies put forth by RDT for managing dependencies was political action since governments are a great source of uncertainty. He finds that while firms can gain political leverage by forging an agreement with policymakers to commit to employee job security (a human resource commitment) as a nonmarket strategy, market strategies may clash with this when the firm needs to consider competitive forces. And since market strategies take precedence over nonmarket strategies, the firm is forced to scale back its commitments to policymakers in order to address competition. As such, the firm would lose clout in the political arena because it must manage dependencies elsewhere (i.e. vis-à-vis competitors), and so corporate influence over political agendas does exhibit a threshold.

Future Research Direction

This paper's theoretical positing rested on the assumptions of the MNC as an interorganizational network, where subsidiaries can become powerful due to their exclusive access to critical resources that become more idiosyncratic to the local environment as it embeds further in it. However, although this paper contributes to a much-needed theory development of RDT, there remains a puzzling aspect not yet addressed in this paper nor in the literature. Specifically, although the key goal for a HQ is maximizing knowledge transfer of these critical resources from the locally embedded focal subunit that would fuel the MNC's competitive advantage, for certain subunits, the key goal seems to be not congruent to that of the HQ. We in fact empirically observe subsidiaries allowing knowledge transfer to decline; indeed, the forces of rent-seeking are greatest in the most innovative subsidiaries (Mudambi et al., 2014b). One promising future stream of research would therefore explore this rent-seeking behavior of the subsidiary that raises an intriguing question: 'why would a subsidiary allow knowledge transfer, a source of its power, to decline in the first place?' This phenomenon of a subsidiary allowing its competencies to become

too idiosyncratic for transfer to the MNC is in direct conflict with the core arguments of RDT, which argues that actors always strive to maximize their power. If knowledge transfer is the source of subsidiary power, then allowing these competencies to become so idiosyncratic, that their transfer to the MNC is no longer possible, defies resource dependence theory.

But then what exactly is the goal of the subsidiary if it is not to maximize knowledge transfer and, by virtue of RDT, its power? As we have not, in detail, tackled this notion within this paper, a promising future research direction would explore under which context this goal incongruence arises. Specifically, the incongruence between the objectives of the focal subunit, which embeds at a point that is suboptimal for knowledge transfer to the MNC, and the objectives of the Headquarters: maximizing knowledge transfers to the MNC from the locally embedded focal subunit. Andersson et al. (2007) identified a subsidiary's waning interest in knowledge transfer to the MNC as a fascinating area for future research. Such a direction in research would certainly enrich our understanding of Headquarters-subunit relations.

Conclusion

This paper's conceptualization provides a more complete picture of MNC power dynamics that has been missing in the literature. We employ RDT to conceptualize how subsidiary power can decline within the MNC, in a similar line of argumentation used in the theory's explanation of a rise in subsidiary power. This contribution is necessary since the literature has largely avoided focus on subsidiary decline and because there has been a sort of research exodus from RDT that has left the theory vulnerable to criticism, chief among them is that it does not predict a limit on firm power. Essentially, this paper synthesizes the literature on sticky knowledge transfer with RDT, linking them through their arguments on internal embeddedness to stave off the association of RDT with a fatal prediction. As sticky knowledge becomes more acute with further external

embeddedness, it reduces interactions among sister subunits, a necessary interaction in RDT for subsidiary power *within* an MNC. Thus, this paper is centrally about the tradeoffs between internal and external embeddedness that exist and, as such, preclude the emergence of a single, all powerful firm in RDT. Furthermore, this paper's conceptualization leaves off with the intriguing question of why a subsidiary would allow its knowledge transfers to the MNC to decline if this is a main source of its power within the MNC. This implies goal incongruences between the subunit and the HQ, and exploring this phenomenon would certainly serve as an exciting and enriching future stream of research.

It is important to note that this conceptualization does not argue that all subsidiaries are beyond the thresholds in the paper's figures (i.e. that all subsidiaries lose power). Rather, the subsidiaries can be anywhere along the curves, which illustrate various possible outcome points, rather than predicted trajectories. In reality we will observe subsidiaries below, around and beyond the threshold, but the argument is that there is some critical threshold of external embeddedness beyond which subsidiary competencies become too context-specific for them to be transferable to the MNC. As a consequence, the MNC ceases to rely on the subsidiary for critical resources, and so the focal subunit's *influence* begins to wane. Little to no attention has been given to subsidiaries to the right of this threshold, and it is important to investigate what is driving subsidiaries beyond this threshold because it raises a perplexing question from an RDT standpoint: If *certain* subsidiaries are not seeking to maximize knowledge transfer to the MNC, and by extension their power within the MNC, then what are they attempting to maximize? More management research is needed on the topic subsidiary decline in order to clarify the drivers of this aforementioned phenomenon. Such research would go a long way in advancing our understanding of interorganizational relationships and subsidiary decision-making.

FIGURES

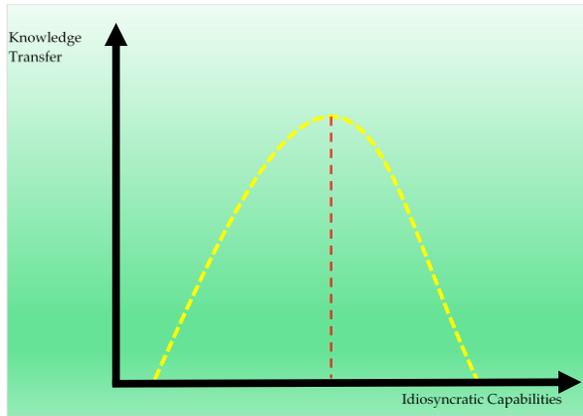


Figure 1

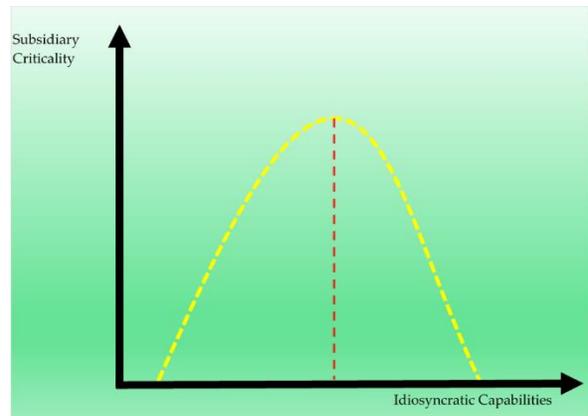


Figure 2

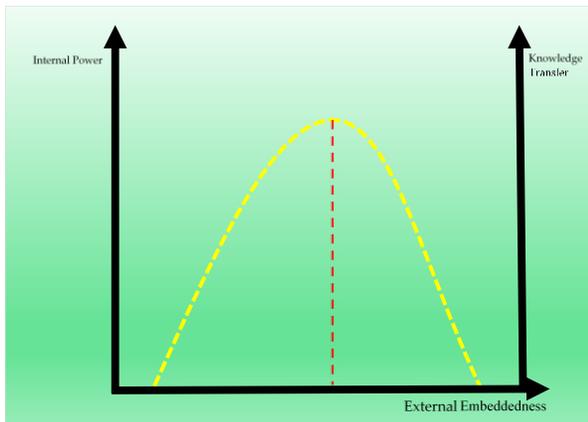


Figure 3

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CHAPTER 3: RESOURCES, UNCERTAINTY AND DEPENDENCE-- A HOLISTIC THEORY ON SUBSIDIARY POWER

ABSTRACT

The management literature has unreasonably debilitated resource dependence theory's explanatory power by haphazardly omitting external relations when exploring subsidiary decision-making and MNC power dynamics, myopically considering subsidiary power as having solely an MNC-internal component. The result is researchers exposing themselves to a fragmentary understanding of what truly drives subsidiary decision-making with respect to its knowledge development and, by extension, to its external embeddedness. In this conceptual paper we present a novel model that parses subsidiary power, into internal and external power, and conceives it in terms of utility. We argue that the subsidiary's total utility is a function of internal power (vis-à-vis the sister subunits) and external power (vis-à-vis local actors), therefore it aims to maximize its *total power*. However, since access to external network resources reduce the subsidiary's inherent uncertainty from dependence on HQ resources, it increasingly places greater importance and focus on power dynamics in external relationships. As such, the subsidiary sacrifices internal power for external power, a welcome tradeoff it can leverage as bargaining power (vis-à-vis the HQ). By contrast, to increase its utility, the HQ seeks to decrease its own bargaining power.

Keywords:

Resource Dependence Theory, HQ–subsidiary relationships, Subsidiary embeddedness, Pareto Rents, Knowledge transfer, Interorganizational power, Decision-making, Organization and Management Theory

Introduction

The relations a focal subunit develops with local actors¹⁶, as it locally embeds, allow it to develop idiosyncratic resources (Andersson, Forsgren, & Holm, 2007; Forsgren, Pedersen, & Foss, 1999) that it transfers back to the Multinational Corporation (MNC) as a source of competitive advantage (Bartlett & Ghoshal, 1989; Birkinshaw & Hood, 1998). This transfer of critical knowledge allows the subsidiary to attain power, or influence, within the MNC (Andersson et al., 2007; Mudambi & Navarra, 2004; Mudambi, Piscitello, & Rabbiosi, 2014b) as the MNC becomes dependent on the focal subunit for its competitive advantage. However, these resources eventually become highly idiosyncratic to the subunit's local relationships as knowledge develops (Andersson & Forsgren, 1996; Asakawa, 2001; Birkinshaw, 1996; Forsgren, 1997).

Indeed, research has shown knowledge development and knowledge transfer to have an inverted U-shaped relationship (i.a Mudambi et al., 2014b; Song and Shin, 2008).¹⁷ However, since RDT regards critical knowledge transfer to the MNC as the impetus to subsidiary influence within the MNC, it would defy the core arguments of RDT for a subsidiary to allow its knowledge transfers to the MNC to be impeded. Such inconsistencies have, over the years, contributed to the marginalization, of RDT within the management literature (Casciaro & Piskorski, 2005; Wry, Cobb, & Aldrich, 2013) but rather than the inconsistencies pointing to a flaw in RDT's tenets, we believe they point to a flaw in the literature's approach to the theory.

To this point, the literature on organizational power dynamics (e.g. Ambos and Schlegelmilch, 2007; Andersson, Forsgren, and Holm, 2002; Forsgren and Pedersen, 2000; Mudambi and Navarro, 2004) has not considered power accrued to a subsidiary in the external

¹⁶ These can be regulators, customers, suppliers, competitors etc. (Bouquet and Birkinshaw, 2008).

¹⁷ These findings corroborate the work done on knowledge transfer impediments (Cohen and Levinthal, 1990; Hansen 1999; Kogut and Zander 1992; Lane and Lubatkin, 1998; Szulanski, 1996; Zander and Kogut, 1995).

network, focusing instead exclusively on subsidiary power accrued within the MNC (internal market). This myopic view of subsidiary power has diluted the explanatory prowess of RDT since it, however inadvertent, inaccurately assumes that power dynamics in external relations do not figure into subsidiary decision-making with respect to degree of embeddedness. There is no reason to believe that RDT was meant to be applied non-holistically, with researchers haphazardly discarding certain relations, as sources of power, based on whether they originate in the internal or external network.

In their influential study, Casciaro and Piskorski (2005) showcased the unrealized explanatory potential of resource dependence theory by parsing the concept of interdependence into power imbalance and mutual dependence. In a similar vein to harness RDT's true potential in explaining interorganizational relationships, we introduce a more holistic approach to conceptualizing subsidiary power, one that parses it into internal and external power, and conceives it in terms of utility.¹⁸ Indeed, research in the RDT tradition has focused on specific empirical motivations rather than pursuing a sustained program of *theory-development* (Wry et al., 2013). Thus, we propose the following research question: *why would a subsidiary decide to externally embed to a point where its resources become too idiosyncratic to be adaptable to the MNC, therefore eroding its own influence within the MNC?*

We argue that, for the subsidiary, power (utility) is derived from *both* the external and internal markets, and that its decision to embed is a function of balancing gains and losses in internal power (vis-à-vis sister subunits) with the gains and losses in external power (vis-à-vis local actors), with the end-goal of maximizing its *total power*, which we conceptualize as total expected utility. For the focal subsidiary *that allows knowledge transfer to decline*¹⁹, we posit that

¹⁸ To be exact, all conceptualizations and figures in this paper represent expected utility as a function of the relevant power an actor accrues.

¹⁹ Important to recall that this paper is only concerned with explaining this phenomenon conceptually.

the gains in power in the external market outweigh the losses in influence in the internal market since the external market provides access to resources over which the HQ does not possess fiat power, a source of inherent uncertainty for the focal subunit.

This paper provides novel and counterintuitive insights into drivers of MNC power dynamics by building a conceptual model that captures the presence of *opposing utility functions* between the focal subunit and HQ, which represent the occurrence of goal incongruences between them. This is profound since, when their respective utilities exhibit opposing preferences, two important things occur within the model: 1) the Pareto optimal set of the focal subsidiary's external embeddedness levels is defined, and 2) the respective sizes of bargaining power of the HQ and the subsidiary are each defined.²⁰

The remainder of the paper is structured as follows. First, we provide a theoretical overview of RDT as well as frame our assumptions. Second, we view goal incongruences through the lens of Pareto optimal outcomes, whereby the HQ and focal subunit exhibit opposing utility functions. Third, HQ and subsidiary bargaining power as well as the necessary conditions for their occurrence are discussed. Fourth, we conceptualize the bargaining process as an optimization problem of each, the subsidiary and the HQ, that reflects a counterintuitive insight. Finally, we wrap up with a well-rounded discussion of our conceptualization, including managerial implications.

Resource dependence theory

RDT states that, within an interorganizational relationship, actors will attempt to increase their relative power over others because they strive to reduce or avoid uncertainty, which is the degree to which future states of the world cannot be anticipated and accurately predicted (Pfeffer and Salancik, 1978). According to the theory, uncertainty stems from dependence on others for

²⁰ This also gives much more substance to the notion of Pareto rents identified in Spender (1996).

critical and scarce resources; and a subunit's reliance on HQ resources represents an *inherent* uncertainty for the focal subunit. This is because the HQ has fiat power, or ownership, over said resources and so the subsidiary stands close to no chance at controlling them.

However, one way for a subsidiary to reduce such uncertainty is to establish unique relationships, within the external network, which permit the development of idiosyncratic competencies the subunit can transfer back to the MNC. As such, the external network itself can be seen as a strategic resource (Dyer and Singh, 1998; Tavani et al., 2014), and one that affects a subsidiary's capabilities (Andersson et al., 2002). Modeling the MNC as an interorganizational network, with subunits embedded in such *external networks*, allows for the incorporation of the reality that a subsidiary can move from a subordinate position to one of equality or leadership with the HQ (Birkinshaw and Hood, 1998).²¹ In other words, the subunit leverages local relations to become powerful within the MNC (Andersson et. al. 2007). Power is a property of social relations rather than an attribute of a particular actor (Emerson, 1962). The more a subsidiary is externally embedded, the less it relies on the resources of the HQ since, through its external relations, it builds idiosyncratic capabilities and gains access to [local] critical resources (Andersson et al., 2007; Tavani et al., 2014). To the extent that these resources are essential to the MNC and for which there are no alternatives, they are indeed critical resources. This subsequently increases the level of dependency, of sister subunits, on the focal subunit, since the latter acts as a gateway between critical resources in the external network and the MNC. Therefore, RDT considers control of such resources to be paramount, since power and dependence (i.e. uncertainty) are obverse of one another (Wry et al., 2013).

²¹ Considering the MNC as an interorganizational network consisting of an HQ and externally embedded subunits, where interdependencies arise among subunits as well as between subunits and the HQ, has been grounds for applying RDT in understanding relationships within the organization (Herbert, 1984).

Although, from the perspective of RDT, the locus of power can be found with those who possess resources that are necessary for the survival (success) of others, it does not however provide a precise identification of these resources (Mudambi et al., 2014a). In this paper we do not consider subsidiary resources that can be acquired from the market without substantial transaction costs (Chang, 1996) or over which the HQ can easily enforce its ownership rights since the subsidiary would unlikely be able to leverage such resources as power (Ciabuschi, Dellestrand, & Kappen, 2012). Such excluded resources would include property, plant and equipment (PPE) and financial assets (Mudambi et al. 2014a). We are instead focused specifically on resources that are rare, inimitable, and non-substitutable (Barney, 1991), that is, critical resources which would form the basis of subsidiary power (Pfeffer and Salancik, 1978).²² Intangible assets, which form some of the MNC's most valuable assets, and account for about 70-80% of US market value (Sampath et al., 2016). That is because their tacitness and complexity, that is, the nature of the knowledge (Tavani et al., 2014), render their imitation near impossible (Mudambi et al., 2014a). The recognition of these resources has since impoverished the traditional hierarchical view and given rise to the possibility of the powerful subsidiary (Bartlett and Ghoshal, 1989; Birkinshaw, 1997; Birkinshaw and Hood, 1998; Ghoshal and Bartlett, 1990; Prahalad and Doz, 1981). In this paper, power is defined in a manner consistent with the research viewing the MNC as an interorganizational network; that is, as the extent to which an actor can overcome resistance from others to achieve desired results (Dahl, 1957). As Jensen and Meckling (1992) put it, power means decision-making will be operative.

²² Though it has been argued that financial control is a critical lever of power, Mudambi and Navarra (2004) showed that subsidiaries with control over *technological* resources (i.e. intangible knowledge) were able to wield greater control over their financial resources than those that did not possess such control.

Lastly, we focus on power-maximization and not profit-maximization for one main reason. There is a great tendency on the part of many researchers to blur the crucial and necessary distinction between decisions of *ends* and decisions of *means*. The only inquiries we as researchers of organizations are ever truly concerned with are inquiries of *means* because ultimately there exists only one *end* to all economic activity, which is already decided on before the business is even founded: to make profits. The decisions made by those within the business organization all strictly pertain to *means*- whether general corporate policy or detailed subsidiary strategy. By contrast, the decisions made with respect to *ends* are all made uniquely by consumers, that is, by individuals entirely outside of the organization.

Oliver Williamson, in his influential 2009 Nobel prize lecture paper, argued that one way to introduce organizational considerations is to change the objective function of the firm by supplanting the neoclassical assumption of profit maximization with various forms of managerial discretion. This is consistent with Palmer et al. (1993) who state that coalitions implement structures that bolster their power vis-à-vis other coalitions, even at the sacrifice of some of their firm's profits, since power is a *precondition* of a claim on profits.²³ Profit-maximization, in our opinion, is a better representation of the utility of shareholders.²⁴ We will revisit the notions of power and profit-maximization in the discussion section of the paper.

Goal Incongruences between the HQ and Subunit

Whereas the subsidiary's actions are directed at local, as opposed to MNC-wide, objectives (Andersson et al., 2002; Andersson et al., 2007; Mudambi and Navarra, 2004), the HQ's actions are focused on ensuring a common strategy and the wide applicability of the knowledge being

²³ One need not look further than the case of Amazon whose entire strategy up until recently has been to hemorrhage cash in order to gain market share.

²⁴ It is also our view that if profit-maximization ultimately represented managers' utility, we would not, in reality, observe the existence of Boards of Directors or HQ monitoring.

transferred back to the MNC by its externally embedded subsidiaries (Andersson, Gaur, and Mudambi, 2015; Tavani et al., 2014). Thus, within an MNC, there is certainly goal incongruence with respect to knowledge transfer (Mudambi et al., 2014a), and as the focal subunit's competencies turn increasingly idiosyncratic due to its relations with the external network becoming more sophisticated, the adaptability of these competencies, to the MNC, decline (Lane and Lubatkin, 1998; Tavani et al., 2014). Therefore, knowledge transfer, on which interdependencies and thus the focal subunit's power hinge, would decline. Allowing adaptability of competencies to decline runs profoundly against the tenets of RDT because knowledge transfer is the basis of the subunit's influence

However, we argue that eventually the power ambitions of the subsidiary grow beyond its internal network; as it becomes more and more locally embedded, the subsidiary begins to shift its *focus* towards its relationships in its local network, essentially placing increasing importance on power dynamics within the external network than within its internal network. Eventually, the subsidiary reaches an initial critical threshold where any *further* increase in external embeddedness results in internal power declining; this point is what we refer to as the *local threshold*, or EE(L) in the forthcoming figures. It is the point at which a subsidiary's internal power is maximized because [critical] knowledge transfer to the MNC is also maximized. However, as the external network aids the subsidiary in reducing inherent uncertainty brought about from dependency on HQ resources, over which the HQ holds fiat power (Bouquet and Birkinshaw, 2008), the focal subunit has every incentive to embed beyond the local threshold. The subsidiary will continue to

externally embed itself up until its *total power* has been maximized; this point is what we refer to as the *global threshold*, or EE(G) in this paper's figures.²⁵

In our model, externally embedding beyond the local threshold represents the emergence of goal incongruences between the focal subunit and the MNC. This incongruence stems from the fact that the subsidiary's total power is maximized at a point of embeddedness that is beyond the level associated with maximum knowledge transfer to the MNC, that is, beyond the point at which the HQ's resource-coordination role, and thus its own utility, is maximized.²⁶

Insert Figure 1 about here.

In figure 1 we model the inverse U-shaped relationship between subsidiary external embeddedness and power, driven by [critical] knowledge transfer in its exchange relationships.²⁷

²⁸ The entire model is fundamentally predicated on contrasting what the literature has thus far exclusively considered (yellow dotted curve of only internal power) with what we argue the subsidiary actually considers when externally embedding (solid black curve of total power). In other words, the yellow dotted curve represents the management literature's non-holistic approach to applying RDT to network relationships. We argue that the subsidiary's relationships, external and internal, must be considered in their *totality* when applying RDT. This means simultaneously considering the internal and external networks as *sources of power* that drive subsidiary decision-making with respect to embeddedness. By parsing subsidiary power into internal and external

²⁵ Formally in this paper's model, these thresholds exist due to *risk aversion* as well as *complexity* of relationships which we discuss later in the paper. These notions are essential to ensure, and consistent with empirical findings, that the subsidiary cannot just simply continue externally embedding and infinitely increase its power.

²⁶ One of the HQ's greatest value-adding roles is the *coordination* of knowledge and activities within an MNC (Provan, 1983).

²⁷ It is important to recall that the model in our figures represents the expected utility.

²⁸ For internal power it would be critical knowledge transfer to sister subunits, for external power it would be to external actors with whom it also has exchange relations. Almost all economic behavior is embedded in complex social relation networks (Granovetter, 1985) where firms make specific commitments unique to their relationship.

power, we are permitting RDT its full explanatory potential with respect to interorganizational relations and subsidiary decision-making.

As this paper seeks to explain the intriguing subsidiary *decision* to allow its knowledge transfer to the MNC to decline, a conceptualization via utility is very useful since decisions are made according to utility (Spender, 1996).²⁹ As such, we can employ Pareto optimality to best capture the goal incongruences in knowledge transfer between the subsidiary and the HQ. Pareto optimality is a state that is achieved when the allocation of resources can no longer be reallocated in way that could make one better off, in terms of utility, without hurting another's utility.

The orange portion of the line in figure 2 represents the Pareto optimal set of subsidiary external embeddedness because, for all levels of subsidiary external embeddedness within this set, no one can improve their utility without harming the other. For example, if the subsidiary's external embeddedness level was anywhere along the orange line and it further externally embedded to increase its total power (seen rising along the total power curve), it would harm the MNC because its locally-developed knowledge is less transferable to the MNC (seen declining in the corresponding level along the yellow-dotted internal power curve). Conversely, the HQ could employ counteractive control measures over the subsidiary, while it was anywhere along the orange line, to reduce its level of external embeddedness. In this instance, the subsidiary's total power would decline as it becomes less externally embedded and, with that, has less access to external resource development. The MNC on the other hand would gain more critical knowledge as the subsidiary's capabilities become more transferable due to less context-specificity in the focal subunit's knowledge development through external relations. In the bottom portion of figure 3, these Pareto rents are depicted in attempts, by the subsidiary, to move in the direction of the blue

²⁹ Our model assumes that the preferences of the HQ and subsidiary are convex to allow for the possibility of a bargaining process to occur. Simply put, this means that actors prefer combinations of inputs to their utility rather than exclusively one input.

arrows (higher external embeddedness) while the HQ tries to push it in the direction of the red arrows (lower external embeddedness) where knowledge transfer would be maximized; the corresponding indifference curves driving these decisions, on the part of both the subsidiary and HQ, are depicted in the upper graph of figure 3 (also in blue and red resp.).

Insert Figure 2 about here.

As seen in the upper portion of figure 3, up until the local threshold, the subsidiary and HQ (and MNC) *both* have utilities increasing in the same direction, consistent with the Pareto improvements in Uzzi (1997).³⁰ Subsequently, between the local and global thresholds, the utilities of each are however increasing in opposing directions, with the subsidiary's utility (blue indifference curves) continuing to increase in external embeddedness, while the HQ's utility (red indifference curves) is now declining in subsidiary external embeddedness. In addition, up until the local threshold, the internal and external markets are complementary sources of power for the subsidiary.^{31 32} However, beyond the local threshold, the power markets become substitutable, implying that there is an amount of one source of power that the subsidiary has to give up in order to increase the amount of the other by one unit. In other words, further subsidiary external embeddedness increases the context-specificity of the knowledge development and lowers its transferability to the MNC, which naturally causes a decline in internal embeddedness.³³

Insert Figure 3 about here.

³⁰ Pareto improvement is where one person is able to increase their utility without making anyone else worse off in terms of their own utility.

³¹ Complementary means an increase in external embeddedness (further knowledge development) leads to an increase in internal embeddedness (i.e. higher interactions with sister subunits) since the focal subunit is, until the local threshold, interested in knowledge transfer to the MNC and internal power. More technically speaking, this is the result of supermodularity.

³² As this procures a competitive advantage for the MNC as a whole, so too is the HQ or MNC's utility, over this area, a function of complementary preferences between internal and external subsidiary embeddedness.

³³ Since the HQ or MNC's utility is a function of subsidiary critical knowledge transfers, this would cause their utility to also exhibit, over this area, substitutable preferences over subsidiary external and internal embeddedness decisions.

Beyond the global threshold, subsidiary external power, and thus its total power, begin to decline. Subsidiaries are also conduits of knowledge for the local environment, passing it on from the MNC (Birkinshaw and Hood, 1998). At very high levels of external embeddedness, the subsidiary would have minimal or trivial contact with sister subunits, and this would harm its new knowledge development (Frost, 2001; Lane and Lubatkin, 1998; Provan, 1983; Tavani et al., 2014; Uzzi, 1997), reducing its influence vis-à-vis local actors. Any point beyond the global threshold is over-embeddedness, the existence of which would run counter to the established argument that over-embeddedness might lead to non-survival (Uzzi, 1997), as well as to corroboratory empirical findings (i.e. Nell and Andersson, 2012; Perri, Andersson, Nell & Santangelo, 2013).

As seen in figure 3, our model allows us to demarcate, in a novel way, an area where the subsidiary and the MNC exhibit opposing preferences. This area defines the Pareto optimal set of subsidiary external embeddedness levels, representing goal incongruences in knowledge transfer between the HQ and the focal subunit. The emergence of goal incongruences triggers a process, conceptualized next, that the management literature has long called the *bargaining process*.

The HQ-Subsidiary Bargaining process

Between the local and global thresholds is the area over which bargaining between the subsidiary and the HQ occurs. The subsidiary wants to be at the global threshold because that is where its power is maximized. However, the HQ, whose role is the optimal deployment of resources and capabilities throughout the MNC, is concerned with knowledge application (Grant, 1996). Therefore, for the HQ, subsidiary embeddedness beyond the local threshold is harmful since the focal subsidiary transfers back less critical knowledge to the MNC, hurting the MNC's competitive advantage. The HQ could thus naturally react by trying to counter, through control measures, any level of subsidiary external embeddedness beyond the local threshold. In figure 4

we depict this potential ‘tug of war’, or bargaining process, between the HQ and focal subsidiary. The total bargaining process between the focal subsidiary and the MNC takes place in the maroon shaded area of figure 4.

Insert Figure 4 about here.

To ensure the existence of a bargaining process in our model, the local and global thresholds are necessarily disparate, and the external environment is necessarily a *net* positive source of subsidiary total power. In other words, the model exhibits a simultaneous *right offset and rise* between peak total power and peak internal power, as shown in figure 5a. The *offset* simply represents technological dissimilarities between the MNC and focal subunit, while the *rise* is the basis of the holistic theory of subsidiary power put forth in this paper: the opportunity for the subunit to break away from the clutches of the HQ’s uncontested hierarchical power.

Insert Figure 5a about here.

To see the necessity of the *right offset* we examine the alternative scenario where the peak of total power is directly above the peak of internal power, seen in figure 5b. In this case, there would never be goal incongruences between the subsidiary and the HQ. The global and local thresholds would always be one and the same, and the utilities of the HQ and focal subsidiary are maximized at the same point of embeddedness; this means bargaining would never take place because there would be nothing over which to bargain. Another way to conceptualize the right offset is as the extent to which the capability profiles of the MNC and local environment are dissimilar. In assuming, and reasonably so, at least some dissimilarity between their capability profiles, we are in effect assuming an offset in the model.

Insert Figure 5b about here.

The *rise* in our model says that a subsidiary that *has allowed knowledge transfer to the MNC to decline* does so because it is necessarily gaining power in the external environment, and does so net of any losses in power in the internal market. Assuming, in this context, that the subsidiary necessarily gains external power is reasonable for two reasons. First, the focal subunit must control the local resources, or at least the relationships providing access to them (Astley & Sachdeva, 1984; Forsgren et al., 2005), that it transfers back to the MNC which serve as a source of sustained MNC competitive advantage; otherwise, it has no credible threat to cut them off³⁴ and could not ever gain bargaining power (i.e. power vis-à-vis the HQ). Therefore, if it controls critical local resources, then there must be at least some degree of influence over local actors. Second, a subunit can be assumed to have been locally established for the very reason that the MNC determined there must exist economic opportunities. It is thus reasonable to assume that subsidiaries, by and large, capitalize on these opportunities, and this translates to power over local actors.³⁵ In addition, gains to total utility from external power are *net* of any losses due to a decline in internal power. This is because the external network significantly reduces, for the subsidiary, the inherent uncertainty of having to depend, in any substantial way, on the HQ for resources. The resources of the external network give the subsidiary the opportunity to accumulate strategic resources of its own, over which the HQ does not possess fiat power. Thus, the reduction in the inherent uncertainty, of dependence on HQ resources, outweighs the loss in internal power.

³⁴ There must be a clear distinction made between the subsidiary as a source of resources [flow] and as a provider of resources [stock]. The former interpretation, which we take up, implies continuation is vital (e.g. Foss and Pedersen, 2002). The subsidiary is a link between the MNC and the local environment. An MNC cannot, at least long-term, simply count on the current stock of knowledge it has, since the environment requires constant adaptation through its impinging demands (Bouquet and Birkinshaw, 2008). The subsidiary's power is thus derived from its ability to cut off this flow. This is consistent with the *evolutionary* theory of Nelson and Winter (1982) where firms are engaged in a *continuous* search and selection process to upgrade knowledge.

³⁵ This is consistent with RDT's assumption that organizations exercise some degree of control or influence over the resource environment or the organization's exchange partners for the purposes of achieving stability (Oliver, 1991).

Taken together, the modeled relationship between peak total power and peak internal power needs to contain a *rise* and a *right offset*; otherwise, we would be modeling a world in which there is never a bargaining process between the HQ and focal subunit.³⁶ In short, the *rise* and the *right offset* guarantee the possibility of Pareto-rents, which have long been discussed, yet not modeled, in the literature. These rents trigger the bargaining process between the subunit and the HQ; and our conceptual model enables us to demarcate the amount of *bargaining power* that *each*, the subsidiary and HQ, gain during the bargaining process. Extending the horizontal internal power line at the EE(L) until it perpendicularly intercepts the vertical line at EE(G), as done in figure 5a, demarcates the size of each actor's accrued bargaining power. This result is shown in figure 6.

Insert Figure 6 about here.

The violet shaded area in figure 6 represents the gains in bargaining power that accrues to the subsidiary, which we conceptualize as the extent to which the subsidiary is able to *leverage* internal and external power- that is, total power- into power vis-à-vis the HQ. The red shaded area represents the net gains in bargaining power that accrues to the HQ, which also corresponds to the loss in internal power for the focal subunit. For the subsidiary, external embeddedness beyond the local threshold entails, on the one hand, gains in external power since it reduces uncertainty tied to relying on HQ resources but, on the other hand, also simultaneous losses in internal power due to transferring fewer critical resources back to the MNC. For the HQ, the subsidiary's loss of internal power is, on the one hand, a gain in bargaining power but, on the other hand, represents losses in total power, or utility, because its role as MNC-wide resource coordinator is less valued

³⁶ It is important to keep in mind that this paper's model seeks to explain the intriguing phenomenon of subunits that have *already* allowed knowledge transfer to decline, which is the prelude to a potential bargaining process with the HQ.

since fewer critical resources to coordinate are being transferred back from the focal subunit. This is the web of tradeoffs for each, the HQ and focal subsidiary.

Who gets the upper hand in the bargaining process really depends on the flow of these tradeoffs. For example, in figure 6, it is clear that the subsidiary has more resulting bargaining power than the HQ. In figure 7, we illustrate a counter narrative to figure 6, where further embeddedness beyond the local threshold results in the subsidiary having weaker bargaining power than the HQ, as it is unable to extract as much of it from its sources of power. The uniqueness of our model is that it captures the extent to which the focal subunit is able to leverage these sources of power- internal and external - into bargaining power vis-à-vis the HQ, a source of inherent uncertainty for the subsidiary due to the HQ's fiat power.

Insert Figure 7 about here.

Noteworthy is that the internal power curve in figure 6 is flatter than that in figure 7. Flatter curves- or thicker tails- are associated with inelasticity, so a relatively flatter internal power curve would mean that the subsidiary's internal power level does not readily react to changes in the subunit's degree of external embeddedness. In other words, the conditions in the internal and external market are relatively uncorrelated; in which case the subsidiary that embeds beyond the local threshold will see marked increases to its external power (which would be increasing) and minimal changes to its internal power (which would be decreasing), resulting in a relatively faster rise in *total power*. As such, the subsidiary's decisions to embed will be increasingly driven by developments in the external market since it is a source of reduced uncertainty, and because there would be fewer negative ramifications in the internal power market.

Another way to view it is that there is less complexity in the subsidiary's decision-making process due to weaker correlations between the inputs to said decision-making process. This is

consistent with arguments and findings in the management and economics literature about the adverse consequences of complexity on decision-making (i.a. Bajari and Tadelis, 2001; Nell and Andersson, 2012; Tadelis and Williamson, 2012). In fact, in comparing figures 6 and 7, we see that our model incorporates the notion that the focal subsidiary is able to extract less bargaining power when it faces a higher correlation between decision inputs.

The subsidiary would thus prefer that the [conditions in the] internal and external power markets, as drivers of its utility, not be correlated in any way. The ideal situation is for it to be able to embed externally, as it sees fit, without this decision having any effect on its internal power level. Such correlation between decision inputs implies complexity, and complexity is a constraining factor on actors, specifically on their ability to maximize their utility because future states of the world cannot be flawlessly predicted due to limitations on the cognitive abilities required in processing the necessary information to do so. In other words, the subsidiary faces an optimization problem that it tries to solve, subject to certain constraints.³⁷

The Subsidiary's Optimization Problem

We formulate the subsidiary's optimization problem as being one of maximizing its total power, where it must weigh the gains to its external power against the losses to its internal power, with the outcome representing the focal subunit's ability to leverage them as bargaining power vis-à-vis the HQ. When maximizing objective functions, decision-makers actively seek out information (Jensen and Meckling, 1992), consistent with the argument that possession of information is an important source of power (Davis and Cobb, 2009; Krackhardt, 1990). However, economic reasoning is limited by mental processes (Dacin, Ventresca, and Beal, 1999; Simon, 1961; Zukin and Dimaggio, 1990), where actors are not always able to behave in the most optimal

³⁷ The notion of the networks in which it is embedded being a constraint on an organization is rooted in the literature (i.a. Casciaro and Piskorski, 2005; Granovetter, 1985; Oliver, 1996; Pfeffer & Salancik, 1978).

way. Thus, we need to model an information flow *constraint*. To do this, we introduce the notion of signals, and do so consistent with Mackowiak and Wiederholt (2008). The signal represents new information concerning conditions within the MNC and/or external network. Possession of such information improves the accuracy of the subsidiary's perception of its power position within the internal and external networks. The information can be in any form and touches on subjects ranging from technical abilities to business relationships to market opportunities.

In information theory, a transmitter produces messages, or signals, that are communicated through a channel, over which the messages are inevitably modified. The receiver must thus infer which message has been transmitted. These messages represent *flow of information*. At its core, information theory quantifies information possession as a reduction in *uncertainty*, and this is measured by entropy. Entropy is thus a measurement of the unpredictability of a particular state with respect to its information content, and is zero when the outcome is certain.

Consistent with Mackowiak and Wiederholt (2008), the *flow of information* between variables can be quantified as (*derivation in Appendix A*)

$$I(\{X_t; Y_t\}) = \frac{1}{2} \log_2 \left(\frac{1}{1 - \rho_{xy}^2} \right)$$

Where ρ^2 is the correlation coefficient of the variables, X_t and Y_t , and operator I measures the information flow between them (it is more accurate to label these as stochastic processes).

Information possession reduces uncertainty, and the relevant information on a subsidiary's internal and external networks is contained in the signals it chooses to receive. Let s_i^t denote the sequence³⁸ of all signals that the subsidiary has received up to period t as well as all information the subsidiary uses in period t . Furthermore, let X_t represent conditions in the internal market and Y_t represent those in the external market. Then the subsidiary's optimization problem is

³⁸ $s_i^t = \{s_{i1}, s_{i2}, \dots, s_{it}\}$

$$\max_{\{s_{it}\} \in \Gamma} \{Total Power\}^{39}$$

Subject to

1. $I(\{X_t, Y_t\}; \{s_{it}\}) \leq \kappa$
2. $\min\{Bargaining Power_{HQ}\}$

In essence, the subsidiary attempts to maximize its total power *subject to* two constraints.⁴⁰

The first constraint is the information flow constraint, which represents the subsidiary's limited cognitive ability to process information, where the operator I measures the information flow between power dynamics (in each, the internal and external network) and the signal s_{it} which contains information about the conditions in these networks. Modeling the optimization problem as such is consistent with Krackhardt (1990)'s argument that power accrues to not only those who occupy a central position within a network, but to those who also have an *accurate perception* of the network itself, in which they are embedded, irrespective of their position. From the perspective of RDT, organizational survival depends heavily on an accurate assessment of the environment, its demands, and the extent to which its various parties are able to exert their influence on the focal organization (Pfeffer and Salancik, 1978; Wry et al., 2013). Knowledge of the network itself is an independent source of power (Andersson et al., 2002). Information flow is modeled such that the average per-period quantity of information that the sequence of signals contains is constrained to a level corresponding to the subsidiary's maximum level of cognitive ability, given by parameter κ . Due to its cognitive limitations, the subsidiary directs the information flow to its internal and/or external power conditions, choosing which power source (internal or external network) on which to focus more. When power dynamics in the external market are more important for the subsidiary

³⁹ More formally: $E(\mu) = Total Power = f(X_t; Y_t) - \lambda^* \rho_{x|y}^2$. This equation is elaborated on in Appendix B.

⁴⁰ These two constraints together with the rise and offset assumptions- to guarantee the presence of goal incongruences and the possibility for a subsidiary to gain bargaining power- determine how much bargaining power the subsidiary is able to extract from its internal and external markets.

in terms of maximizing its total power, the subsidiary focuses more on the external network relative to the internal network, choosing to receive more of the signals containing information about conditions in the external network than ones containing information on the internal network. This is consistent with Hart (2009) who argued the importance of signals related to industry *conditions* in improving matters for the firm.

Information flow is a good proxy of the mental resources necessary for *good decisions* (Mackowiak and Wiederholt, 2008). First, when the information flow is large (implying a high κ), the subsidiary's responses will be close to the power-maximizing behavior (i.e. embedded at the global threshold). Second, when the subsidiary allocates a large portion of the information flow (i.e. its focus) to one variable (i.e. internal or external network), suboptimal responses to that variable become small. Third, the subsidiary must direct more information flow to the variable with higher variance or with low serial correlation (i.e. highly stochastic) in order to minimize suboptimal responses to that variable. Subsidiary suboptimal responses would be any embeddedness level that is not at the global threshold.

The second constraint is the HQ's own optimization problem, solved for at the local threshold where knowledge transfer is maximized. However, at the local threshold, the HQ's bargaining power is zero. This raises the intriguing question of why a HQ would want bargaining power in the first place. In an ideal world, the HQ would not worry about needing bargaining power since all of its subunits would adhere to the corporate objectives and act in the best interests of the MNC as a whole. However, we know that subsidiaries engage in rent-seeking (Mudambi and Navarro, 2004). This begs the question of when is bargaining power truly needed? This paper argues that bargaining power is needed *only* when, during interaction, the utilities of the interacting actors differ in direction. Otherwise, bargaining power is immaterial and irrelevant as a concept.

It is important to recall that, at the local threshold, so too was the subsidiary's bargaining power zero. As demonstrated in figure 3: up until the local threshold, the utilities of the MNC and the focal subsidiary increase in the same direction, meaning bargaining power was a moot point since there was nothing over which to bargain. However, beyond the local threshold and towards the global threshold, critical knowledge transfer to the MNC declined, and only then did bargaining power materialize and become relevant. That is because, beyond the local threshold, the utilities of the subsidiary and the MNC go from increasing in the same direction to increasing in opposing directions. In fact, the HQ only gains bargaining power as a result of subsidiary rent-seeking whereby less critical knowledge transferred back to the MNC causing the focal subunit's internal power to decline. The HQ's focus is on ensuring a common MNC strategy and on the wider applicability of the knowledge being transferred back to the MNC by its externally embedded subsidiaries (Andersson et al., 2015; Tavani et al. 2014). Therefore, the HQ minimizing its own bargaining power is akin to rendering it *unnecessary* for it to have bargaining power in the first place since its utility would be maximized because knowledge transfer, which it coordinates, would also be maximized. In fact, bargaining power is an *externality* on the HQ's utility. We can thus conceptualize the HQ's utility, or total power, as being equal to fiat power plus resource-coordination power (holistic value-added)⁴¹ minus bargaining power. We therefore argue, counterintuitively, that the HQ seek to minimize its bargaining power vis-à-vis the focal subunit.

Discussion

Summary

We depicted subsidiary embeddedness decisions as being a function of power accrued in *both* the external and internal markets, where it seeks to maximize total power, not just internal

⁴¹ The HQ should be adding value above and beyond the sum of the contributed values of the individual subunits that make up the MNC, otherwise the HQ's existence is called into question. In other words, the whole should be greater than the sum of the parts.

power, on which the existing literature has thus far exclusively focused. The subsidiary derives greater utility from focusing on external power dynamics rather than internal ones because external relationships secure a path to resources over which the HQ does not possess fiat power. Subsequently, we showed that only when actors' utility functions increase in opposing directions does bargaining power materialize and become relevant. Lastly, our model showed that the HQ seeks to minimize its bargaining power, which is tantamount to eliminating subsidiary rent-seeking.

Limitations and Future Research direction

Implicit in our conceptual model is a 1:1 ratio between HQ and subsidiary bargaining power. Since power is relative, power accrued to the subsidiary from embedding at the global threshold can be conceptualized as a corresponding loss in power to the HQ (because it coordinates less knowledge). However, if the ratio of HQ power to subsidiary power is not at parity, then there should be caution in conclusions reached about how much power the HQ has subsequently lost or gained as a result of subsidiary embeddedness decisions. For example, if the power conversion ratio were 1:2 in favor of the HQ, then the subsidiary would need to gain twice as much power as the HQ loses in order to see a gain in [relative] power, and thus our graphs would not fully capture the tradeoffs to scale. However, it must be crucially pointed out that our model does not attempt to make a prediction as to who would win out in the bargaining process.⁴²

Furthermore, the paper does list a number of assumptions in the model, some of which may seem strong. However, great care was taken in assessing the reasonableness of such assumptions in extensive discussions with both academics and top-level executives. First, our assumption of

⁴² Our model is not a predictive model, it is a snapshot of different possible outcomes. The subsidiary can be anywhere along the total power curve up to the global threshold, with its corresponding internal power & resource transfer level both represented along the yellow dotted curve. We do not claim that *all* subsidiaries end up maximizing power, or exhibit goal incongruences with the HQ. Nor do we take a position on what the HQ might do when the subsidiary does go beyond the local threshold; it is entirely plausible that the HQ does not exert control for various reasons. Having bargaining power does not imply one will use it (Dörrenbacher & Gammelgaard, 2016; Lukes, 2005).

MNCs being an interorganizational network allows for the possibility of a powerful subsidiary emerging but management's limited cognitive prevents infinite power accumulation (i.e. curvilinear shape of the paper's figures). Second, the parsing of subsidiary power into internal and external allows for the possibility that the subunit has considerations other than internal relations, namely external ones. Third, the fact of an HQs irrevocable fiat power explains why a subunit favors external power over internal power: external power is based on resources beyond the HQ's reach. Thus, we believe that while there are winding details, the model's conceptualization is novel, relevant, and empirically testable. The model also responds to a critical need for more visualizations that capture power dynamics (Bouquet and Birkinshaw, 2008). From this paper, there are a number of interesting theoretical and empirical research directions going forward.

Naturally, the assumptions on which this paper's conceptualization are based can be empirically tested. The paper's central theory is that a subunit allowing knowledge transfer, and by extension its internal power, to decline is doing so because it is gaining influence in its external relations, and external power is preferred to internal power because it is derived from controlling resources beyond the reach of the HQ's fiat power. Therefore, future research would do well to, in addition to internal relations, expand its focus to include power dynamics between the focal subunit and its external partners. Specifically, to confirm this paper's theory researchers would have to find that subunits that allow knowledge transfer, and by extension their influence within the MNC, to decline, are doing so because they are gaining influence over external partners. This could allow greater insight into subsidiary decision-making as well as into HQ-subsidary relationships, from a perspective of resource control and power dynamics. In addition, it would confirm the inherent tradeoffs that are present between internal and external embeddedness.

In addition, another future direction implicit from this paper's model is towards conceptual drivers of spinoffs. For example, if the focal subsidiary has attained maximum power while simultaneously having zero internal power, then it has essentially nothing more to lose internally, and conditions within the internal market do not at all figure into its utility-based decisions. At the same time, the MNC is not gaining any knowledge from the focal subunit, so its competitive advantage completely ceases to depend on the focal subunit. A firm's previous and current ties provide opportunity for future interaction because repeated transfers of exchange in information, services, and personnel bring about mutual adjustments and thus create a web of economic interdependencies that facilitate *further* cooperation (Dacin et al., 1999). Therefore, we believe that further external embeddedness coupled with zero internal power would create strong incentives for the subsidiary to want to spinoff. Employing our model to conceptualize such a scenario could pave the way to better capturing the forces behind spinoffs.

Revisiting power and profit maximization in our paper

Power in RDT is much less about 'power hunger' and much more about achieving stability (Oliver, 1991). The theory focuses much more on reducing uncertainty by accumulating critical resources rather than on accumulating power for the sake of becoming powerful and mighty. It is a strategic response to uncertainty. In RDT, there is nothing necessarily precluding a firm who seeks power from also seeking to maximize profits. In fact, it is entirely plausible to seek power (i.e. strategic resource accumulation) in order to maximize profits. Utility in terms of *power* (i.e. strategic resource accumulation for the purposes of uncertainty reduction) allows for the *possibility* (though not for the inevitability) that the HQ and subsidiary exhibit opposing utility functions.

There is nothing in our model that is *necessarily* inconsistent with profit-maximization. Our model in fact allows for the free interpretation of all other potentially pertinent considerations,

and combinations thereof (e.g. profit-maximization, sustainability, legitimacy etc.), namely, in the first constraint of the optimization problem. In other words, although the subsidiary's ultimate problem is the optimization of its power relations between the internal and external markets, this is subject, in part, to the subsidiary choosing to receive signals concerning internal and external network *conditions*. One may freely interpret the model as saying, for example, that when information related to profit-maximization is more important in the external market, it focuses more on maximizing its power (i.e. gaining control of strategic resources) in the external market rather than in the internal market. In short, the first constraint in our model can be freely interpreted as capturing a subsidiary's consideration of a slew of [non-power] factors as it optimizes its power between the internal and external markets. These factors can include profits, sustainability, legitimacy etc. The topic of legitimacy in the context of this paper presents an opportunity to broaden and enrich its contribution, and will thus be presently delved into further.

Implications for Management

To be clear, legitimacy attainment was one of the strategies for managing dependencies outlined in Pfeffer and Salancik's original 1978 work on RDT, specifically in chapter seven. Subsidiaries, even peripheral ones, gain power through their ability to help the MNC deal with critical legitimacy issues (Dörrenbacher & Gammelgaard, 2016; Hart and Sharma, 2004). One such way is through relations with local institutions (Hillman and Wan, 2005) which can pave the way for the subsidiary to pressure the HQ (Bouquet and Birkinshaw, 2008; Clark and Geppert, 2011). One example of this is the British and German subsidiaries of Ruberoid which unilaterally severed all ties with the parent and, with the support of local financial institutions, ultimately secured complete legal independence. Another example is the Australian subsidiary of Ericsson which amassed a very high level of R&D resources mainly because its local management formed

a coalition with the Australian Post and Telegraph authorities that worked to create a major R&D center in Australia (Ghoshal and Bartlett, 1990). Dun & Bradstreet (D&B) Australia funded initiatives from local venture capitalists rather than from the MNC that eventually led to a management buyout (Bouquet and Birkinshaw, 2008).

One important management implication of the need for legitimacy is political strategies of firms, and their subsidiaries. Governments pose a great deal of uncertainty for firms due to the fact that they control critical resources and hold final say in affairs that shape the local economic and competitive landscape (Baron, 1995; Jacobson et al., 1993). As a result, many firms implement political strategies to influence public policy (Baysinger, 1984). This would include attempts to create a new, more favorable environment by establishing, altering, or dismantling government regulations (Pfeffer and Salancik, 1978). In fact, regulations were one of the three pillars of isomorphism to which Scott (1995) argued firms must adhere in order to gain external legitimacy.⁴³

When the success of the MNC is closely tied to subsidiaries dispersed around the world, the relationships with local entities become indispensable for the purposes of *legitimacy* (Hillman and Wan, 2005). Researchers have defined legitimacy as the perception or assumption of desirable or appropriate actions within a social system of norms, values and beliefs (Suchman, 1995). In other words, legitimacy is a sort of social approval (Bouquet and Birkinshaw, 2008). Legitimacy can be seen as a source of power (Dörrenbacher & Gammelgaard, 2016; Rosenzweig and Singh, 1991). For larger organizations, such as the MNCs alluded to in this paper, this holds even more importance. Owing to their size, large organizations attract more scrutiny and this poses critical challenges to their legitimacy and reputation (Fombrun, 1996; Suchman, 1995). Thus, large subsidiaries, as part of their strategy for external legitimacy, are highly likely to find themselves

⁴³This pillar is concerned with the laws and rules of the local environment.

engaged in campaigns of influence over political and public opinion. This is tied to the fact that large corporations have substantial investments that incentivize them to exercise political strategy to ensure interests are protected (Vernon, 1971). Adding to the urgency is the fact that these subsidiaries are part of a foreign corporation, and there is a liability of foreignness (Zaheer, 1995), that makes it an easy target for protectionist, populist or opportunistic politicians.

Other reasons for engaging in political activity relate to competitive advantages, which are, as previously argued in this paper, based on intangible assets (Hillman and Wan, 2005). Many countries have inadequate intellectual property rights protection, exposing firms in a way that could have a strong ripple effect on its worldwide operations. Thus, firms are heavily incentivized to pursue political strategies promoting intellectual property rights. Further, global MNCs operate across jurisdictions to which they are legally accountable; therefore, it is in the MNC's best interest that there be a common global standard of laws and regulations across these jurisdictions. To that end, the MNC would lobby for global standard practices that would allow synergies and cost-savings.

As such, attempts at political strategy could easily be one of the main drivers of goal incongruences between the focal subunit and the MNC. Subunits face both internal and external legitimacy *pressures* in what is called 'institutional duality' (Kostova and Roth, 2002) and both sorts of legitimacy are necessary because the survival of the MNC depends on continued support from the local environment as well as from the HQ (Hillman and Wan, 2005). However, external embeddedness can be complicated by the presence of corruption in the foreign country of operations where the subunit is present. Spencer and Gomez (2011) show that there is a positive relationship between the corruption level in a subsidiary's local environment and the pressure the subunit faced to commit bribery. Indeed, the inclination to bribe is a function of the firm's

vulnerability and exposure to government officials and corruption (Lee et al., 2010). The consequences of this can, of course, hurt efficiency and profitability. First, corruption creates distortionary outcomes because bribery money is in fact an inefficiently allocated resource (Goudie and Stasavage, 1997). Second, the penalties levied are hefty and have been previously underestimated. For example, Sampath, Gardberg and Rahman (2016), using a residual approach, partitioned share value losses into regulatory penalties, class action settlements, and loss to reputation, finding that reputational penalties account for 81.8¢ of every dollar of share value loss. The authors conclude that omission of these reputational penalties has caused researchers to underestimate true bribery costs by 4.5 times. Management must therefore value *reputation* for what it is: a unique and inimitable intangible asset (Fombrun and Van Riel 2004) that in fact procures a sustainable competitive advantage for the firm (Roberts and Dowling 2002; Shamsie, 2003).

Conclusion

Our conceptualizations provide managers and researchers with a more holistic and accurate way of using RDT to examine strategic decisions made by subsidiaries and HQs, decisions that have ramifications for the resource configuration and balance of power within firms. In addition, in synthesizing management and economic theories, we have challenged conventional wisdom concerning HQ bargaining power. We believe our theoretical framework should open up the literature to a more holistic empirical approach, in measuring subsidiary power, which will strengthen the field's understanding of HQ-Subsidiary relations. This of course did require a recalibration and elaboration of RDT, but one that we believe to be very much in the spirit of the theory yet harnesses its true potential. The purpose of the paper is not to use RDT to the exclusion of any other theory; to the contrary, we believe that our efforts here could contribute to theory

development elsewhere that could complement or challenge our notions, both of which we welcome.

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FIGURES

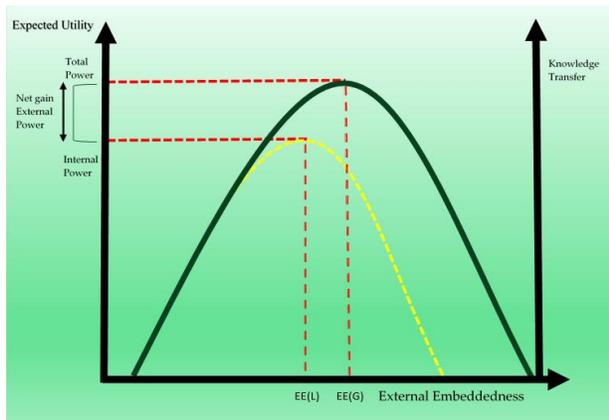


Figure 1

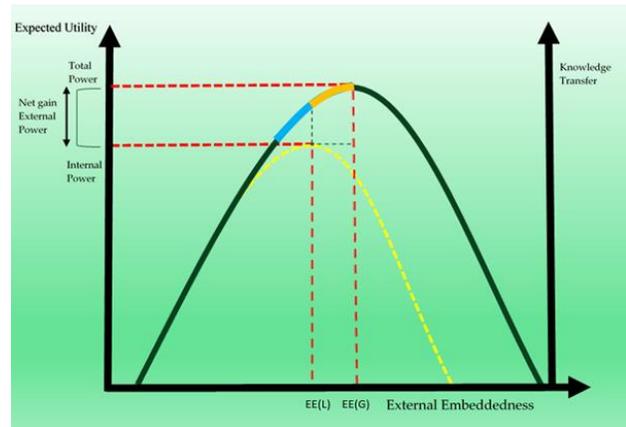


Figure 2

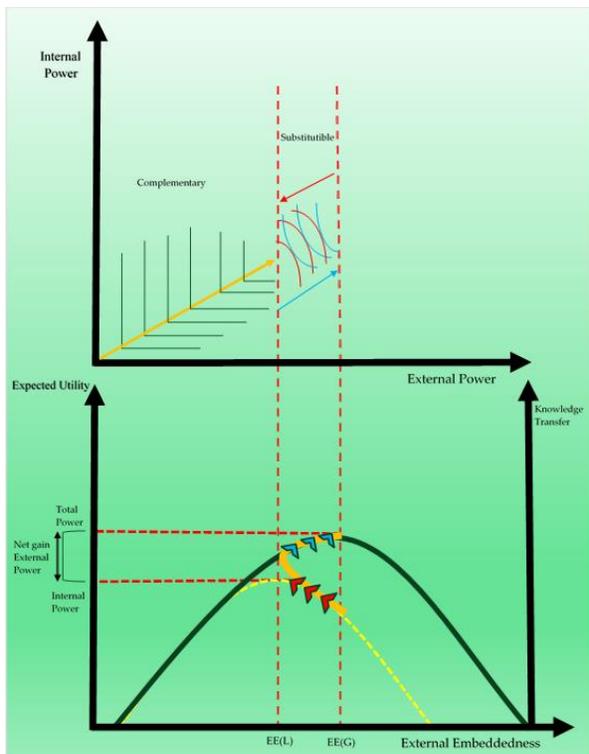


Figure 3

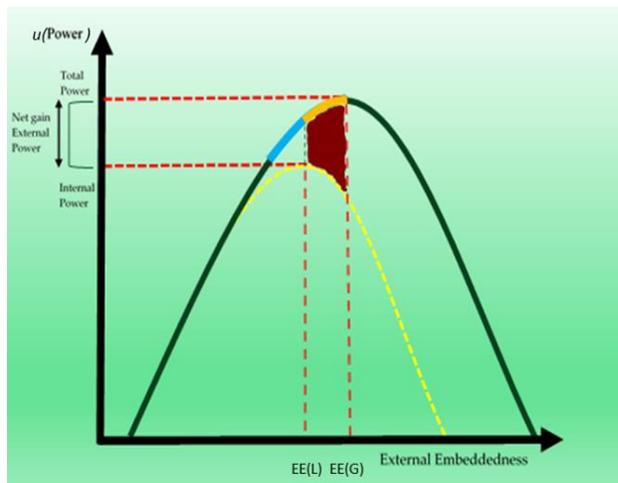


Figure 4

Resources, uncertainty and dependence-- A holistic theory on subsidiary power

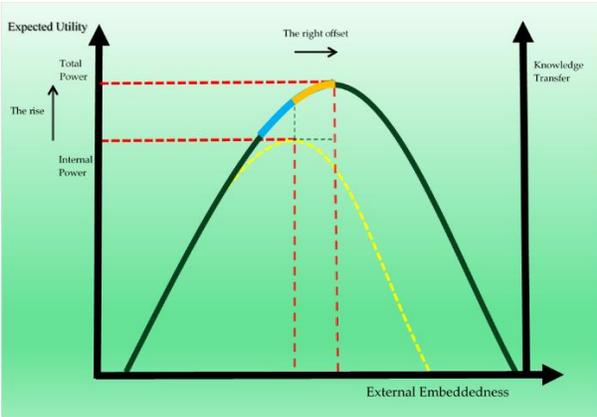


Figure 5a

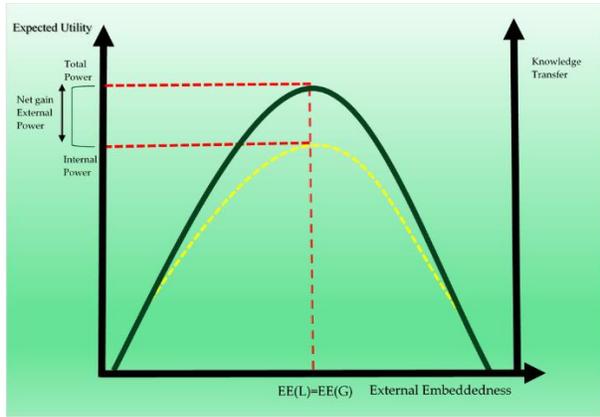


Figure 5b

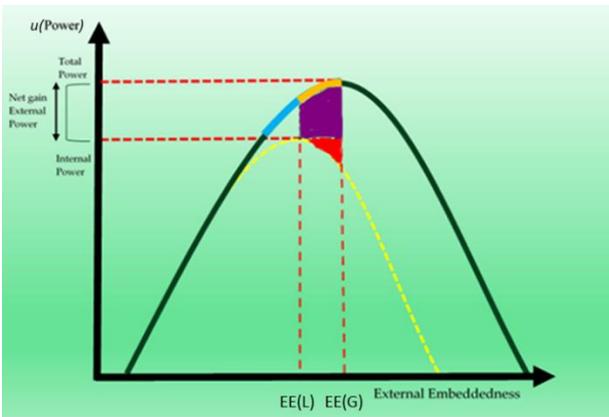


Figure 6

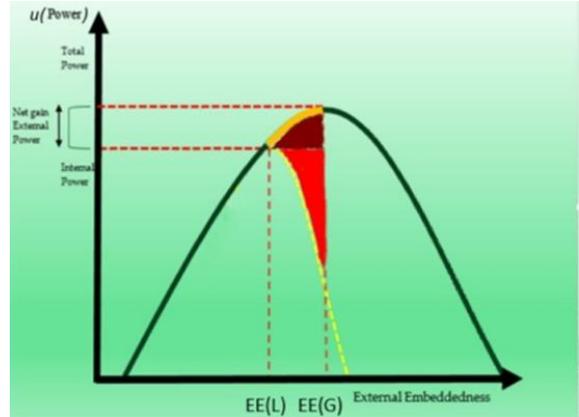


Figure 7

Appendix A (*Derivation of Information Flow Equation*)

The entropy of a single random variable, say X, that has a normal distribution with variance σ^2 is $H(X) = \frac{1}{2} \log_2 2\pi e \sigma^2$

In the case of a *vector* with a multivariate normal distribution, the entropy becomes

$$H(X') = \frac{1}{2} \log_2 (2\pi e)^T \mathbf{det} \Omega, \quad [1]$$

where Ω is the covariance matrix of the random variables in the vector, and ‘**det**’ is the determinant, which represents the quantity equaling the sum product of the elements of a square matrix, according to a given rule.

Conditional uncertainty can be measured by *conditional entropy*. With a multivariate normal distribution, conditional entropy is

$$H(X | Y) = \frac{1}{2} \log_2 (2\pi e)^T \mathbf{det} \Omega_{X|Y}, \quad [2]$$

Now that we have determined measurements for uncertainty as well as for conditional uncertainty, we can combine them to illustrate one random vector (Y) containing *information* about another random vector (X):

$$I(X | Y) = H(X) - H(X | Y) \quad [1] - [2]$$

Furthermore, we can model this as a stochastic process whereby future sequences cannot be ascertained with probability 1. Stochasticity is apropos in our context since the subsidiary is always faced with at least some level of uncertainty due to its environment and limited cognitive ability. Put differently, when the development of future states involves at least some randomness, the process is stochastic. Let there be T elements in the stochastic processes $\{X_t\}$ and $\{Y_t\}$. The *flow* of information between stochastic processes can be quantified as

$$I(\{X_t; Y_t\}) = \lim_{T \rightarrow \infty} \frac{1}{T} I(X_1, \dots, X_T; Y_1, \dots, Y_T) \quad [3]$$

where operator I measures the information *flow* between stochastic processes $\{X_t\}$ and $\{Y_t\}$.

Using substitution, we get

$$\begin{aligned} I(\{X_t; Y_t\}) &= \lim_{T \rightarrow \infty} \frac{1}{T} I\left(\frac{1}{2} \log_2 (2\pi e)^T \sigma_x^2 - \frac{1}{2} \log_2 (2\pi e)^T \sigma_{x|y}^2\right) \\ &= \lim_{T \rightarrow \infty} \frac{1}{T} I\left(T \frac{1}{2} \log_2 (2\pi e) \sigma_x^2 - T \frac{1}{2} \log_2 (2\pi e) \sigma_{x|y}^2\right) \\ &= \frac{1}{2} \log_2 (2\pi e) \sigma_x^2 - \frac{1}{2} \log_2 (2\pi e) \sigma_{x|y}^2 \\ &= \frac{1}{2} \log_2 \left(\frac{2\pi e \sigma_x^2}{2\pi e \sigma_{x|y}^2}\right) \end{aligned}$$

Finally, as (X_t, Y_t) exhibits a multivariate normal distribution, the following property holds:

$$\sigma_{x|y}^2 = \sigma_x^2 - \rho_{x|y}^2 * \sigma_x^2$$

It then follows that the *flow of information* between processes Y_t and X_t is

$$I(\{X_t; Y_t\}) = \frac{1}{2} \log_2 \left(\frac{1}{1 - \rho_{x|y}^2}\right)$$

Appendix B (*Subsidiary Utility Function*)

$$E(\mu) = Total Power = f(X_t; Y_t) - \lambda * \rho_{x|y}^2$$

The subsidiary's utility function is its total power which is equal to some function of the power it accumulates in the internal market, X_t , and the external market, Y_t , minus its risk aversion (λ) times the complexity of its relations ($\rho_{x|y}^2$). The first term is capturing the benefits of external embeddedness, namely that the subsidiary obtains power in the external market because the external market provides the focal subunit with resources that are beyond the control of the HQ. The second term captures the *tradeoff* between external embeddedness and internal embeddedness. That is the subsidiary must be assumed to be risk averse⁴⁴, that is, $\lambda > 0$, else the subsidiary could just infinitely increase its power by simply continuing to externally embed. Risk aversion can be thought of as the inverse of innate ability, specifically, cognitive ability, κ , from the first constraint of the optimization problem⁴⁵. The complexity term captures the extent of correlations of interrelations (between external and internal markets) but also of intra-relations (within, each, the internal and external market). As previously argued, and a notion well established in management and economics literature, complexity renders decisions more difficult because of limited cognitive abilities. The subsidiary is unable to infinitely increase its power by simply externally embedding because, as it externally embeds, it develops more relations and those relations have relations and so it becomes increasingly difficult to manage all relations- this is why its power declines at particular levels of embeddedness.

⁴⁴ The assumption of risk aversion is standard in economics for one simple reason: in reality, people tend to be risk averse.

⁴⁵ Therefore, $\lambda = 1/\kappa$

CHAPTER 4: THE PROFITS OF ENTERPRISE: WHY AND HOW RISK AND UNCERTAINTY COMPENSATE DIFFERENTLY

ABSTRACT

The literature on the theory of the firm has imprudently used the terms ‘uncertainty’ and ‘risk’ interchangeably, often referring to contractual hazards as an ‘uncertainty’ and then proxying them with what are effectively risk metrics such as variation of sales. Indeed, the concept of uncertainty, owed to its measurement difficulty, was largely abandoned in favor of the easier to measure concept of risk. Nevertheless, risk and uncertainty are two concepts that must be crucially distinguished from one another because, as this paper will argue and support empirically, they compensate investors differently for assuming them. Risk being situations in which we can rely on objective probabilities and thus eliminate, and uncertainty being situations in which probabilities are meaningless and so we must defer to own intuition and judgement. Drawing on a sample of 114 firms and 10,500 observations over a 23-year quarterly period, I find that investors are rewarded for assuming uncertainty and punished for assuming risk. These findings are also discussed in the context of routine responsibility for which wages are earned, and ultimate responsibility for which profits are gained.

Keywords:

Risk, Uncertainty, Theory of the firm, Diversification, Theory of Profit, Ultimate Responsibility, Routine Responsibility, Organizational and Environmental Change

Introduction

The literature on the theory of the firm is composed of a vast, rich and diverse array of explanations for what determines the boundaries of the firm. Transaction cost economics (TCE), property rights theory (PRT)⁴⁶, Principal-agent theory (PAT), Behavioral theory⁴⁷, team production⁴⁸, among others, have all contributed enormously to our understanding of the determinants of firm boundaries. Critical to these theories has been their shared notion that whenever there is a sufficiently high hazard or contingency stemming from a transaction or relationship with the market, then the prerequisites for eliminating the market transaction and absorbing the transactional asset within the confines of the firm have been established. The hazard or contingency can be derived from situations such as asset specificity, importance of investments, distorted incentives or, in general, asymmetric information. However, a subtle yet critical omission in this literature is whether this hazard is a situation of risk or uncertainty, two terms which have been used interchangeably in empirical work (Klein, 2005), and this has left a void in understanding how the two may affect a firm and its stakeholders differently, if at all.

In Knightian fashion, this paper will argue the importance of distinguishing between risk and [true] uncertainty precisely because they lead to different predictions with respect to firm profitability. To this end, the following research question is proposed: *why are risky assets pooled in firms?*

I argue that firms pool risky assets because, when confronted with a variable environment, they are able to 1) realize the benefits of asset diversification and 2) earn a profit on the assets for assuming uncertainty, which this paper defines as the probability of these diversified assets within the firm suddenly becoming undiversified. Empirically, the two aforementioned notions of diversification benefits and asset profitability are tested on a sample

⁴⁶ Incomplete contracting paradigm.

⁴⁷ Simon 1962's argument that the hierarchy (the firm) is the most understandable form of a complex system in that it is not beyond our bounded rationality.

⁴⁸ Alchian & Demsetz 1972

of 114 firms from the S&P Index over a 23-year quarterly period. I argue and employ beta as a proxy for true *uncertainty* whereas the standard deviation of stock returns is used as a proxy for *risk*. Return on Assets (ROA) and Return on Equity (ROE) are used as profit metrics. The findings show that beta has a positive and significant impact on ROA but no such impact on ROE, implying that investors are compensated for owning assets that may suddenly become undiversified rather than for merely investing money. Furthermore, the results show that assuming risk harms profitability, suggesting that investors are incentivized to diversify since risk, or return volatility, can always be reduced through diversification. As such, the results point to the need for a distinction between risk and true uncertainty as compensation for assuming responsibility for them are fundamentally different in nature. This distinction in compensation will feature prominently in the paper's managerial section as the distinction between wages, earned for assuming routine responsibility, and pure profits, earned for assuming ultimate responsibility; this discussion is a further contribution of the paper since the institutional and decision-theoretical implications of diversification have not been fully investigated (Skogh and Wu, 2005).

The rest of the paper is as follows. First, I will give an overview of the main contributions to the theory of the firm. Second, the common notion of a contractual hazard or contingency across these theories is discussed. In the third section, I detail the difference between risk and true uncertainty. Fourth, the paper argues beta as a strong proxy for true uncertainty. Fifth, the paper's empirical findings are presented and discussed. Sixth, summary arguments, limitations and promising future direction, as well as managerial implications are detailed.

The theory of the firm

Coase (1937) introduced the notion of transaction costs to both modes of governance- hierarchy and markets- arguing that deciding which of the two modes of governance to use

should be derived rather than taken as given. As such, TCE holds that different kinds of transactions (underlain by either generic or specific assets) are more efficiently governed by different modes of governance (hierarchy or market). If the transaction is supported by generic assets, then market governance suffices; if the transactions are underlain by specific assets⁴⁹ then the hierarchy mode of governance (a firm) is more efficient than the market.

Alchian and Demsetz (1972) looked at why a team process induces the contractual form called 'the firm'. Two necessary conditions for its emergence are 1) synergies are achievable through team production, which is costly to directly monitor⁵⁰, and 2) it is economical to observe input behavior in order to measure marginal productivity and thus avoid metering and shirking problems. Thus, the firm enhances the efficiency of an organization in a way that simple markets cannot.

PRT focuses exclusively on ex-ante underinvestment in relationship-specific human capital brought about by inefficient ownership arrangements (e.g. Grossman and Hart, 1986; Hart and Moore, 1990; Holmstrom and Milgrom, 1991, 1994). Therefore, of importance for PRT is the role of asset ownership as a way to allocate residual rights of control. According to the theory, the party for which the investment is more important should own the asset, complementary assets should always be owned by the same party, and independent assets should be owned separately (Hart, 1995).

Holmstrom (1999) examines why it is that firms own essentially all of the productive assets they deploy, arguing the reason is because it allows the firm to define the rules and set incentive structures such that contractual externalities stemming from imperfect information are internalized. In other words, in a world of imperfect information, firms use low-powered incentives and narrow job designs to encourage cooperation when it is compromised by excessively strong market incentives.

⁴⁹ Specific assets are not re-deployable without at least some loss in productive value.

⁵⁰ Making it difficult to reduce shirking through simple market exchange.

A recurring central notion: Contractual Hazards

Although distinct in their contributions, the literature tackling the theory of the firm has essentially made predictions about firm boundaries in situations where contractual hazards arise. The exact nature of the hazard has varied in the literature, but they all revolve around a blurred distinction between risk and uncertainty. TCE holds that the more specific an asset is, the harder it is to replace the exchange partner in the event of disagreement, therefore the more uncertain one's future state of the world is because there are fewer outside options. Similarly, PRT's argument that the party, whose investment is more important, should have ownership can also be argued to reflect uncertainty.⁵¹ The more one party invests in a given relationship, the greater uncertainty they face because they are effectively more tied to the success of the relationship or, in other words, to the whims of the other party. Holmstrom (1999) argued that the tendency of firms, rather than employees, to own assets was due to uncertainty arising from imperfect information (i.e. worker can manipulate effort creating inefficiencies). Hart and Moore (2008) presented a novel model in which ex-post performance depends on whether a party receives what they're entitled to relative to the *uncertain* outcomes permitted by the contract. Hart (2009) then comes back to this point of uncertainty, specifically payoff uncertainty, arguing that an asset should be allocated to the party whose payoffs are more uncertain since asset allocation enhances a party's outside option, making it more difficult for the counterparty to holdup.

Although they share a common underlying premise- contractual hazards within relationships of economic exchange- in their predictions, problematic is that much of the literature on the theory of the firm has not considered the difference between uncertainty and risk. The literature often loosely refers to the hazard as an 'uncertainty' in the theoretical sense and then crudely proxies it through metrics such as variation of sales (Klein, 2005). However,

⁵¹ PRT is a generally considered a collective of Grossman and Hart (1986) & Hart and Moore (1990) (Hart, 2017).

and importantly so, variation, or standard deviation of *any sort of returns to a firm*, is a measure of its idiosyncratic risk and not the uncertainty it faces. In this paper, the standard deviation of firm returns will be properly employed as a proxy for risk, not uncertainty. In fact, the concept of “uncertainty”, owed to its measurement difficulty (Downey & Slocum, 1975), was largely abandoned in favor of the easier to measure concept of “risk” (Milliken, 1987). Nevertheless, risk and uncertainty are two concepts that must be crucially distinguished from one another. Due to the imprudent common usage of the two terms in an interchangeable manner, this paper differentiates between the two words as *risk* on the one hand and *true uncertainty* on the other. To be sure, their difference reaches down to the very foundations of our thinking, and depending on which of the two is at play, there are far-reaching and critical consequences.

Distinguishing between risk and uncertainty

Knight (1921) argued that there was a fatal ambiguity in the terms *uncertainty* and *risk* which must be gotten rid of, and that the use of the term *risk* in connection with the *measurable* probabilities of insurance gave some justification for specializing *risk* as objectively measurable and *true uncertainty* as subjectively measurable. Measurability is contingent on the possibility of grouping, or classifying, a given situation with a set of similars, and finding the proportions of the members of the group that are thought to exhibit the various possible outcomes. Fundamental to classification is the notion that not only must it be possible that the *same* thing always behaves in the same way, but that anything of the *same kind* will also behave in that way. It must also be true that there is a finite, manageable number of *kinds* of things in the sense that their properties are not stochastically associated, but that rather some level of *consistency* in their association exists. A crucial consequence of an occurrence exhibiting a high degree of consistency is that it is expected or predictable and, as such, has no significant

influence on its distribution of income.⁵² Such would be a situation of risk, as it is defined in this paper.

By contrast, under true uncertainty, the instance does not occur frequently enough for a *known* probability distribution to be associated with it, and thus there is ‘no *valid basis* for classifying instances’ (Knight, 1921).⁵³ There are two different *valid* methods of probability judgment: mathematical and empirical. The first type is driven by the theory of permutations and combinations where possible groupings of equally probable alternatives are determined. Necessary in this sort of calculation is the perfect homogeneity of the grouped instances, where any differences between them are purely indeterminate. However, as the number of factors to be considered increase, the mathematical method becomes unmanageable, prone to error, and the loss of generality in the results outweigh any gains from a closer approximation. Thus, it becomes necessary to approximate using empirics. Through empirics, we cannot, as we can in the first, calculate the *true probability* from collected data, but must approximate it from an inductive study of a large group of cases or observations.

The throwing of a fair die illustrates the appropriateness of applicability of each methodology. It would be pointless to roll the die many times in order to procure the probability of it landing on one side or another. The probability distribution of outcomes given any number of rolls can be mathematically calculated. Conducting a statistical experiment to reach this probability would be an exercise in futility since no finite number of trials could give certainty to the probability distribution. That is, the actual, or true, probability would remain elusive if the method of statistics were to be applied in the case of rolling a fair die. However, if the

⁵² This treatment of a known loss being treated as a cost rather than as a loss is evident in other literatures. Sampath et. al (2016)’s paper in the Journal of Business Ethics uses the *residual approach* in examining how accusations of misconduct affect investors. Under the approach, total dollar loss in share value is first calculated and then subtracted are regulator-imposed legal penalties, class action settlements, and other applicable direct costs. The idea is that investors would rationally expect firms to incur these penalties and costs when the news of the firm’s misconduct becomes public, so its not assessed as part of their losses.

⁵³ Knight’s use of the term ‘classify’ is a reference to probabilistic classification, that is, assigning probabilities. His point, however, centers on the validity of such an assignment of probabilities, not on whether one can actually assign probabilities to instances, pointing out that since nothing is absolutely unique any more than any two things are absolutely alike, it is always possible to form classes if the standards are lowered and a loose enough interpretation of similarity is permitted.

situation at hand was the chance that a house will burn down, it would be as much an exercise in futility to attempt to calculate the probability mathematically, of the proportion of homes that would catch fire in a given area and time, as it would be applying statistics to calculate rolling dice.

Indeed, the difference between mathematical and statistical probability is the accuracy involved in classifying instances grouped together. The instances of throwing dice, for example, are thought to be sufficiently homogenous to an extent and fashion certainly not afforded to instances of homes burning down; one in six is the real, or true, probability irrespective of the outcome in any given throw of a die, but the chance of a fire at a home cannot be claimed to hold any true or definite probability. The first probability, the mathematical one, is an apodictic certainty, whereas in the case of the fire, it would be an empirical generalization. Nevertheless, it is precisely in situations of risk that the distribution of the outcomes of a group of instances is known either mathematically or from statistics of past experience.

By contrast, in situations of true uncertainty it would be impossible to form a group of sufficiently homogenous instances since the situation at hand is highly unique, and as such we defer to *estimates*. Estimates have the same form as a probability but any attempt at equating the two would be extremely flawed. For example, a firm that is contemplating expanding operations abroad would see its management consider various *measurable* factors and metrics, but the end result would be some estimate of the probable outcome of any decision taken⁵⁴. It would make little sense to attempt to calculate the mathematical or statistical probability of this instance, precisely because it is so unique that there almost certainly be nothing like it or at least, a sufficient number of alike cases, to form a basis for any serious inference about the real

⁵⁴ If that very decision were to be taken many times over.

probability. This is a general fact of decisions made in everyday life, not just in business decisions.

The role of exact science in everyday life

The exact science of inference has little weight in forming the opinions on which our decisions in everyday life are based. Rather than exhaustive analysis we mostly act on estimates or judgments because we accept that the future depends on a sufficiently large number of factors and so no reasonable effort, on our part, is made to consider all of them. As humans, we task ourselves with simplifying complex webs of relationships, which is done by separating them into uniform elements that are analyzable in a way such that we are able to reach our ultimate goal in knowledge procurement: having laws or principles that govern the way we understand behaviors. Such is the analytic treatment that defines the very concept of exact science; and analytic treatment is, to a great extent, abstraction because its application is necessarily non-universal or incomplete, owed to the sheer complexity and number of factors involved in nature. However, the advantage of the method is its reliance on the reality that, in a large group of cases, *certain* important tendencies among factors are common in each case and are not cognitively cumbersome in number. What's more is that the laws or principles governing these particular factors allow us to approximate as much to the entire situation in general. In other words, we are able to know what *tends* to happen in simplified conditions, that is, in the absence of the numerous and less important factors, which our laws or principles do not take into account. It is only by the discarding of the numerous and relatively less important factors of a situation that we obtain laws or principles of behaviors in a general sense, allowing ourselves to tackle practical problems intelligently because our laws and principles are *approximately* true and we become adept at discounting them on the basis of their incompleteness (Knight, 1921).⁵⁵ As such, approximations, or estimates, of situations by

⁵⁵ Discounting the incompleteness of laws or principles is the same notion as being able to judge the accuracy of one's estimates.

dealing with the more important and general elements of a situation are truly the only reason how we, as humans, have ever amassed even a semblance of intelligent understanding of behaviors, accounting for our impressive grasp of the forces of nature in our world, a world as venturesome as it is uncertain.

It is thus no wonder that the ability to form correct estimates, judgments or opinions is the determining attribute of serviceability in industry. And although we estimate outcomes, we also estimate the accuracy of our estimate because, in the absence of exact scientific methodology, the chance of error is amplified. In other words, the economic actor not only estimates outcomes of their decisions, but they also estimate the probability that their estimate is in fact correct. The importance of this cannot be understated since one's action pursuant to an estimate depends as much on the level of confidence one has in that estimate as it does on the favorability of the estimate being true. In fact, humans do tend to form, over time, accurate inferences regarding their own ability, the ability of others, or of others' ability to do the same (Knight, 1921). This is in fact a sort of probability judgment in the sense that it is based on "tabulated" past experiences, but nonetheless must not be favorably equated with actual statistical methodology, a methodology inherently tied to the principle of insurance.⁵⁶

The principle of insurance

Insurance illustrates the principle of eliminating risk by dealing with groups of cases instead of individual cases (Kahneman & Tversky, 1979). This principle need not in any way be restricted to the insurance industry. In fact, organized economic activity is fundamentally about the production of goods by producers to satisfy the wants of consumers, but a closer examination of who, producers or consumers, does the forecasting of the future demand goes to the heart of the insurance principle. It would seem somewhat obvious that the consumer would be able to much better anticipate their own demand than for a producer to do it for them,

⁵⁶ The mere tendency to do something versus always doing it with constancy is an important distinction that is essentially the difference between equilibrium and actual outcomes. Tendency, as opposed to constancy, is the result of true uncertainty.

but this is not observed anywhere in business. It is a matter of fact that economic organization is centered around producing goods for a *whole market* rather than at the behest of any consumer, who generally does not contract for the production of goods in advance. No consumer writes a contract with their local supermarket or car manufacturer for goods to be produced at a future point in time at which the consumer pays. The reason is due to the consumer not knowing what they really want, the extent to which they want it, or how much of it; so it becomes incumbent on the producer to make impersonal predictions, produce the goods and then ready them for when the consumer's decision is eventually brought to fruition. What appears, at first, to be a perplexing phenomenon- a producer anticipating, for a consumer, what they want- is in fact nothing more than the consolidation of risks, that is, the application of the insurance principle. The consumer is, to himself or herself, only one, but to the producer, the consumer is one of many, and so idiosyncrasy, and whatever risks it carries, is obliterated.

Insurance firms deal with cases that are reasonably classifiable and exhibit a low degree of idiosyncrasy. However, the different branches of the insurance industry illustrate the breadth of accuracy in probability measurement that they are able to obtain. Life insurance represents the branch of insurance, acting on near-known risk probabilities owed to its sophisticated development. The reason its contingencies are so accurately measured may be explained by considering two individuals in good health. If they are in similar circumstances, the probability of their deaths would be near parity, and where the death of one but not the other would be almost as conceivably indeterminate as possible. Business risk is not of this [perfectly homogenous] nature, and the branch of insurance that most illustrates this is fire insurance. As previously argued, the chance of a fire breaking out at a particular establishment holds no true or definite probability. This problem of uniqueness is further compounded by the complication that the outcomes involved after the outset of a fire are not independent since once a fire breaks out, it spreads to other things indiscriminately and these "other things" tend to be unique to the

business. Consequently, this branch of insurance does not cover against all loss due to a fire. Coverage is limited to, at most, “direct losses” as it would be unthinkable that indirect losses, such as interruption of business operation, would form part of the covered contingency since there wouldn’t be a sufficient number of homogenous instances to obtain a valid probability of the outcome. It is precisely this type of uncertainty that is *true uncertainty* since it is not susceptible to [valid] measurement and hence to elimination (Knight, 1921). By contrast, any individual situation with a *known* risk can be converted into effective certainty because, when grouped with a substantial number of similar cases, the outcomes are predictable in a manner consistent with the laws of chance, and any error ascribed to the prediction approaches zero as the number of cases increases. This is the technique of business organization: combine a sufficient number of cases such that the risk will be borne in groups large enough so as to be reduced to substantially negligible proportions.

The technique of business organization

The opportunity to deal with uncertainty through grouping constitutes a strong incentive to extend the *scale* of operations of a business establishment (Knight, 1921). In doing so, one extends the scope of their exercise in judgment over a greater number of decisions or estimates, and the chances rise that bad estimates will, in aggregate, be neutralized by accurate ones, providing a degree of constancy and dependability in the overall outcome. In fact, the superiority of the corporation over other forms is partly in its wide scope of operations that encompass a larger number of individual decisions, ventures, or, in other words, instances. This process is also known as diversification.⁵⁷ The diversification theorem states that if a risk-averse individual is given the choice between two assets with identical but random returns, the individual would prefer to invest half of the endowment in each asset (Rothschild and Stiglitz,

⁵⁷Although studies in this tradition within the management literature (i.a. Lubatiken Chatterjee, 1994) have shown that high and low “levels” of diversification are associated with higher levels of risk, their setup makes a baffling choice in proxy for diversification level, namely that of Rumelt’s scheme, which is based on the type of firm diversification rather than the level of diversification. The authors even point this out in their own paper (pg. 122).

1971). In other words, when facing the same distributions of losses, two identically risk-averse individuals would gain by sharing losses equally, a notion fundamental to portfolio theory (Skogh and Wu, 2005).

Diversification allows the pooling of risky assets under one roof and distribute them across their operations such that the total outcome, the firm, is not dependent on any one asset for success, and so is an outcome that becomes more consistent and dependable. When risk is pooled, it is non-additive since the risk of the pool is always necessarily lower than the sum of its individual risks. This concept is best exemplified through the risk metric Value-at-Risk (VaR) which is non-additive precisely because of the diversification benefit. The economic actor who holds, for example, five separate market contracts will necessarily be judged as holding more risk than if they were to pool them into one entity; the risk of that “pooled entity” will be assessed as lower than individually adding up the risks of the five separate contracts. Thus, for the economic actor, holding separate contracts would make little sense because it would result in an unfavorable pricing of the risk they hold since each contract would be judged as a standalone risk, and added up in a method that ignores the diversification benefit. In short, the economic actor avoids unfavorable pricing of the risk they hold by pooling it under one entity, namely the firm.

It is perhaps interesting to then ask what is a firm (or organization) if nothing more than a pool of diversified assets? No matter the organization, it can be thought of as an amalgamation of risk, or environmental variability, that has been pooled from the market and into one firm. These assets can be norms, human capital, activities, investments— any of which, when outside of the firm or organization, can be perceived as threats with a certain level of risk, but if this risk is measurable, then these “threats” can be neutralized by being absorbed into the firm and dispersed within, and so assets that, when relatively uncorrelated, transform that which is risky to riskless (or to at least negligibly risky).

A highly talented worker or a new technology that are outside of an organization can be perceived as potential hazards. That is because the worker or technology can instead be leveraged at a competing firm; in this case they would form part of the variable environment that unpredictably influences the outcomes of the focal firm. Thus, in assessing whether or not to acquire the worker or technology, the focal firm assesses the risk of them remaining outside the firm (i.e. not acquiring them) and the benefits of acquiring them given the assets already within the firm. The benefit of this goes back to the point made earlier that a wider scope of operations entails judgment over a greater number of decisions, where errors in estimates are neutralized, in aggregate, by accurate estimates; this creates stability and predictability in outcomes. However, a wider scope of operations also entails a greater exposure to the external environment. This point of greater exposure to the external environment warrants further discussion because of the latent liability associated with it.

Diversification is never to the point of zero absolute risk because diversification only eliminates idiosyncratic risk; there is still a non-diversifiable residual “risk” that remains, and it stems not from the nature of a firm’s idiosyncratic operations, but from the market itself. This is known as market or systematic risk, and despite the containing the word “risk”- and unfortunate symptom of imprudent usage- these two terms represent what this paper stresses as [true] uncertainty.⁵⁸

Although the technique of business organization takes advantage of the fact that at least some variability in the environment can be dealt with by absorbing it into the firm and dispersing it throughout such that diversification benefits are realized, this diversification effort

⁵⁸ Unlike proponents of corporate diversification theory (e.g. Bettis & Hall, 1982; Lubatkin & O’Neill, 1987; Chatterjee & Lubatkin, 1990), the position of this paper is that systematic risk cannot be reduced because these are contingencies that cannot, by definition, be anticipated ex-ante. The basic argument of these proponents is that business managers, unlike portfolio managers, can actively intervene to influence the underlying risk profiles of their various businesses in such a way that the expected variance of the combined return need not be a linear extension of historical variances. In other words, the [active] business manager can alter cash flows while [passive] portfolio manager can only combine cash flows. First, it is not clear why altering returns is a sufficient condition for reducing systemic risk. In any case, although portfolio managers cannot influence the underlying businesses, per se, they don’t need to in order to alter their returns. They simply can create any risk profile vis-à-vis any company they desire, synthetically, through a seemingly endless supply of financial derivatives. They do not need to passively wait for management to change the business so that their cash flows, from investments in that firm, to be altered. Thus, the ability to alter one’s returns is not a sufficient condition, or a defining feature of the ability, to lower systematic risk as the proponents erroneously claim. Business managers cannot lower systematic risk any more than portfolio managers can.

is bounded by the cognitive abilities of management. That is, by their ability to objectively measure all environmental variability in order to properly absorb it.⁵⁹ Due to the fact that the challenges stay the same for a while or repeat, a fundamental question in organization is how can survival prospects be enhanced by exploiting the element of *continuity* in the environment since continuity allows for economies of various sorts (Winter, 2017).⁶⁰ Factors of production tend towards greater economies with an increase in the size of the establishment, and the chief limitation on its size is the capacity of its leadership (Knight, 1921). As such, there is an associated downside that is just as pervasive as the opportunity to secure economies: that the world will change and strand the very investments designed to exploit continuity, leaving the firm evolutionarily vulnerable. In other words, while diversification reduces variance, it comes with the latent liability of higher correlations to the wider market. Thus, this paper argues that, as a firm eliminates risk, it builds up [true] uncertainty through exposure to increasingly opaque correlations dispersed throughout the economy, which escape the cognitive abilities of its management and are, as such, not subject to elimination.⁶¹

For example, a producer with only one supplier may be heavily dependent on that one supplier, but there is relatively little complexity involved since the producer is only dealing with one supplier. The producer likely only needs to understand this focal relationship with the supplier and perhaps a few immediate relationships the supplier has with others that may affect the focal relationship. However, if the producer decides to expand their supplier network to include other suppliers then, on the one hand, they would be less dependent on any one supplier since they would have a greater number of outside options but, on the other hand, there is a greater exposure to the wider economy. That is because peripheral relationships would be

⁵⁹ Human behavior is intendedly rational, but only limitedly so (Simon, 1961), and so economic actors cannot account for all possible contingencies (Chiles and McMackin, 1996).

⁶⁰ A stark example of continuity is when in 1979 General Motors wanted to reduce contracting risks through minority equity holdings in a supplier base which could provide repetitive systems, seeking what it referred to as ‘continuity and consistency.’ (Argyres, 1995)

⁶¹ Institutional limitations, estimation errors, and transaction costs are among the most cited reasons for the limited diversification observed in practice (Rode, 2000). For simplicity this paper refers to all of these as “complexities”, or externalities, that are exacerbated as relationships develop with further diversification.

increasingly involved, and such relationships increase the complexity involved within the focal relationship (Nell and Andersson, 2012), in line with the argument of Tadelis and Williamson (2012) that incompleteness is more severe as the number of transaction features and consequential impinging disturbances increase. Thus, as diversification increases, so does complexity since the web of relationships expands, and consequently assessments of the risks involved become increasingly distorted, and thus subjective, due to bounded rationality (i.e. incomplete information).

It is therefore the view of this paper that [true] uncertainty is the probability of uncorrelated risks, pooled within a firm, suddenly becoming correlated or undiversified. This would be in the form of some exogenous economic shock that occurs where all human capital or machinery sync in their *inability* to resolve the unfolding contingency. This is of course what we observe after the onset of such economic shocks: the tendency for all groups to be incapacitated in their ability to mitigate the widespread losses amassing. This is a consequence of human limited cognitive ability. However, it is precisely this cognitive limitation that precludes perfect competition and thus permits the securement of profits for those confident enough in their own superior cognitive abilities to assume uncertainty.

Firm profits

With uncertainty absent, individuals would possess perfect knowledge, and the notion of responsibility for productive activity would lose all meaning. Under a situation of perfect knowledge, even if there were high-level executives and managers, these individuals would simply be laborers, undertaking banal, routine tasks that involve a level of “responsibility” on par with that of a worker at the furthestmost bottom of the hierarchy. It is questionable whether the concept of intelligence itself would even exist in a world devoid of uncertainty; for in such a world adaptation would become perfunctory, bereft of any sort of cumbersomeness on the mind. But with uncertainty present - incomplete information necessitating the need to act on

opinion rather than on knowledge- the world is completely changed: it becomes a venture. In a venturesome world, uncertainty behooves individuals to dedicate efforts towards deciding *what* to do and *how* to do it; the subsequent act of executing an activity is reduced to subordinate importance.

Business decisions are in fact made under such venturesome circumstances because changes from the variable external environment (Hannan and Freeman, 1977, 1984; Haveman, 1992; Oliver, 1991) often bring about situations that are all too unique for mathematics or statistics to be useful in determining probabilities; individuals are thus subjected to the liability of erring in an unknowable fashion. It is also precisely in these circumstances that profits materialize, owed specifically to the fact that contracts for productive services are largely done in advance at fixed rates, and unanticipated changes cause an imbalance between costs and price, which would otherwise be paired through competitive forces that, when unhindered, erase profits nearly as fast as they are created.⁶² It is this *true uncertainty* which, by driving a disturbance in the balance normally brought about from competitive forces, accords the distinction of "enterprise" to economic organization, a deciding factor in the existence of profits. The enterprising nature of our world forces economic actors to rely on estimates, where the stability and success of businesses is largely dependent on the ability to estimate the capacity of *others*, which is necessary for assigning them to positions and for fixing their remunerations- the two fundamental problems of organization (Knight, 1921). So fundamental, to organized economic activity, is this paramount ability of the individual to estimate the capacity of *others*, that it will be discussed at length in the managerial implications section at the end of this paper.

⁶² It is undoubtedly so that if all changes occurred in an invariable fashion, they would be completely anticipated, and would not upset the uniformity of product values between the economic actors involved in the chain of production, and so prices and costs would pair. Profit only arises to the extent that a change and its consequences are unpredictable and so non-anticipatable in their nature.

In an uncertain world where individuals differ in their intelligence to form estimates, as well as in the degree of confidence they have in their estimates, the result is an economic system in which the confident and intrepid insure the doubtful and reluctant by *guaranteeing* them a contracted income in return for furnishing productive services under their managerial direction (Knight, 1921).⁶³ However, this guarantee entails the bearing of uncertainty for the enterprising guarantor, that is, an “ultimate” responsibility for any error involved in the exercise of judgment or opinion. Where there exists such a *liability of error*, as a condition for resources falling under one’s direction, the individual is transformed into the entrepreneur. For the entrepreneur, who assumes true uncertainty by way of organized venture in the form of an enterprise in which they, by guaranteeing the value of their own judgement (estimates) to subordinates, bear ultimate responsibility, there is but one possible remuneration: the residuum.

This residuum is profit, and it is what remains after payment is made, at competitively-determined rates, to all claimants for all goods and services for which competition exists. Specifically, it is the difference between the market price the entrepreneur guarantees for productive services he employs- determined in a competitive bidding process with other entrepreneurs- and the market value of the output produced under his direction. This guaranteed market price for productive services is a *wage*, and is equal to the anticipated value of the laborer’s (agent’s) specific contribution to the output.⁶⁴ The propensity of entrepreneurs, as a group, to bid up wages for productive services is the main driver of their profits⁶⁵ since their income is the residual after wages, imputed in the competitive bidding process, are paid out. The distinction between wages and profits is the distinction between risk and uncertainty.⁶⁶

⁶³ This guarantee is what Knight refers to as “ultimate responsibility”: the fact of assuming uncertainty.

⁶⁴ Any decision to enter into a contractual wage agreement involves an estimate, on the part of both parties, of the value of the contribution as well as of the market price of the final output to which a contribution would be made.

⁶⁵ It is of course clear that other important factors will be the diminishing returns from entrepreneurial ability as well as their proportion in size relative to non-entrepreneurs.

⁶⁶ And is also the distinction between perfect and actual competition.

A wage, or any economic rent, is a *contribution residual*; it is what is paid out after deductions are made for the contribution of other distributive shares of production.⁶⁷ Profit, by contrast, is a *margin-of-error residual*, a miscalculation on the part of either the entrepreneurs, the agents, or both, in the wage-bidding process whereby the entrepreneur does not end up paying the competitive price that is fixed in advance of productive services being rendered. It is the imperfect knowledge of the future, a product of change, rather than change per se, that is necessary in explaining why profits arise.⁶⁸ Specifically, the sheer fact that the results of human activity are inherently unpredictable, where any probability attributed to them is meaningless, is why profits arise.

Proposition 1: For a firm, higher uncertainty is associated with a higher ROA

Proposition 2: For a firm, higher uncertainty is associated with a higher ROE

In the event that probabilities of outcomes are actually *known*, a *definite* return is imputed to the activity in question, but such definiteness is the hallmark characteristic of a wage, not a profit. And contractual wages do not involve ultimate responsibility and, by extension, the liability of error of judgement because they are paid out for services involving predictable routine tasks. Further, if outcomes were *known*, this wage compensation would be *competitively* determined, and therefore set exactly equal to the return of the economic undertaking, eliminating any profits from the undertaking. It should thus be evident to the reader that if the nature of risk was *exclusively* of a *known* calculation or probability, then there couldn't be a return for risk-taking. That is because if the probabilities of gains or losses are in any way attainable, either mathematically or statistically, then risk could always be avoided by paying a fixed premium in exchange for insurance.^{69 70} In this case risk would not exert any

⁶⁷ Contribution is specifically the marginal contribution of a productive unit multiplied by the number of units

⁶⁸ An anticipated change that does not materialize would have the same effect as an unanticipated change that materializes. It is not change that brings about profit, but rather that actual conditions deviate from those expected and on the basis of which business activity was arranged.

⁶⁹ Even in the event that the individual forgoes the insurance, this would then be no different than a gamble, securing a profit due to luck rather than from knowing the outcome.

⁷⁰ The insurance firm itself would not see profits either because if the probabilities are known, there would be a sufficient number of competing insurance firms such that the premium would be competitively set to the cost of providing them, eliminating profits.

considerable influence on the distribution of income (Knight, 1921) and the entrepreneur would cease to be an entrepreneur (Hawley, 1900). This point of no reward for a *known* risk will be reiterated again in arguing beta as a proxy for uncertainty in the next section.

Proposition 3: For a firm, a higher risk is associated with a lower ROA

Proposition 4: For a firm, a higher risk is associated with a lower ROE

Beta as a proxy for true uncertainty

Notwithstanding the common, and loose, labeling of beta as a ‘risk’, this paper argues that beta is the proper proxy *uncertainty*, in the way the term has been used in this paper and originally argued by Frank Knight. The financial metric beta (β) measures a special form of “risk”, one that is undiversifiable because it stems from general market movements rather than from idiosyncratic factors. It is the amount of incremental “risk” to an already-diversified portfolio. A market portfolio of all investable assets has a beta of exactly one. There are two reinforcing reasons by which this paper argues beta as a feasible proxy for true uncertainty. First, its relationship to the risk-free rate in the Capital Asset Pricing Model (CAPM).⁷¹ Second, its relationship to Entropy in Information theory.

In the CAPM model, beta is the *only* kind of risk for which investors should receive an expected return *higher than the risk-free rate* of interest (Fama, 1976). Beta’s relation to the risk-free rate is of great importance to the arguments of this paper. The risk-free rate of return is a theoretical rate of return of an investment containing absolutely zero risk. It has zero variance in returns, implying that it is uncorrelated with any other asset. Thus, when the risk-free asset is combined with another asset, any change in the return is *linearly* related to the change in the risk as the ratio of the combinations change. To the investor, the risk-free rate is the minimum return they expect since no incremental risk is accepted unless the investment

⁷¹In the CAPM literature, beta is referred to as a “risk” but its definition is in fact the same as that which Knight termed “uncertainty”. This imprudent labeling of beta as a “risk” is symptomatic of the larger problem across literatures of interchangeably using the terms *risk* and *uncertainty* - the very problem Knight sought to tackle almost 100 years ago, and apparently to no great avail.

returns a rate higher than the risk-free rate. However, in reality, there is no such thing as a truly risk-free investment; even the safest of investments carries some amount of risk, however small. What is commonly used as a proxy for the risk-free rate is the three-month U.S. Treasury bill. That is because an investor can *almost be certain* that the US government will be solvent in 90 days in order to pay the interest on the bond. It is, for practical purposes, as close to absolute certainty as one can be in the financial markets. In the case of US T-bills, investors estimate with near certainty that the US government will respect its financial obligations in the future, and so the return one receives for assuming the risk of lending to it is correspondingly near zero. This characteristic is consistent with the arguments put forth in this paper: if risk is of a known probability, there could be no return for assuming it. Thus, it becomes apparent that another kind of “risk” must exist, one for which a return is in fact received; in the CAPM model, the return associated with this kind of “risk” is beta, which represents what this paper deems to be true uncertainty.

Information theory provides another way of quantifying uncertainty: *entropy*, which measures the unpredictability of a particular state with respect to its information content (Mackowiak & Wiederholt, 2009). Viewing the problem from an information standpoint is particularly useful since, when maximizing objective functions, decision makers actively seek out information (Jensen and Meckling, 1992) but have limited cognitive ability to do so (Cyert & March, 1963; Simon, 1947). Thus, as per information theory, messages are communicated, between multiple parties, through a channel, over which, the message is modified. The receiver of the message must then *infer* which message has been transmitted. At its core, information theory quantifies information as a reduction in *uncertainty*, which is measured by entropy. Entropy is zero when the outcome is certain, and says nothing of the meaning behind the information, but rather only of the probability of observing an event.

The common link between *beta* and *entropy* is the correlation coefficients present in each of their equations. The basic reasoning is, as argued earlier in the paper, that correlations engender uncertainty because greater correlations impoverish predictability precisely because they increase the necessity of factoring in peripheral factors that influence the focal correlation. Due to diminishing returns on our mental capacity to consider factors, there is a limit on the number of correlations we can consider. Therefore, both metrics capture unpredictability, or uncertainty, through their correlation coefficients.

From Mackowiak & Wiederholt (2009), the Entropy Equation⁷² can be written as

$$I(\{X_t; Y_t\}) = \frac{1}{2} \log_2\left(\frac{1}{1-\rho_{x|y}^2}\right) \text{ where } \rho^2 \text{ is the correlation coefficient between variables}$$

X_t and Y_t .

When the correlation coefficient $\rho_{x|y}^2 = 0$, we have

$$I(\{X_t; Y_t\}) = \frac{1}{2} * \frac{\ln(1)}{\ln(2)} = \frac{1}{2} * \frac{0}{\ln(2)} = 0$$

As such, when the correlation coefficient, ρ , between two processes (two variables) is zero, then entropy (i.e. uncertainty) is also zero.

The beta of a portfolio can be expressed in terms of correlations and standard deviations

$$\beta = \rho_{x,y} * \frac{\sigma_y}{\sigma_x}$$

which is precisely how this paper calculates beta for reasons elaborated on in the methodology section.

Thus, as we have the correlation coefficient (ρ) in *both* beta and entropy, we can see how minimizing uncertainty would also mean a beta of zero; that is, zero correlation to the market.

⁷² Derivation provided upon request

Hypotheses

Consistent with what has been argued throughout this paper thus far, the following is a summary of the propositions are put forth in this paper

Proposition 1: A higher firm β is associated with a higher ROA (*supported*)

Proposition 2: A higher firm β is associated with a higher ROE (*not supported*)

Proposition 3: A higher risk (stock volatility) is associated with a lower ROA (*supported*)

Proposition 4: A higher risk (stock volatility) is associated with a lower ROE (*supported*)

In addition to the four main propositions of this paper, I test whether or not volatility of the uncertainty (i.e. correlations to the wider market) acts as a bonus compensation to investors.

As such,

Proposition 5: A higher market volatility is associated with a higher ROA (*not supported*)

Proposition 6: A higher market volatility is associated with a higher ROE (*not supported*)

Methodology

I draw longitudinal data from the economy-wide S&P 500, covering the period of March 1994 to June 2017. The final sample size is 114 firms, with approximately 10,500 observations. All regressions are done on quarterly data due to the fact that ROA and ROE are reported on a quarterly basis; betas are however calculated based on daily price data. The data has been pulled from Bloomberg, Thomson Reuters, CRSP, Yahoo Finance, and S&P Capital IQ. For the regressions, a fixed-effects model, with cluster robust standard errors on firms (Models 1 & 2) is used. For robustness purposes, I conduct bootstrapping with 1000 iterations (Models 3 & 4) and then multiple imputation with 50 cases and 1000 iterations (Models 5 & 6) as a further robustness check due to missing data, which is a natural occurrence with financial data and time horizons of this length. However, the data for the six models are always missing-completely-at-random (MCAR).

Dependent Variables

Measurements of firm profitability include Return on Assets (ROA) and Return on Equity (ROE). ROA measures exactly how efficient a firm is in using its assets to generate earnings. ROE, by contrast, measures how much earnings are generated with shareholder money; in other words, how effective a firm is in turning invested cash into greater earnings. Both of these metrics are reported quarterly, therefore the regression analysis is done on quarterly data (although betas are calculated on the basis of daily data).

- ROA= Net Income / Total Assets
- ROE= Net Income / Shareholder Equity

Main Independent Variable

Beta. Betas are estimated as a function of the product of the three-month daily standard deviation (volatility) and the four-month three-day correlations. For correlations, three-day returns⁷³ ($r_{i,t}^{3d}$) are used to account for nonsynchronous trading (which only affects correlations), and a somewhat longer horizon because correlations move more slowly than volatilities (Frazzini and Pedersen, 2014). Daily data, rather than monthly data, was used for returns as the accuracy of covariance estimation improves with the sample frequency (Merton, 1980). Our estimated beta for security i is given by

$$\beta_i^{TS} = \rho_{i,m} * \frac{\sigma_i}{\sigma_m}$$

Finally, to reduce the influence of outliers, I follow Vasicek (1973) and Elton, Gruber, Brown, and Goetzmann (2003) and shrink the time series estimate of beta toward the cross-sectional mean as per the Bayesian shrinkage factor given by

$$w_i = 1 - \sigma_{i,TS}^2 / (\sigma_{i,TS}^2 + \sigma_{i,XS}^2)$$

⁷³ $r_{i,t}^{3d} = \sum_{k=0}^2 \ln(1 + r_{t+k}^i)$

where $\sigma_{i,TS}^2$ is the variance of the estimated beta for security i and $\sigma_{i,XS}^2$ is the cross-sectional variance of the betas.⁷⁴

Thus, beta is $\beta_i = w_i * \beta_i^{TS} + (1-w_i) * \beta_i^{XS}$

Secondary and Control variables*⁷⁵

- *Risk**. This is the proxied through what is traditionally been a proxy for risk: volatility. Specifically, the volatility of a firm's stock returns since this is idiosyncratic to a firm and can always be reduced through diversification. Stocks with high idiosyncratic volatility have realized low returns (Ang, Hodrick, Xing, Zhang, 2006, 2009; Falkenstein, 1994). Idiosyncratic volatility is defined as the three-month standard deviation of beta-adjusted residual returns. Residual return = $R - R_f - \beta(R_m - R_f)$. For simplicity, I set the risk-free rate (R_f) to zero. Therefore, the formula is reduced to $R - \beta * R_m$, where R is the stock price return and R_m is return of the benchmark.⁷⁶
- *Market Volatility** (mvol). Of the S&P 500 to account for the possibility that higher market volatility might push returns higher.
- *Firm Size*. Fama and French (1992) demonstrate that the relationship between beta and returns becomes even flatter after controlling for firm size.
- *S&P 500 Level* (spx). To account for the state of the economy or market.
- *Inflation* (cpi). This is to account for potential effects of money illusion, and is equal to the one-year US CPI inflation rate (Frazzini and Pedersen, 2014).
- *Market return* (mreturn). This is the return on the S&P 500 to account for noise (Frazzini and Pedersen, 2014).
- *Stock return* (sreturn). This is to account for momentum (Frazzini and Pedersen, 2014).

⁷⁴ The shrinkage factor places more weight on the time series estimate with a lower variance or when there is large dispersion of betas in the cross section. Pooling across all firms, the shrinkage factor w_i has a mean of 0.606

⁷⁵ Industry effects are not controlled for consistent with the findings of Asness et al. (2014) showing that industry bets are not drivers of the relationship between returns and beta.

⁷⁶ Previous research in management testing beta has made a crucial error in their empirical studies by not controlling for idiosyncratic risk which is inherently captured in the metric beta. Because of this, the authors were left wondering why there exists strong correlations between systematic and unsystematic risk (e.g. Lubatkin & Chatterjee, 1994; Miller & Bromiley, 1990).

Results

Table	1.		Correlation					Matrix
	uncert~y	risk	firmsize	cpi	spx	mvol	mreturn	sreturn
uncertainty	1.0000							
risk	0.2514	1.0000						
firmsize	-0.0393	-0.2230	1.0000					
cpi	-0.0100	-0.2155	0.2645	1.0000				
spx	-0.0655	-0.2053	0.3087	0.8591	1.0000			
mvol	-0.0265	0.4803	-0.0100	0.1872	-0.0267	1.0000		
mreturn	0.0199	0.0841	0.0540	0.1570	0.1018	0.2384	1.0000	
sreturn	-0.0608	0.1851	-0.0370	0.0113	-0.0037	0.1190	0.2977	1.0000

Table	2.		Regression			Results
	(1) ROA	(2) ROE	(3) ROA_bs	(4) ROE_bs	(5) ROA_mi	(6) ROE_mi
uncertainty	1.018** (2.56)	-0.267 (-0.12)	1.018*** (4.64)	-0.267 (-0.18)	1.006** (2.55)	-0.303 (-0.14)
risk	-49.00*** (-3.82)	-327.2*** (-2.88)	-49.00*** (-6.50)	-327.2*** (-3.51)	-47.03*** (-3.69)	-326.2*** (-2.97)
firmsize	0.00000601 (1.22)	-0.00000971 (-0.06)	0.00000601*** (4.87)	-0.00000971 (-0.16)	0.00000573 (1.21)	-0.00000166 (-0.10)
cpi	-0.0329*** (-4.56)	-0.0439 (-1.07)	-0.0329*** (-13.38)	-0.0439** (-1.98)	-0.0316*** (-4.42)	-0.0424 (-1.06)
spx	0.000308 (0.84)	0.00577* (1.91)	0.000308** (2.12)	0.00577*** (4.04)	0.000295 (0.81)	0.00591* (1.98)
mvol	16.66 (1.11)	75.32 (0.96)	16.66* (1.91)	75.32 (1.04)	17.95 (1.23)	91.04 (1.17)
mreturn	7.935** (2.03)	57.63** (2.43)	7.935* (1.93)	57.63** (2.43)	8.241** (2.09)	56.20** (2.32)
sreturn	0.426 (0.17)	-11.73 (-0.75)	0.426 (0.17)	-11.73 (-0.66)	0.0125 (0.00)	-11.74 (-0.75)
_cons	12.50*** (11.01)	26.08*** (3.17)	12.50*** (32.33)	26.08*** (5.79)	12.23*** (10.85)	25.43*** (3.16)
N	10523	10504	10523	10504	10716	10716

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.010

The findings are very interesting. A significant positive impact on ROA from increased uncertainty (beta) is found, but not for ROE. Furthermore, the results show that assuming any risk (proxied through standard deviation of stock return) harms profitability. Surprisingly, market volatility (mvol) does not act as a “bonus return” on top of the return earned for the magnitude of uncertainty (beta) in model 1 (but it does in the bootstrapped model 3). Overall, the results point to investors being punished for not diversifying (i.e. taking on more risk) and rewarded for assuming the uncertainty of doing so. As such, the results point to 1) the theory

of the firm's predications- the necessity of owning assets in the face of economic contingencies- being consistent with greater profitability and 2) the need to distinguish between risk and true uncertainty as investors are compensated differently for assuming them.

But the fact that, under uncertainty, there is a return to assets (ROA) but not to money (ROE) warrants further reflection. It would appear that the explanation lies in the very way in which this paper defined true uncertainty: the probability that diversified *assets* pooled within a firm suddenly becoming undiversified due to an exogenous shock. Investors receive a profit return for owning *assets* that risk becoming undiversified whereby what was once a wide scope of operations suddenly becomes near singular. In other words, investors are compensated not for diversifying but for the *unknown* "risk" of suddenly becoming undiversified.⁷⁷ What is captured, by contrast, in ROE is how well money is making more money. It is apparent that money invested within a firm contains no property in of itself that would allow it to diversify or undiversify (unlike assets). Further, investors, as soon as they purchase a share in a firm, part ways with their money, and in return they gain ownership of the assets of the firm that entitle them to a claim on its residual profits. Thus, investors' stake in a firm is not money but rather assets. When they later sell their shares they sell away their claim on the [future] residual profits returned from that asset and, in return, attain the market value for that claim on asset profits. It is at the moment they sell their shares, they realize any gains (or losses) associated with how well the firm used investor money to make more money (i.e. ROE performance). However, the investor, at the moment they sell their shares, is then no longer, by definition, an investor. An investor's realization (of ROE performance) would of course not take place so long as the investor is still an investor in the firm; in other words, this performance realization is not captured by ROE.

⁷⁷ Unknown risk is what is referred to as uncertainty in this paper and Knight (1921)

Discussion

Uncertainty in the sociological and management literatures

Although this paper has largely taken the economics view of uncertainty, it is worthwhile to highlight the views of other literatures on the subject. Edwards (1954) introduced economic theories to psychology, which spurred psychology research into choice-behavior (Rakow, 2010). Herbert Simon's work on bounded rationality was very much about decisions under uncertainty, that is, acting on limited information. The psychology research has focused on both contexts: decisions made under situations of uncertainty (e.g. Gilovich et al., 2002; Tversky & Kahneman, 1974) as well as under situations of risk (e.g. Kahneman & Tversky, 1979; Tversky & Kahneman, 1992).

In the context of *uncertainty*, for example, Tversky and Kahneman (1974) argued that organizations facing uncertainty substitute probability assessments with 'simpler judgmental operations. In the context of *risk*, by contrast, Kahneman & Tversky's 1979 paper on prospect theory diverged from expected utility (Savage, 1954) and subjective expected utility (von Neumann & Morgenstern, 1947). However, prospect theory research still focused on decision making in conditions of risk (Camerer & Weber, 1991), and risk-based decision frameworks- in economics, organization theory, and organizational behavior- are increasingly viewed by researchers as being quite simplistic and unrealistic (Teece & Leih, 2016).

In the management literature, uncertainty has been associated with a lack of information (Luo and Zhao, 2013) or a lack of clarity (Daft and Lengel, 1986) with respect to economic and commercial conditions. These can relate to technological uncertainty (Anderson and Tushman, 1990), policy uncertainty (Banerjee et al., 2018), or from both (Miller, 1993), where economic and socio-political factors are nearly indistinguishable (Boddewyn, 1988).

Summary

In this paper I have sought to tackle the omission of a crucial distinction in the literature on the theory of the firm, hypothesizing that the distinction is necessary because of its implications for firm profitability and, by extension, for that of investors as well. In doing this, I first carefully delineated the fine, and often convoluted, difference between risk and true uncertainty. The argument centered on risk being situations in which outcomes are predictable and thus subject to elimination through the insurance principle, the pillar of diversification, while uncertainty were situations in which outcomes were unforeseeable such that any attempt at a real probability would be meaningless, and thus individuals must resort to innate ability to make estimates or form judgements. The possession of the crucial ability to form correct estimates or judgements is what separates the entrepreneur from the masses. For it is the entrepreneur who, gifted with intuition and brimming with confidence, dares to venture. They place the weight of ultimate responsibility on themselves by assuring others a guaranteed wage in return for control over productive services in a world characterized by unpredictability. As such, the entrepreneur is ultimately liable for decisions associated with the enterprise because their income, the profits, is the remainder after wages are paid out. Profits, or loss, is manifestly an outcome of uncertainty. It is by the same token that no profit, or loss, can arise for a responsibility where outcomes are certain, because the returns to such a “responsibility” are then *competitively* imputed into a wage that necessarily equipoises the returns to the economic undertaking, annihilating profits. The empirical results are consistent with this: investors are rewarded for the uncertainty built up in an effort to diversify away risk, rather than for taking on risk itself.

Limitations and future research direction

It will almost seemingly be inevitable that the question arises of whether or not Net Income, present in ROA and ROE, represents pure profit as described in this paper. It is of

course a practical impossibility to distinguish wages, or any rent, from pure profit. All actual income contains elements that are rent and elements that are pure profit. The presence of uncertainty, the condition on which various income sorts are differentiated in the first place, renders it impossible to truly say how much of any income is of one type or the other. However, we can take comfort in the fact that a negative relationship between risk (an economic undertaking with a predictable outcome) and ROA was found. As risk increases, wages would be bid upwards in order to deal with this economic undertaking, which, as argued earlier, is the chief factor that determines residual income, that is, profits.

However, good proxies for pure profit can be established. Income derived from intangible or high-tech assets could be argued to be income derived from conditions of uncertainty. Argyres (1995) argued that technological uncertainty was akin to Knight's concept of uncertainty and that it can arise when different agents may have different ideas about the underlying probability distribution of possible outcomes of various technical development paths. By contrast, income derived from routine assets (e.g. fees routinely earned on a deposit account) would involve almost no responsibility, and a decision was taken in that regard precisely because it was a sure one rather than venturesome or enterprising.

Furthermore, the effect of uncertainty on the returns of short-term vs long-term assets would undoubtedly be of great extension to the research question at hand. Length of the production process is one of the two key determinants of uncertainty.⁷⁸ As such, the inquiry into whether or not, and to what extent, uncertainty affects the returns on short versus long-term assets would serve to further bolster the arguments made in this paper, or conversely, attenuate them. Whether it is a greater scope of activities or time, there is greater uncertainty due to the fact that estimates must then be made over more precarious lengths. Thus, one would

⁷⁸ The other being the general level of economic wants of consumers. The more they are of staple goods, the easier they are to predict; the more they are of aesthetic, or impulse, goods, the harder they are to predict.

expect to find a stronger relationship between uncertainty (beta) and long-term asset returns versus the returns on shorter-term assets.

Managerial implications

The practical implications here for managers are especially important for “without more precision in establishing the existence of environmental complexity and the means through which it impinges on an organization, the antecedents for theorizing internal dynamics are neither defined nor established empirically” (Wry et al., 2013). In the foregoing arguments of the paper, little effort was made to break away from the notion of the *pure entrepreneur*, that is, the entrepreneur who holds the dual role of ultimate responsibility (guaranteeing wages) and control (making judgement-based decisions). If the world consisted uniquely of pure entrepreneurs, it would be due to it being impossible to obtain knowledge of the abilities of others. For no one would place their resources under the control of another without a guarantee, and no one could become the entrepreneur without being able to guarantee this themselves.⁷⁹

However, the fact that individuals do form estimates, a form of knowledge procurement, of the ability of others means that they are not necessarily assumed to be unwilling to place their productive services under the control of others without receiving a guarantee of a fixed remuneration. To the extent that they are confident in their own ability to judge the ability of others, they go ahead and place their productive services under the control of a hired executive without such a guarantee, and consequently assume ultimate responsibility. As a result, it may seem that the transfer of the control function from investors to a hired executive, who in fact executes or does the “controlling”, means that the function of responsibility is alienable from the function of control. However, upon closer inspection, we will see that this can never truly be the case, and this inseparability has interesting and important implications for management. To see this, it becomes necessary to refer to the earlier

⁷⁹ It goes without saying that similarly, due to this impossibility of obtaining knowledge of others, no third party would underwrite the guarantee.

notion from Knight (1921) that it is one's judgement of people (and their ability to deal with situations) rather than of one's judgement of situations that is most important within an organization.

Thus, the type of knowledge on which responsibility and control depend is not the knowledge of situations and the means for dealing with them; it is the knowledge of others' knowledge of such things. In an organized setting, the challenge of judging situations is therefore superseded by the more daunting challenge of judging the ability of others to estimate situations. As such, the locus of error is displaced from errors in the estimates of *situations* to errors in estimates of *people* themselves since organized control of nature depends less on knowing nature than it does on the possibility of knowing the accuracy of others' knowledge of nature, and their capacity to use this knowledge (Knight, 1921). It becomes apparent that the principle modus operandi of *control* is to select the right person and delegate tasks to them. However, when control is accurately located within the organization, its inseparability from responsibility for its correctness will be evident.

Consider the most monotonous of positions at the bottom of a hierarchy; most of their work would be mechanical and routine, but even such a position would occasionally deal with at least some uncertainty and, in such cases, the subordinate is forced to exercise an important judgment in whether to tackle the uncertain situation themselves or to appeal to their supervisor for guidance. The superior of course does not know, with certainty, the ability of their subordinate to do the job, and so exercises an even more important level of judgement when they assign the subordinate to this position and set their wage accordingly. As such, the outcome is that the uncertainty and responsibility the subordinate faces are effectively transferred to the superior, because the true uncertainty is the superior's estimate of his subordinate's ability to do the job. What happens, as a result, is that the subordinate's function then becomes somewhat of a ["routine"] duty whereby they employ their best judgement but

leave the consequences to others higher up in the hierarchy. However, this upward pass-through of responsibility need not necessarily stop at this level of the hierarchy. The responsibility of this superior's ability to judge the subordinate's ability is further transferred up to his hierarchical manager in those cases that are even more extraordinary, or uncertain, than the ones that landed on the superior's desk. The effect is that the uncertainty passes on to the manager who had hired and tasked the superior of the subordinate. It becomes clear that at the same time that selection of personnel and delegation of tasks work their way down the hierarchy, responsibility makes its way up the hierarchy, becoming more "ultimate" in nature, and this ascent continues in stepwise fashion until the uppermost echelons of the organization are reached. However, even the chief executive was placed in their position by someone, and so the responsibility for errors in her judgement is similarly further passed upwards to the board of directors that elected her, before finally reaching those who have ultimate responsibility: the investors. It is investors who have no task elected for them, but rather elect a board, and task it with electing a chief executive who is tasked with electing deputies and so on and so forth. The only "risk" which leads to a profit is a unique and true uncertainty stemming from an activity for which responsibility cannot be insured nor capitalized nor salaried (Knight, 1921). The members of a corporation have no ultimate responsibility at all; only the assets of the corporation are liable for the corporation's errors in judgements. This is consistent with the notion that the hired manager makes decisions but the enterpriser takes the consequences of decisions (Hawley, 1900).

The principle of organized economic activity is in fact confronting uncertainty in individual judgments by grouping these judgements. This is the principle of insurance. The overall outcome, for the firm, can then be said to depend on a sort of "average" competency of all persons within the organization to perform their duties, where a cancelling-out of errors in judgements occurs across an individual's decisions as well as across the decisions of all

employees. The determinants of the level of this “average” is set in motion from the very top when individuals make estimates of the capacity of their direct subordinate to do a job, and subsequently place them in that position and remunerate them accordingly. This sets the tone for the rest of the organization. It will in fact determine the threshold in quality of judgements before an inquiry is passed up the hierarchy; the higher the threshold, the better uncertainty is dealt with at lower levels of the hierarchy, which translates to greater profits for investors. It is thus manifest that the selection of individuals with the highest capacity to deal with unique situations represents one of the most important aspects of an organization.

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Firms

3M Company	Avery Dennison Corporation	Cincinnati Financial Corporation
Abbott Laboratories	Ball Corporation	Cintas Corporation
Aflac Incorporated	Bank of America Corporation	Cisco Systems Inc
Air Products and Chemicals, Inc.	Baxter International Inc.	Citigroup Inc.
Alliant Energy Corporation	BB&T Corporation	Coca-Cola Co/The
Altria Group, Inc.	Becton, Dickinson and Company	Colgate-Palmolive Company
American Express Company	Best Buy Co Inc	Comcast Corp
American International Group, Inc.	Boeing Co/The	Comerica Incorporated
AMETEK, Inc.	Bristol-Myers Squibb Company	Conagra Brands, Inc.
Amgen Inc.	Cabot Oil & Gas Corporation	Corning Incorporated
Anadarko Petroleum Corporation	Cadence Design Systems, Inc.	Costco Wholesale Corp
Analog Devices, Inc.	Cardinal Health Inc	CSX Corporation
Andeavor	Caterpillar Inc.	Cummins Inc.
Apache Corporation	CenturyLink, Inc.	CVS Health Corporation
Apple Inc.	Chevron Corp	Deere & Company
Applied Materials, Inc.	Chevron Corporation	Dover Corporation
Archer-Daniels-Midland Company	Church & Dwight Co., Inc.	Duke Energy Corporation
AT&T Inc.	Cigna Corp	Duke Realty Corporation
Automatic Data Processing, Inc.	Cigna Corporation	Edison International
Eli Lilly and Company	Helmerich & Payne, Inc.	Laboratory Corporation of America Holdings
Emerson Electric Co.	Hess Corporation	Leggett & Platt, Incorporated
EOG Resources, Inc.	HollyFrontier Corporation	Lockheed Martin Corp
EQT Corporation	Home Depot Inc/The	Lowe's Cos Inc
Eversource Energy	Honeywell International Inc.	Merck & Co Inc
Exxon Mobil Corporation	Humana Inc.	Microsoft Corp
Federal Realty Investment Trust	Intel Corporation	PepsiCo Inc
FedEx Corp	International Business Machines Corp	Pfizer Inc
Fifth Third Bancorp	International Flavors & Fragrances	Procter & Gamble Co/The
Flowserve Corporation	International Paper Company	Sysco Corp
FMC Corporation	J.B. Hunt Transport Services, Inc.	Target Corp
Ford Motor Co	Jacobs Engineering Group Inc.	Tyson Foods Inc
Franklin Resources, Inc.	Johnson & Johnson	United Technologies Corp
General Dynamics Corporation	JPMorgan Chase & Co.	UnitedHealth Group Inc
General Electric Company	Kansas City Southern	Valero Energy Corp
Genuine Parts Company	Kellogg Company	Verizon Communications Inc
Harley-Davidson, Inc.	KeyCorp	Wal-Mart Stores Inc
Hasbro, Inc.	Kimberly-Clark Corporation	Walt Disney Co/The
HCP, Inc.	KLA-Tencor Corporation	Wells Fargo & Co

CHAPTER 5 : DISSERTATION CONCLUSION

Overall, this dissertation project is concerned with uncertainty, resources and organizations. Although the first two papers focused on *resource dependence theory* and the third paper on the *theory of profit*, both theories thematized uncertainty prominently. In RDT, uncertainty brings about the necessity of assessing the complex external environment in order to manage dependencies, principally through resource control. In the theory of profit, uncertainty forces individuals to rely on estimates in making decisions, with those possessing superior intellect and confidence, in forming the estimates, securing resources. As such, both theories emphasize actors using assessments, or estimates, as a way of controlling resources to deal with uncertainty. However, both theories also recognize that environmental *complexity* introduces biases into these estimates and assessments. Thus, the chief limitation in dealing with uncertainty is human cognitive ability.

Resource dependence theory states that those with superior estimates enable particular firm strategies that permit control of resources and power, which provides stability in outcomes. These strategies include restricting information flows, deflecting controversial actions onto others, shaping perceptions, organic growth, M&A, establishing ties to other organizations in order to coordinate, procure information or establish legitimacy and, finally, the use of political strategies to change or dismantle government regulations (Pfeffer and Salancik, 1978). However, this dissertation project largely avoids detailed treatment of the aforementioned strategies of RDT. This is because the goal of the first two papers is not to simply restate what RDT has to say, which is mostly what research nowadays does with its ceremonial citations of Pfeffer and Salancik's classic 1978 book (Wry et al., 2013). Rather, the goal of the first two papers is to *add* to the theory-development of RDT, which has been lacking and has resulted in a research exodus from the RDT tradition.

Similar to RDT, Knight's theory of profit also predicts that those with superior estimates will control resources. Specifically, in an uncertain world where individuals differ in their intelligence to form estimates, as well as in the degree of confidence they have in their estimates, the result is an economic system in which the confident and intrepid insure the doubtful and reluctant by *guaranteeing* them a contracted income in return for furnishing productive resources under their managerial *control*. To deal with uncertainty, this enterprising individual, with superior estimates, will then engage in many ventures such that they spread their estimates over a large number of undertakings in order to secure stability in their overall outcomes.

Rather than exhaustive analysis, humans mostly act on estimates because the future depends on a sufficiently large number of factors and so no reasonable effort is made to consider all of them. In order to simplify complex webs of relationships, the numerous and relatively less important factors of a situation are discarded in order to obtain laws or principles in a general sense. Thus, humans tackle uncertainty intelligently because these laws and principles are *approximately* true and are adeptly discounted on the basis of their incompleteness (Knight, 1921).¹

This dissertation project detailed three ramifications of firms handling uncertainty through resources: 1) subsidiary power decline, 2) greater subunit focus on external power dynamics, and 3) reward for uncertainty but not risk. The first paper theorized the decline of subsidiary power as the subunit externally embedded into its local environment and its resources became increasingly context-specific, or idiosyncratic. This idiosyncrasy is driven by knowledge-based factors such as casual ambiguity, absorptive capacity, and arduous relationships. The second paper argued that in order to understand empirical findings of subsidiaries allowing knowledge transfer declines, it was necessary to parse subsidiary power

¹ Discounting the incompleteness of laws or principles is the same notion as being able to judge the accuracy of one's estimates.

into internal and external power whose interplay (i.e. correlation) determines how much bargaining power, vis-à-vis the HQ, can be leveraged. The main point was that the subunit increasingly focuses on external power dynamics in order to secure resources over which the HQ faces inherent problems in exercising ownership rights. The third paper argued that uncertainty and risk are concepts that need to be distinguished from one another because they compensate differently. While risk was argued to be a routinely [diversifiable] hazard for which no reward can thus arise, uncertainty was argued to be a unique hazard that is not subject to routine diversification, and therefore a reward is gained for the superior ability to confront it.

The first paper synthesized the literature on sticky knowledge transfer with RDT, linking them through their arguments on internal embeddedness. As sticky knowledge becomes more acute with increased subsidiary external embeddedness, the focal subunit reduces interactions with sister subunits- a necessary interaction in RDT for subsidiary power within an MNC. Thus, this paper was centrally about the tradeoffs between internal and external embeddedness, which preclude the emergence of a single all-powerful firm. To the extent that a subsidiary can transfer back, to the MNC, the competencies it developed locally, RDT predicts the subsidiary becoming more critical, more influential and thus more powerful within the MNC (Tavani et al., 2014). However, as its criticality declines due to acuteness in sticky knowledge transfer (e.g. causal ambiguity, absorptive capacity, arduous relationships), paper 1 argued that, per RDT, so too does the subsidiary's ability to influence MNC corporate objectives. In other words, the subunit's power declines because power is dependent on criticality² which is dependent on being able to transfer those unique resources to the MNC in the first place. If a subsidiary is no longer able to transfer critical knowledge back to the MNC because said knowledge has become too relationship-specific, then the subsidiary itself becomes less critical to the MNC since the MNC would come to depend less on the focal unit for its survival.

² That is, being central within the MNC (structural embeddedness) and possessing unique resources the MNC needs (relational embeddedness).

Therefore, the focal subunit's power within the MNC would begin to wane- a prediction that is consistent with the core tenets of RDT. Lastly, paper 1's conceptualization raised the intriguing question of why a subsidiary would allow its knowledge transfers to the MNC to decline if this is a main source of its power within the MNC.

Naturally, paper 2 then explored the intriguing phenomenon of subsidiaries allowing critical knowledge transfers to their MNCs, a power source, to decline. The paper depicted subsidiary and HQ decisions as a function of their utilities, providing novel insights into drivers of MNC power dynamics. This was done by building a conceptual model that captures the presence of *opposing utility functions* between the focal subunit and HQ, which represent the occurrence of goal incongruences. Subsidiary embeddedness decisions were argued to be a function of power accrued in *both* the external and internal markets, with the subunit focused on maximizing total power, not just internal power. The existing literature has thus far exclusively, and unwarrantedly, focused on internal power.

Paper 2's central argument was that a subunit derives greater utility from focusing on external power dynamics relative to internal power dynamics because external relationships secure a path to resources over which the HQ does not possess fiat power. From there, the paper's model then showed that only when actors' utility functions increase in opposing directions does bargaining power materialize and become relevant, which led to the paper's most counterintuitive insight: the HQ seeks to minimize its bargaining power, which is tantamount to eliminating subsidiary rent-seeking. The paper's model also captures how correlations between the internal and external markets impact the subunit's ability to maximize its bargaining power- consistent with management and economic argumentation (i.a. Nell and Andersson, 2012; Tadelis and Williamson, 2012).

The conceptualizations in paper 2 provided researchers with a more holistic and accurate way of using RDT to examine strategic decisions made by subsidiaries and HQs, decisions

which have ramifications for the resource configuration and balance of power within firms. Further, in synthesizing management and economic theories, the paper also responded to a critical need for more visualizations that capture power dynamics (Bouquet and Birkinshaw, 2008).

Paper 3 kept with the central theme of the dissertation project- uncertainty, resources and organizations- but rather than employ RDT, it used Knight's classic theory of profit to problematize the contemporary lack of a proper distinction between risk and uncertainty in the literature on the theory of the firm (although this void is rampant across most literatures today). The problem is tackled is from the standpoint of the 'problem of profit', and any satisfactory elucidation of the problem must clear up the nature of the distinction between perfect competition and actual competition, since the critical distinction between the two is the absence of profit. The answer to this problem is to be found in a thorough examination of the concept of *uncertainty*, and its bearings upon economic processes, when it is present and when it is absent; but *uncertainty* must be understood in a sense radically different from the familiar notion of *risk* (Knight, 1921).

Knight argued that dealing with uncertainty through grouping, to secure outcome continuity, constitutes a strong incentive to extend the *scale* of operations of a business establishment in order to generate greater economies. However, the chief limitation on this was the cognitive capacity of its business' leadership (Knight, 1921). In fact, there is an associated hazard that is just as pervasive as the opportunity to secure economies: that the world will suddenly change and strand the very investments designed to exploit continuity, leaving the firm evolutionarily vulnerable (Winter, 2017). Paper 3 thus argued that while diversification reduces variance, it comes with the latent liability of higher correlations to the wider market. Specifically, as a firm eliminates risk through diversification into the wider economy, it builds up [true] uncertainty through exposure to increasingly opaque correlations dispersed throughout

the economy. These opaque correlations escape the cognitive abilities of its management and are, as such, not subject to elimination. However, it is also precisely and uniquely due to uncertainty that profits materialize because unanticipated changes cause an imbalance between costs and price, which would otherwise be paired through competitive forces that, when unhindered, erase profits nearly as fast as they are created.

To operationalize uncertainty, the paper used beta, arguing the justification based on the CAPM model and information theory. The findings of paper 3 showed a significant positive impact on ROA from increased *uncertainty* (beta), but none on ROE. Furthermore, the results showed that assuming any *risk* (standard deviation of stock return) harms profitability. Overall, the results point to investors being punished for not diversifying (i.e. taking on more risk) and rewarded for assuming the uncertainty of diversifying in order to avoid risk. As such, the results point to 1) the theory of the firm's predications- owning assets in the face of economic contingencies- being consistent with greater profitability and 2) the need to distinguish between risk and uncertainty, as investors are compensated differently for assuming them.

Overall, organizations, including their subunits, handle uncertainty through resource diversification, but this strategy is limited by the cognitive abilities of the decision-makers. In this dissertation, the cognitive limitation resulted in tradeoffs, faced by firms, in each of the three papers. In the first paper, the tradeoff was between internal and external embeddedness where the ramification was subsidiary power decline. In the second paper, the tradeoff was between internal power and external power where the ramification was goal incongruences between the focal subunit and the HQ.³ In the third paper, the tradeoff was between risk and uncertainty, where the ramification was a penalty of risk-bearing but a reward for uncertainty-bearing.

³ That is, the focal subunit placed more emphasis on external relations than internal ones.

In this closing paragraph the dissertation project can be *holistically* summed up as follows. The individual who is confident and venturesome transforms herself into the entrepreneur by *guaranteeing*, to those who are doubtful and reluctant, a fixed remuneration in return for their productive resources falling under her managerial direction. This guaranteed remuneration to others is the bearing of uncertainty, that is, the liability to err in managing the dependencies arising from an unpredictable external environment. The entrepreneur then employs her superior ability to form estimates, based on past experiences, in order to understand complex relations within the environment. In light of her assessments, she consolidates her risks through diversification whereby she absorbs assets and expands the scope of her operations. This allows her to spread her judgements over a larger number of ventures, which provides stability and predictability in the outcomes of her business activities. She relies on being correct on average; that is, although some of her ventures will be spectacular failures involving large losses (e.g. over-embeddedness), a larger proportion of them will rather be relatively unprofitable and she will rely on making her [residual] gains from the occasional large successes. That is, sometimes she wins and sometimes she loses in her bargaining with other economic actors (e.g. contrast figures 6 & 7 of paper two). But she counts on the *long-run value* of her estimates in dealing with uncertainties arising from the conflicting and impinging demands of the complex environment she faces, which includes governments, competitors, suppliers, producers, laborers and customers. Nevertheless, at the end of the day, she is *ultimately* responsible for things not going according to plan: for unanticipated changes occurring or anticipated changes failing to occur. She carries the full burden of the uncertainty that has been built up as a result of her diversifying into a larger scope of activities across the wider market. The extent of this burden of uncertainty is a function of the accuracy in her estimates, and she is only as accurate in her estimates as she is limited in her cognitive ability to procure knowledge.