The resource-based tangle

Towards a sustainable explanation of competitive advantage

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Abstract

The arguably dominant contemporary approach to the analysis of sustained competitive advantage is the resource-based view. Taking Barney (1991) and Peteraf (1993) as representative summary statements of the view, we argue that much resource-based research rests on partial, implicit and problematic assumptions, and that this has led to conclusions that are much less general than the proponents of the view believe. As an example, the widely cited ”value-rareness-inimitability” or “heterogeneity-immobility-ex post and ex ante limits to competition” lists do not stand up to scrutiny. In general, the view suffers from a confusion of what are necessary conditions for the expression of sustained competitive advantage and what are additional conditions which only serve to give the expression of sustained competitive advantage a specific form. We argue that there are only two *necessary* conditions for the expression of sustained competitive advantage, namely uncertainty and immobility, and that all other conditions are additional.

Introduction

The arguably key strategy (content) issue has conventionally been seen as the creation and sustainability of firm-level competitive advantage. A large theoretical and a growing empirical literature exist on the subject. The perhaps dominant contemporary approach to the analysis of sustained competitive advantage (henceforth,"SCA") is the resource-based view (henceforth, "the RBV"), initiated in strategy content research in the mid-1980s by Wernerfelt (1984), Rumelt (1984) and Barney (1986), and continued by these and other writers (e.g., Amit and Schoemaker 1993; Barney 1991, 1997; Black and Boal 1994; Conner 1991; Dierickx and Cool 1989; Grant 1991; Kay 1993; Peteraf 1993; Reed and DeFilippi 1990; Wernerfelt 1995; Wernerfelt and Montgomery 1986; Williams 1992). It is hard to underestimate the strength of the voice of the RBV in the present conversation in strategy research. The critique that we shall present in this paper is thus not an unfairly harsh critique of a budding research program, but rather an overhaul of some of the basic premises of a perspective that has been well established in the strategy field for about 15 years, has been dominant for almost as long, and has gone surprisingly unchallenged.

Of course, some critical voices have been raised (e.g., Ghemawat 1991; Porter 1994; Pedersen 1999). For example, critics have pointed to the RBV's neglect of the firm's environment and its over-emphasis on uniqueness (of resources and strategies), to the chicken-and-egg nature of the problem of ascertaining the temporal priority of firm versus industry determinants of competitive advantage (e.g., Porter 1994), and, relatedly, to the necessarily dual nature of an industry and a firm view of competitive advantage (Ghemawat 1991; Pedersen 1999). While we sympathize with these critiques, our critical points are different.

First, we shall argue that much RBV research rests on partial and / or implicit assumptions and that this has led to a number of problematic conclusions. We provide examples of this.

Second, we argue that the RBV is characterized by a confusion of necessary and additional conditions in the analysis of SCA. Specifically, the RBV has not precisely disentangled those fundamental conditions that are always logically necessary for the expression of SCA from those additional conditions that are not strictly necessary but which may add to the analysis by giving the expression of SCA a specific form. An example that may help illustrate this important distinction is the formation of prices in a market. Here, certain conditions are logically necessary, such as the assumption of the existence of a demand side of the market that values the relevant goods. But whether the particular market is monopolistic, oligopolistic or competitive is, strictly speaking, not necessary conditions for the existence and abstract understanding of pricing. Assumptions about market structure are what we here call additional conditions, which give the expression of market price a specific form.

Third, a point that is closely related to the two previous ones, but is more implicit in the discussion, is that although the RBV has drawn strongly on economics, the adoption of economic principles has been rather incomplete. In fact, in our view this incompleteness may be an important source of such features of the RBV as implicit theorizing (i.e., implicitly working with certain crucial assumptions) and the inability to distinguish between necessary and additional conditions. Fundamentally, the use of economics in the RBV has not gone significantly beyond very basic price theory (Foss 2000).[1] Needless to say, there is much more to economics than this, and a huge potential with respect to further refining and extending RBV reasoning awaits exploitation.

In order to support these claims, we first summarize the RBV, drawing on what may well be the two most quoted and authoritative summary statements of the RBV, namely Barney (1991) and Peteraf (1993) (”*The Resource-Based View of Sustained Competitive Advantage”*). We then present a number of key RBV ideas that turn out to be quite problematic when analyzed through the lens of economic

[1] Notable exceptions are Wernerfelt (1984, 1995) and Lippman and Rumelt (1982).

reasoning (”*Some Fundamental Problems in the Resource-Based View*”). For example, many RBV ideas are put forward as general propositions. However, it is often easy to construct counter-examples to these (and we shall provide some). In our view, this is because the distinction between what are necessary and additional conditions for the expression of SCA is confused in the RBV, and, because a number of conditions are implicitly stated.

As an example of the latter, the RBV argues that resources acquired on informationally efficient factor markets cannot be sources of SCA (Barney 1986). However, nothing is said in the RBV about the institutional basis of trading processes in such markets and nothing is said about the characteristics of those who bargain on factor markets. However, RBV conclusions strongly depend on additional and highly contingent assumptions about trading processes. This is an example of both incomplete use of economics and ignorance of the necessary conditions for the existence of SCA. As an example of the confusion between necessary and additional conditions for the expression of SCA, consider the RBV claim that uniqueness of strategies is a necessary condition for the existence of SCA (e.g., Barney 1991; Aharoni 1993). However, this may only be so if strategies are substitutes; if they are complementary, in the sense that implementing the same strategies raise profits (likely within bounds) for the relevant firms, the claim is, of course, false. Uniqueness is only required for SCA if the additional assumption is made that there are no strategic complements (Bulow *et al.* 1985). So, unless the specific additional condition is taken on board, that strategic complements are absent, uniqueness of strategies is not a necessary condition for the existence of SCA. Furthermore, as we shall point out, uniqueness of strategies is actually not necessarily a condition for the expression of SCA, even in the absence of strategic complements.

The bottom-line of all this is that competitive outcomes are highly dependent on additional conditions regarding competitive activity, bargaining, and much else — conditions that are seldom or never stated explicitly in the RBV.

As a result, RBV frameworks have not yet identified the necessary and sufficient conditions for the existence of (sustained) competitive advantage. In fact, we shall argue that there are only two such conditions, namely *uncertainty* and *immobility* (”*The Determinants of Competitive Advantage*”). These are truly necessary in the sense that we cannot rationalize SCA without these two concepts. On the other hand, they are also the only necessary conditions (i.e., they are sufficient), in the sense that regardless of the specific additional conditions that we impute to the context of competitive advantage — such as the characteristics of competition (e.g., Bertrand or Cournot), the specification of trading processes on factor markets, the protocol of the game, etc. — combinations of uncertainty and immobility may always be chosen so that equilibria with firms that have differential competitive advantages (i.e., realize differential profits) can be supported. However, a comprehensive strategic framework should also identify as many and as precisely as possibly the set of additional conditions which may, in real world strategic settings, define the context of competitive advantage.

The Resource-based View of Sustained Competitive Advantage

The different components of the RBV view of SCA have been laid down in a number of important papers published since the mid-1980s (notably Wernerfelt 1984; Barney 1986, 1991; Rumelt 1987; Dierickx and Cool 1989). Rather than providing a comprehensive literature review of all these contributions, we focus on two much cited papers that elegantly and somewhat differently pull together in simple frameworks the diverse theoretical components that enter into the RBV analysis of SCA. These two papers are Jay Barney’s 1991 paper, “Firm Resources and Sustained Competitive Advantage,” and Margaret Peteraf’s 1993 paper, “The Cornerstones of Competitive Advantage.” We regard these two papers as

authoritative summaries of the RBV on SCA, and shall refer to them throughout this paper rather than to other RBV papers.[2]

Barney's 1991 Analysis

The RBV is conventionally distinguished from other approaches to strategy by taking the individual resource as the unit of analysis when it comes to understanding the sources of SCA. Moreover, the RBV is also often characterized as a distinctive approach by pointing to its beginning from the factor market side rather than from the product market side, again somewhat in contrast to other approaches to strategy. Thus, attention is focused on various characteristics of resources, including the price at which their services are acquired, in order to clarify whether these resources may be sources of SCA.

However, Barney (1991) begins by formulating the analysis of SCA in terms of the *strategies* that firms implement in product markets. According to Barney, one necessary condition for SCA to obtain is uniqueness of product market strategies. In other words, only strategies that are not implemented by competitor firms can secure a SCA. This would seem to make SCA a product market concept (perhaps somewhat in contrast to the usual identification of the RBV with an emphasis on factor markets). However, Barney is quick to point out that although uniqueness of product market strategies is crucial for the expression of SCA, the key to understanding what make strategies valuable and sustain their uniqueness lies at a lower level of analysis, namely at the level of resources that a firm needs to access and control in order to implement its strategies.

Barney then goes on to discuss the necessary conditions that resources must conform to in order to give rise to valuable and unique strategies, that is, to give rise to SCA. Referring to the SWOT framework, Barney defines resources as being

[2] For example, we don't make reference to the paper that is conventionally taken to be the founding contribution of the RBV, namely Wernerfelt (1984). Further reasons for this is that Wernerfelt's paper is perhaps more of a contribution to the diversification literature than to the literature on competitive advantage, is often cited but surprisingly little used, and does not seem to be vulnerable to the critiques of the RBV that we launch.

valuable when they help seizing an opportunity in the firm's environment or when they help neutralizing some threat in that environment, or at least shielding the firm against the threat. By resources being *rare*, Barney seems to have a simple counting sense (as distinct from an economic sense) in mind. Thus, if a million firms control a certain resource, it is not likely to be rare (even if a billion firms badly need the relevant resource). Firms that control valuable and rare resources possess a competitive advantage and will be able to implement superior strategies.

While necessary, these two criteria are not sufficient, since they do not guarantee that competitive advantage can be enjoyed on a sustained basis. This shifts the attention to two additional necessary criteria that resources must conform to in order to give rise to a SCA, namely *non-imitability* and *non-substitutability*. The non-imitability (or more correctly: "costly-to-imitate") condition directs attention to whether (or more correctly: at which cost) competitor firms can acquire or accumulate resources with attributes and levels of attributes similar to some desired resource (Barzel 1997) which produces a competitive advantage. The non-substitutability (or more correctly: "costly-to-substitute") condition directs attention to whether (or more correctly: at which cost) competitor firms can access resources that will allow them to implement the same strategies as some successful firm. This is different from the non-imitability condition because it is not here required that the underlying resources that substituting firms access are the same as those controlled by the successful firm in terms of their composition and level of attributes.

These two criteria directs attention to the barriers that may block imitation and substitution and much research in the RBV has centered on identifying and classifying such barriers (e.g., Rumelt 1987; Dierickx and Cool 1989; Reed and DeFilippi 1990; Grant 1991). It is also these two criteria that allows Barney to define the existence of SCA in terms of situations in which all attempts by

competitor firms at imitating or substituting a successful firm have ceased. Thus, SCA is seen as a property of some essentially unspecified Nash-equilibrium.[3] Barney's framework is summarized in Figure 1a.[4]

XXXXXXXX *Insert Figure a and 1b here* XXXXXXXX

Peteraf's 1993 Analysis

Peteraf's analysis of the conditions for SCA, which is summarized in Figure 1b, is somewhat different from Barney's by more explicitly drawing on basic price-theory, specifically the economic analysis of various types of rent. Moreover, it directly takes individual resources as the relevant level of analysis, rather than strategies.

According to Peteraf, resources yield a SCA to the firm that controls them when they meet four necessary conditions. The first one is that the resource should be *heterogeneous*, where heterogeneity is essentially undefined but may be taken to refer to differences in the amount and level of various attributes of the resource relative to other resources. The implication is that resources that are heterogeneous in this sense will lead to different outcomes when they are used in similar productive occupations (e.g., similar manufacturing processes). In particular, there will be efficiency differences across resources. These efficiency differences translate into differences in rents, both in the Ricardian sense, where rents arise as a result of efficiency differences inside the same resource category (e.g., land), and in the more standard opportunity cost sense, where rent is the difference between the value of the resource in the best and the next-best uses.

Peteraf adds to this that for the firm to actually be able to reap the economic

[3] An idea earlier formalized by Lippman and Rumelt (1982), and going back at least to Demsetz (1973).

[4] It should be mentioned that Barney (1997) has later added the efficient organization of resources as an independent necessary condition for the expression of SCA.

fruits of superior efficiencies, the relevant resources should be characterized by *imperfect mobility* — which means that the resource should be relatively specific to the firm. The underlying story is that bargaining advantage and mobility is directly related. For example, (the owner of) a very mobile resource has an advantage with respect to bargaining over the sharing of the surplus (rent) that the resource's activity in the firm produces, and while the resource may give rise to substantial surplus, the firm (i.e., the other input owners) will not be able to share very much of this surplus with (the owner of) the resource.

In addition to the criteria of heterogeneity and imperfect mobility, Peteraf focuses on competitive forces that relate to acquisition of resources. Thus, following Barney (1986), she argues that resources must be acquired at a price below their discounted net present value in order to yield rents / give rise to SCA — this is the necessary condition of *ex ante limits to competition*. If this condition is not met, future rents will be fully absorbed in the price paid for the resource. Finally, Peteraf focuses on *ex post limits to competition* as a final necessary condition for the expression of SCA. This is a more guarded version of Barney's (1991) condition of non-imitability, and directs attention to the reasons why would-be competitors may find it costly to imitate attractive resources.

Some Fundamental Problems in the Resource-based View

The above analyses have been widely cited and used,[5] and we shall take them as broadly representative of much RBV work on the sources of SCA. In the following paragraphs, we identify problems and ambiguities that are associated with these analyses, and argue that these problems and ambiguities stem from

[5] As, for example, participants in Academy of Management and Strategic Management Society meetings will know.

the fact that the analyses often stop short of identifying fundamental causes of competitive advantage, and that necessary assumptions are usually not stated or even misidentified.

Valuable and Rare Resources

The basic RBV aim is to consider the reach of heterogeneous (rather than homogeneous) resources as causes of heterogeneous outcomes (i.e., differential performance).[6] While this is a worthwhile aim, there are reasons to be less comfortable with some specific ideas concerning this link between heterogeneous resources and outcomes.

As we saw above, Barney (1991) requires that only resources that are rare, valuable, non-imitable, and non-substitutable can be sources of SCA. From an economic point of view, this is a partly pleonastic scheme, since resources cannot be valuable if they are not rare; thus, a rare resource is a valuable resource (Lewin and Phelan 1999; Pedersen 1998). Thus, all the scheme appears to be saying is that a resource that is valuable on a sustained basis is a source of SCA, which, of course, is a tautology, at least if we think of competitive advantage in terms of value creation.[7]

One may argue that the charge that Barney (and those who repeat his scheme) confuses value and rareness turns on value being defined in terms of market price. An alternative interpretation may be to suggest that Barney exclusively uses ”value” in reference to the subjective valuation of infra-marginal consumers/users. In this case, however, SCA is essentially assumed by limiting

[6] We note in passing that heterogeneity of resources is seldom or never defined. One possible understanding of heterogeneous resources is that these are inputs with different levels of valued attributes.

[7] Furthermore, sustainability of competitive advantage is a matter of whether the uniqueness of the relevant resources can be sustained in equilibrium. This depends on the degree of imitability and substitutability of the resources. Now, it is not clear that the condition of substitutability is necessary. From an economic point of view, if resources are functionally substitutable (e.g., can underlie the same strategy), they should be treated as identical (Lewin and Phelan 1999). In other words, substitutability is not an independent necessary condition; it collapses into the hard-to-imitate condition.

the supply of those resources that produce goods at a cost below the customer's willingness to pay. So, the scheme now appears to be saying that the lucky few holding a resource whose products are valued over the competitive price on a sustained basis hold a source of SCA. This re-interpretation does not seem to help much in escaping tautological reasoning.

The important part of the RBV has to do with the distinction between homogeneous and heterogeneous resources rather than with the specific postulated link between heterogeneous resources and heterogeneous outcomes. This is because heterogeneous resources are more likely to be immobile than homogenous resources (e.g., they may be more specific), as we shall later explain. However, even the emphasis placed on heterogeneity may sometimes be misplaced, for example, as when it is claimed that possessing heterogeneous resources in an industry is a necessary condition for success (Barney 1991: 104).

As an example, consider an industry where incumbents control homogeneous endowments (resources), but where competition is Cournot and high entry barriers exist for whatever reason (it doesn't matter whether these are strategic or "natural"). Firms will, of course, earn returns above the competitive level, although the resources they control are identical.[8] As a related example, consider an industry with n identical units of capacity (each unit being controlled by one firm) and given entry barriers. Let y ($0< y <n$) capacity units "die" (e.g., because of natural disasters that physically wipe them out) and trace the resulting equilibrium under Cournot competition. Then, the surviving capacity units/ firms will demonstrate better performance, even though heterogeneity has not

[8] A RBV critic may of course counter that we are actually talking about heterogeneous resources, because incumbents control resources that are different from those controlled by firms outside the industry. However, when RBV writers are discussing heterogeneity, they refer to intra-

increased.

These toy examples suggest, first, the rather elementary point that industry entry barriers must matter for performance, somewhat contrary to the general tenor of the RBV. Second, they suggest the, likewise elementary, point that the form of competition matters for competitive outcomes. While resource-based writers are generally keenly and critically aware of the role of entry-barriers in accounting for performance differences, they have paid little or no attention to the form that inter-industry rivalry may take. For example, Peteraf (1993) illustrates her reasoning with reference to only a competitive price-taking context that only differs from the standard competitive equilibrium model by allowing for some asymmetric information on the level of production technology. Surely, it is completely acceptable to assume the harshest possible competitive conditions, such as Bertrand competition. This may be the case because one wishes to fully concentrate on the impact of heterogeneous endowments on performance differences. But this should be stated and justified, exactly for the reason that the performance distribution in an industry is not just a function of firm-specific resources and industry barriers, but also of the form that competition takes in that industry. Unfortunately, RBV analyses fail to provide explicit specification of the form of competition despite the fact that this additional condition gives distinct shape to the expression of SCA.

A possible import of the reasoning so far is that the important distinction in the analysis of SCA is not really the one between homogeneity and heterogeneity *per se*, but rather the one between mobility and immobility of factors / resources (Baumol *et al.* 1982). Thus, an industry of firms that are homogeneous in terms of the resources they control may nevertheless be characterized by firms with above-normal returns if it is costly for potential entrants to compete in that industry. The above normal returns may be composed of both rents and profits, but the essence is that for some reason it is costly for potential entrants to transfer resources to the

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industry heterogeneity (e.g., Peteraf 1993).

industry and set up production.

The Uniqueness Argument

The emphasis in the RBV on heterogeneous resources as necessary conditions for competitive success is often encountered in a strong(er) version which emphasizes uniqueness of strategies. As we have seen this is the case of Barney (1991) (if not of Peteraf 1993). To quote one author: "[c]ompetitive advantage can be achieved if the firm is able to be *different*. Success is based on using a unique strategy. The ability to protect the uniqueness against imitators ensures continued success" (Aharoni 1993: 31). This emphasis on uniqueness goes back to the founding fathers of the strategy field, such as Selznick (1957) and Andrews (1971). However, it may be at least partly misguided, notably when strategies are *complementary*.

An important distinction in recent industrial organization economics concerns whether firm strategies are substitutes or complements (Bulow *et al.* 1985; Tirole, 1988). For example, consider firm *A* and firm *B*, both placed in the same industry. If firm *A*'s return from implementing a strategy is increasing in firm *B*'s return from implementation of its strategy and *vice versa*, then the strategies of the two firms are complementary. A special case of this obtains when *A* and *B* implement the same strategy. This may be the case in network industries (i.e., industries characterized by network externalities), in which case incumbents, or a subset of the incumbents, may benefit from adopting identical strategies in the sense of achieving returns higher than outsiders or compared to the incumbent firms that don't adopt similar strategies. Or, it may be the case in oligopoly industries in which firms will benefit from implementing and enforcing the same pricing strategies. Clearly, homogenous resources are a distinct *advantage* in the latter case, since it eases the enforcement of oligopolistic collusion (Tirole 1988). The upshot is that because of its emphasis on unique strategies, the RBV (and much of strategy thinking in general) implicitly but erroneously assumes that all strategies are substitutes and neglects complements. In reality both substituting and complementary strategies

matter. However, even if we abstract from strategic complements, further problems remain with the RBV analysis of SCA.

A Theory of Competitive Advantage, or of Rents, or Both?

So far, we have taken differential competitive advantage to be identical to differential profits and/or rents. However, comparing Barney (1991) and Peteraf (1993) actually makes it unclear whether the RBV is a theory of competitive advantage in the sense of a theory of unique product-market strategies where the uniqueness can be sustained in equilibrium (what appears to be Barney's position), a theory of the sustainability of rent differentials in equilibrium (what appears to be Peteraf's position), or perhaps both?

This may sound as hair-splitting, but there is a subtle difference here: SCA in the sense of sustaining a unique strategy in equilibrium doesn't necessarily imply the earning of rents in that equilibrium, and *vice versa.* For example, a firm may persistently implement a unique strategy based on resources acquired in fully competitive and informationally efficient factor markets, in which case the firm may well have a SCA, but actually only realizes the competitive return. Or, to take the inverse case, a firm may adopt the same strategy as a large number of competitors, but may still exploit informational advantages or bargaining advantages in factor markets or simply be favoured by luck, so that while it doesn't have a SCA, it does earn an above-normal return.

Now, the convention appears to be to associate competitive advantage with above-normal returns rather than with unique product market strategies. However, it is easy to see why Barney focuses on unique strategies. Only in this way can he uphold an emphasis on unique, firm-specific resources — the emphasis that is conventionally taken to be the hallmark of the RBV. But as the above discussion of complementary strategies has suggested and as we shall later argue in more detail, a group of firms in an industry may very well implement exactly the same strategies and still earn rents relative to the rest of that industry. The emphasis on uniqueness in the RBV is subject to strong qualifications.

The RBV Factor Market Argument

Barney's 1986 analysis of "strategic factor markets" (mirrored in Peteraf's notion of *ex ante* limits to competition) has become very influential. It provides much of the justification for the notion that one of the features that distinguish the RBV from other strategy approaches is its emphasis on factor markets. Nevertheless, the analysis rests on unstated but crucial assumptions (cf. also Ghemawat 1991). The main point of Barney (1986) is this: Since factor markets can empirically be taken to be at least semi-efficient (in the finance sense), that is, all publicly available information will be reflected in market prices, firms can only hope to purchase resources at a price lower than the discounted present value if they hold some informational advantage or are simply favored by luck. Resources acquired in factor markets that are perfectly informationally efficient cannot yield rents to firms.

This argument is not necessarily wrong. Barney presents it as simply an application of quite standard economics and finance reasoning. However, in the specific formulation adopted by Barney (1986) and by most of those resource-based writers (e.g., Peteraf 1993) who apply his reasoning — namely that if the demand and the supply side on strategic factor markets hold the same information, the price of a resource will equal its discounted present value — the argument is either wrong, or it rests on very specific, but unstated, assumptions.[9]

It is true that under symmetric information, bargaining will lead to a maximization of joint surplus, and, hence, be efficient. No value will be dissipated because of transaction costs and strategic behavior. However, this basic proposition does not imply any claim *per se* about the division of surplus, and certainly not that the supply side appropriates all value, as Barney (1986) asserts. It is perfectly conceivable that a firm may acquire a resource in an informationally perfect factor market at a price below its discounted present value for that firm. It all depends on what is asserted about, for example, the competition on both sides of the market,

[9] For example, Ghemawat (1991) interprets Barney (1986) as having a common value auction in

the institutional set-up in which trading processes take place, and on factors such as the ”impatience” (i.e., time preference) of the traders (Rubinstein 1982; Sutton 1986). These factors determine relative bargaining powers and, hence, the distribution of surplus between the two sides in the trading processes on factor markets.

The ”No Rules for Riches” Argument

Accepting the argument that SCA can only be based on resources that are acquired on informationally inefficient factor markets may suggest the seeming corollary that competitive advantages cannot be enjoyed from publicly available strategic advice (e.g. Barney 1986; Rumelt, Schendel and Teece 1991a; Kay 1993). In other words, in the presence of (informationally) perfect factor markets, there can be no “rules for riches.” Of course, such an argument rests on the *empirical claim* that factor markets are at least semi-efficient. The economic logic appears to be that factor market prices will perfectly adjust, or, even if competitive forces on these markets don’t push prices of the relevant resources in the right direction, then product market competition between numerous firms, all implementing the same piece of strategic advice, will quickly compete away any excess profits.

It is easy to see that this argument can be met with objections similar to those we used to criticize the general point that competitive advantage is not ensured by resources acquired in perfect strategic factor markets. Thus, suppose that firms accept and use advice *á la* “only enter markets that grow fast” or “only enter markets where suppliers are in a weak bargaining position”. Is this useless advice? Only if the advice is associated with post-entry performance distributions that are strictly dominated by pre-entry performance distributions, or, as a rather extreme outcome does not affect the shape of the performance distribution, for example, when these are mean-preserving and risk-adjusted.

But why should this hold in general? Every manager in the economy may know, for example, that the suppliers to a certain industry are particularly weak,

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mind.

but there is no reason to suppose that this translates into a general profit opportunity. At the limit, it is conceivable that only a single firm, (or even none at all), may benefit from the advice, because only this firm has the capability, or sufficiently deep pockets, to exploit the advice. As Richardson (1960: 57) pointed out, "[a] general profit opportunity, which is known to everyone, and equally capable of being exploited by everyone, is in an important sense, a profit opportunity for no-one in particular." The import of Richardson's point is that an analysis of whether firms may benefit from publicly available information simply cannot be made in isolation from the specific details of industries, of the relevant firms, of capital markets (e.g., there may be rationing on these markets) (Richardson 1960).

Moreover, even abstracting from the above arguments, "the no rules for riches" argument is problematic as a general proposition. To see this consider Lippman and Rumelt (1982) (cf. also Mosakowski 1998). In a stochastic equilibrium set-up, in which risk-neutral firms can pay a fee to draw from a random distribution of possible production functions that determine their costs and performance, Lippman and Rumelt showed that firms will not earn any rent on average. Thus, the advice to enter the industry is in this setting risk-adjusted and mean-preserving. However, choosing not to enter the industry means that firms will not earn rents with certainty, whereas the post-entry performance is associated with a positive probability of earning rents. As Mosakowski (1998) put it, there are at least "rules for *chances* of riches."

The Neglect of the Environment

The much-cited findings of Rumelt (1991) have been widely interpreted as an argument that "industry doesn't matter." It is, however, important to understand what this means and what it doesn't mean. Rumelt's findings do indeed point to firm heterogeneity playing the major role for the understanding of performance distributions. But they do not suggest that the industry — and in particular the mode of competition in an industry — can be neglected. As a matter of general

modeling practice, it may be wise to begin by assuming the harshest possible kind of competition — such as Bertrand competition and competitive equilibrium (as in Peteraf 1993) — since all sorts of behaviors and performances may be rationalized by assuming less harsh competition. One might think that assuming, for example, Bertrand competition would allow one to "black box" the environment, as one would not seem to have to bother with complicated oligopolistic interdependence. Such is not the case. For example, under Bertrand competition, returns come to a firm through low costs, as it were. However, profits come to an *industry* through cost heterogeneity. This implies that there is a collective motive to install an industrial structure that maximizes cost heterogeneity[10] — even if this does not minimize costs.

Thus, the form of competition matters for performance, but so does the organization of industry. For example, Farrell *et al.* (1998) examine the vertical organization of complementary activities by analytically separating whether firms compete in terms of selling an end product (a "system") or whether firms compete in terms of selling individual components (that together make up the system). Contrary to intuition, even under Bertrand competition, these two ways of organizing industry are not perfect substitutes (in terms of overall efficiency and firm performances), provided that firm resources (proxied by production costs) differ. This means that the organization of industry (here in terms of systems or component organization) is a choice variable for firms, and that firms may have an incentive to organize industry in such a way that cost heterogeneity is maximized (which may not minimize costs). Thus, differential resources clearly matter (in fact, the whole analysis of Farrell *et al.* 1998 requires taking such a starting point), but they matter for reasons that are somewhat different from those normally identified in the RBV.

Summing Up

[10] Of course, this is associated with all the usual problems of the provision of public and semi-public goods.

The RBV appears to aspire to being a general theory of SCA. Its propositions are put forward as general ones. For example, both Barney and Peteraf assert that their frameworks identify the necessary and sufficient conditions for SCA. However, we have identified a number of arguments derived from these frameworks where, for example, additional assumptions are required to make the argument right. In the next section, we shall argue that the difficulties that we have exemplified by criticizing these specific arguments are manifestations of deeper-rooted problems with the basic analysis of SCA, as exemplified by Barney (1991) and Peteraf (1993). For example, we shall argue that it is possible to have sustained interfirm differences in a competitive model with only (demand) uncertainty and fixed costs (Lippman *et al.* 1991). More generally and provocatively, we suggest that there are only two necessary conditions of SCA, namely uncertainty and immobility. On a fundamental analytical level, there is no need to refer to the whole armory of, for example, the Peteraf (1993) analysis.[11] The main lesson that we draw from our examination of RBV arguments is the need to strengthen RBV's explanatory bite by separating the necessary conditions for the existence of SCA from those additional conditions, which only serve to give the expression of SCA a specific form. Put differently, uncertainty and immobility should be the only conditions to enter the analysis of SCA as exogenous elements whereas a host of additional conditions are candidates for inclusion as endogenous elements. As pointed out by Hicks (1979: 22), from the point of view of the theory, "an exogenous element cannot be an effect, it can only be a cause." It is in this sense that we distinguish between necessary and additional conditions. Additional conditions may be both cause and effect whereas necessary conditions can only be a cause.

The Determinants of Competitive Advantage

[11] This is not to say that the Peteraf (1993) framework is inconsistent with Lippman, McCardle, and Rumelt (1991). For example, it may be argued that the notions of "immobility" and "heterogeneity" relate to the fixed cost component of the Lippman *et al.* framework and that "ex post" and "ex ante limits to competition" relate to the uncertainty component. However, the Lippmann *et al.* analysis goes beyond the RBV analysis because of its concern with demand-side factors which are neglected

Necessity and Causality

So far, we have pointed to a number of examples where RBV reasoning relies on unstated assumptions (e.g., the emphasis on uniqueness and the factor market argument). As we see it, this is symptomatic of a broader tendency in the RBV of not applying sufficient analytical precision. Most fundamentally, we discern what we think is a confusion of necessary conditions and what reduces to additional conditions that, while useful for focusing and adding realism to the analysis, are not strictly necessary for the expression of SCA. The inability to perform this separation means that the conditions necessary and sufficient conditions for the existence of SCA are not precisely identified and what are only additional conditions may become elevated to the state of necessity. An example is ”uniqueness” which by some writers (e.g., Aharoni 1993) is taken to be a necessary condition for SCA, even if this can only be true in the absence of strategic complements (which is an empirical matter; not a logical one).

One way to see the importance of the distinction between necessary and additional conditions is in terms of the causal structure of the explanation of SCA. Of course, the production of a SCA in a firm is, at any point in time, a result of the interplay between many interacting causes, both in theory and in reality. However, some causes are more fundamental than others, in theory as well as in reality. Notably, some causes are necessary for the production of the phenomenon (SCA) while others are not. As pointed out by Hicks (1979), one possible litmus test for examining whether some cause is more fundamental than another cause is to ask whether the former can “dissolve” the latter. In the present context, this means that a SCA may conceptually be produced by the operation of the former (necessary) condition, independently of the state of the latter. Conditions that, regardless of their particular expression, do not alter the possibility of the existence of SCA cannot be candidates for necessary conditions (Hicks, 1979), and, are referred to as additional conditions. This is not to deny the explanatory importance of additional

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in the RBV.

conditions, however. Clearly, we need statements regarding some additional conditions to tailor the analysis to capture what we think are the important aspects of any specific phenomenon to be explained.[12] To use an example, while we can assert that some sunk costs are a necessary condition for the existence of strategic entry barriers, whether these costs will actually deter entry depends on additional conditions regarding entrants' and incumbents' beliefs, the size of the sunk costs, etc.

As a strategy (content) theory, the RBV makes causal arguments about the expression of SCA. Essentially, we have criticized representative statements of the RBV (namely Barney 1991; Peteraf 1993) for misrepresenting the causal chain associated with the expression of SCA. For example, we pointed to instances in which the RBV relies on additional conditions that are, however, mistaken for necessary conditions of SCA. Our conclusion is that the chain of causal determinants of SCA is misidentified in the RBV. This misidentification is problematic, not only because the logic of RBV models may be questioned, but also because it makes the application of the RBV framework to the real world troublesome. For example, empirical research in the RBV is likely to be led astray, since the effect of variables that measure necessary conditions of SCA (i.e., those that according to logical necessity must be present for SCA to obtain) will influence any variable that measures additional conditions (i.e., those that are represented in models in order to capture a specific phenomenon) and *vice versa.* For example, a regression analysis that omits a control for additional conditions will typically show biased and weaker effects. Or, a regression analysis may show a significant result despite the fact that the only independent variables included were some that captured additional conditions. However, a replication will inevitably lead to incomprehensible results if those variables that reflect necessary conditions — those omitted in the regression — have changed.

Moreover, the inability in the RBV to "get causality right" is the underlying

[12] In fact, in section II, we criticized the RBV for not being sufficiently specific about such additional conditions.

source of many of the confusions that we reported in the section II. For example, it is incorrectly asserted that heterogeneity is a necessary conditions for the expression of SCA (because, as we shall argue, heterogeneity is a derived concept); that uniqueness of strategies is a necessary condition for SCA (when this entirely depends on the specification of further additional conditions regarding the complementarity and substitutability of strategies); that informational inefficiency has to exist for SCA to obtain (whereas this depends on further additional conditions in terms of institutions, trading processes and traders on factor markets), etc.

The conclusion is that it is essential to provide a correct specification of the causal chain through which SCA is expressed. We pursue this objective in the rest of this paper. A main conclusion emerging from the analysis is that the widely cited ”value-rareness-inimitability” or “heterogeneity-immobility-ex post and ex ante limits to competition” lists do not stand up to scrutiny. We argue that only two conditions are necessary for the expression of competitive advantage, namely uncertainty and immobility.[13] No further conditions are needed to produce SCA, and, all other conditions are additional in the sense that they serve to lend a particular form to the expression of SCA. Alternatively, additional conditions such as heterogeneity may themselves be expressions of uncertainty and immobility. Therefore, additional conditions, including heterogeneity, has an intermediate position in the causal chain that produces SCA. In consequence, RBV should apply a sharp distinction between necessary and additional conditions for the expression of SCA, taking uncertainty and immobility as the only acceptable candidates for exogenous elements of explanation. All other conditions should be modeled as endogenous[14]. In order to support the argument that uncertainty and immobility

[13] We are agnostic on the precise meaning of ”uncertainty.” Thus, it may be taken to refer to both Knightian uncertainty and to risk.

[14] A case in point for the suggested approach is Sutton’s (1991) theory of market structure. Interestingly, Sutton (1991) begins with immobility and, it may be argued, adds uncertainty (in terms of strategic response) in order to arrive at the result that the precondition for the existence of a concentrated market structure *in all situations* (even when market size is indefinitely large) is that both conditions are present.

are the starting point of this causal chain and thus necessary and sufficient conditions for the expression of SCA, we rely heavily on the relevant economics literature.

Heterogeneity and Performance

Here, we shall review a sample of relevant studies from the industrial organization literature. These are relevant in the sense that they are all taken up with examining performance differentials in equilibrium as somehow influenced by uncertainty, immobility and heterogeneity. The common consent emerging from these studies is that the combined effect of uncertainty and immobility can always produce heterogeneity in the sense of equilibrium differentials in efficiency (average costs). Since the reverse is not always true, they establish the basis for our argument that uncertainty and immobility should be seen as necessary conditions for the expression of SCA, while persistent heterogeneity in the efficiency properties of inputs is best viewed as an additional condition for SCA through which the effect of uncertainty and immobility is expressed.

The upshot of all this is that a careful consideration of the difference between necessary conditions and what turns out to be additional conditions, through which the necessary conditions act to produce SCA, help avoid misidentification of causes and clauses — the confusion of which has plagued previous RBV attempts to identify the conditions that by necessity underlies SCA.

Before turning to the review of studies, which establish what we find is an unambiguous causal relation between uncertainty, immobility, heterogeneity and SCA, we need to consider what is meant by heterogeneity of outcomes. Implicit in the RBV is two meanings of outcome heterogeneity, namely (1) efficiency differentials (average costs) in equilibrium, or (2) different realized non-zero profits (pure profits in excess of the cost of capital). Since the two do not necessarily go hand in hand, an explicit distinction is important. Following RBV writers (e.g. Peteraf 1993), efficiency differentials in equilibrium may refer to persistent differences between incumbents' after some level of entry and exit has been

allowed for (as in Lippman and Rumelt 1982 and Rumelt 1984). Compared to differential efficiencies as a criterion of SCA, non-zero profits is a broader criterion since it also includes the case of differences between *identical* incumbents and potential entrants (as in a number of two-stage Cournot-Nash models involving sunk costs and perhaps sequential entry, see e.g. Sutton, 1991 and Tirole, 1988). As previously indicated, the present paper adopts non-zero profits as the basic criterion of SCA. The perhaps most interesting cases, however, are those included in the intersection between the two criteria of SCA.

In the following, we first consider studies which analyse how efficiency differentials may emerge, and then consider two models which may be interpreted as analyses of how the combination of non-zero profits and efficiency differentials may be obtained. The main point of this brief review is that combinations of uncertainty and immobility may produce efficiency differentials and/or non-zero profits in equilibrium, whether or not resources are heterogeneous.[15]

Models of Efficiency Differentials

The primary thrust of this rather brief review of models of efficiency differentials is to establish that heterogeneity is best viewed as an additional condition of SCA whereas immobility and uncertainty are necessary conditions.

Lippman *et al.* (1991) consider a two-stage model where firms are price takers in a competitive environment. In stage one, firms enter the industry by installing capacity and paying a fixed cost to do so. In stage two, demand is announced. Efficiency increases in fixed costs but because of demand uncertainty, there may be room also for the less efficient producers. Since the model establishes heterogeneity as an expression of demand uncertainty and immobility, it is clear that the necessary conditions for SCA in this model are uncertainty and immobility. By contrast, heterogeneity enters as an additional condition in the causal chain that

[15] Let us further note that we follow Lippman and Rumelt (1982), Lippman *et al.* (1991) and Tirole (1988) in expanding the common definition of immobility as functional uniqueness to encompass the much wider number of cases where investment in capacity requires an uncertain non-recoverable fee, that is, sunk cost commitments. Consequently, we acknowledge Lippman and

produces SCA.

A study by Mills and Smith's (1996) provides an important extension of Lippman *et al.* (1991) by considering a continuous set of technologies. The choices of technology, outputs and prices emerge through a two-stage game: (1) the firms simultaneously choose technologies, and (2) the firms play Cournot-Nash, choosing outputs given the cost functions previously chosen in stage 1. As in Lippman *et al.* (1991), these embody a trade-off between fixed and variable inputs, and, here again, we see how heterogeneity is an expression of the (necessary) conditions, uncertainty and immobility.

The reviewed studies suggest the following conclusion. Within the very wide bounds of Lippman *et al.'s* (1991) and Mills and Smith's (1996) analyses, the combined effect of immobility and uncertainty may always support an equilibrium structure with efficiency differentials. Note that without some level of immobility there is no support for efficiency differentials in equilibrium. Moreover, Lippman *et al.'s* (1991) analyses shows that uncertainty is a precondition for the existence of resource heterogeneity. In other words, uncertainty is a condition that, in combination with immobility, is necessary for the support of the heterogeneity which is responsible for efficiency differentials in equilibrium. We next turn to consider models that allow not only for efficiency differentials but also for non-zero profits.

Models of Efficiency Differentials and Non-Zero Profits

The purpose of this examination of models where efficiency differentials and non-zero-profits go hand in hand is to provide further support of the claim that immobility and uncertainty are necessary conditions for the expression of SCA while heterogeneity is best viewed as an additional condition.

Lucas (1978) and Oi (1983) argue that efficiency differentials will emerge in equilibrium when inputs are distributed and (quasi)fixed; specifically there is an

Rumelt's (1982) suggestion that immobility and uncertainty are deeply interdependent.

inelastic supply of managerial talent. In this case, profits are returns to (quasi-)fixed factors such as coordinating and monitoring ability. That is, a dispersion of entrepreneurial abilities generates an equilibrium size distribution of firms, even if all firms face the same production function and supply the same homogeneous good. The key to this result is that firm size is bounded by managerial ability, which again is limited by the (assumption of) fixed supply of calendar time. In Oi's (1983) models, more able entrepreneurs have the capacity to convert calendar time into relatively larger supplies of managerial coordination effort but, by assumption, incur the same loss to monitor work performance as their less able peers. Thus, in equilibrium, efficiency differentials and non-zero profits are caused by the combined effect of factor immobility and heterogeneity, that is, variation in the input distribution of managerial abilities. Note, however, that the variation in managerial ability would involve uncertainty had Oi (1983) not explicitly assumed away the problem of allocation of entrepreneurial ability across firms and industries.

Consider further Lippman and Rumelt's (1982) analysis of a two-stage model of uncertain imitability. In this model, firms are price-takers, risk neutral and choose according to expected values. The analysis further assumes fixed industry demand, stable technology and homogenous products. Uncertain imitability is modeled as a parameter of the firm's cost function, which depends on a realization of a probability distribution. Each prospective entrant knows the distribution, but can only discover its actual cost function by making a nonrecoverable entry fee.

In the atomistic case, the simplest and perhaps most noteworthy analysis provided by Lippman and Rumelt (1982), entry is sequential; each potential entrant observes the results realized by previous entrants and receives an independent draw from the distribution of cost functions. Given a limit where the realization of the random component of the cost function exceeds price, there are non-zero profits in equilibrium. Moreover, due to the random component in the cost function, efficiency differentials will remain. The prospective entrant expects zero profits but some are unfortunate and draws a bad cost function. The unsuccessful prospects

die and the survivors share the rents. That is, positive profits are survivor rents, i.e., let all entrants be successful, and profits will be driven down to zero. It is further noteworthy that Lippman and Rumelt's (1982) analyses demonstrate that even in the absence of information asymmetries among competitors, uncertainty (in obtaining efficiency) in combination with immobility is enough to produce efficiency differentials.

Again we see that the combined effect of immobility and uncertainty produces efficiency differentials in equilibrium. Since the existence of input heterogeneity is an expression of immobility and uncertainty (cf. Lippman *et al.* 1991) and the obverse is clearly not true, the reviewed studies suggest that there are only two necessary conditions for SCA (in the sense of efficiency differentials in equilibrium).[16] Note that the reviewed studies explicitly deal with those cases that are traditionally considered illuminating by RBV writers, that is, where intraindustry differences in efficiency among firms are supported in equilibrium. Since most interesting cases in addition to immobility also require uncertainty to support equilibria with efficiency differentials, and since heterogeneity when not assumed away is an expression of uncertainty and immobility, we submit that uncertainty and immobility should be identified as the necessary conditions for the expression of SCA. Those further assumptions necessary to make the analysis explicit and which may be included to address a particular problem are referred to as additional conditions.

The Resource-Based View and the Fundamental Determinants of Sustained Competitive Advantage

We shall now tie our argument that only two conditions are necessary for the expression of SCA, namely uncertainty and immobility, to the RBV. To begin with, recall the Peteraf (1993) approach to SCA, which identifies heterogeneity,

[16] One could further argue, as we did in our toy examples, that immobility is sometimes all it takes to produce non-zero equilibrium profits. So, even in the absence of uncertainty, non zero-profits and thus efficiency differentials between identical incumbents and competitive industries may exist in the presence of immobility. While this is certainly true, such a "result," simply obtained by assumption, is not very interesting, an issue we shall have more to say about in the following.

immobility and barriers to *ex post* and *ex ante* competition as four conditions that all are needed to produce SCA. Our argument is, however, that this is a misspecification. As we have seen, immobility is a necessary condition for the expression of heterogeneity, whereas the reverse is not necessarily true (cf. Lippman *et al.* 1991). Similarly, uncertainty is a necessary condition for the expression of *ex ante* and *ex post* barriers to competition (Lippman and Rumelt 1982; Rumelt 1987) while the reverse does not always hold. This is summarized in Figure 2.

XXXXXXXX *Insert Figure 2 here* XXXXXXXX

Uncertainty and immobility are fundamental in the sense that they are both necessary for the expression of SCA. This also implies that, regardless of what specific (additional) assumptions we make with respect to, for example, characteristics of inputs (e.g., homogeneity or heterogeneity) and the characteristics of competition (e.g., Bertrand or Cournot), there are always combinations of uncertainty and immobility such that we can sustain equilibria with firms that have differential competitive advantages. We here comment on immobility and uncertainty, the two necessary conditions for the expression of SCA.

1st necessary condition: Immobility. As previously noted, immobility simply refers to sunk cost commitments (Lippman *et al.* 1991). Asset specificity and complementarities are closely connected to this as immobility allows the firm to engage in signaling, for example, to demonstrate commitment to certain market positions (Archibald *et al.* 1986; Ghemawat 1991; Porter 1980). Immobility is a necessary condition for, and perhaps the most fundamental determinant of, competitive advantage.[17] To see this, consider a situation with initially

[17] In the resource-based framework (Peteraf 1993), immobility is likewise seen as a condition for sustained competitive advantage, but here attention is only focused on the effects of inputs' bargaining positions, whereas the commitment effects of immobility are neglected.

heterogeneous inputs. Under full mobility, competition will immediately equalize all returns across firms. Adding uncertainty to this does not change anything. Thus, as suggested in Archibald *et al.* (1986), Lippman *et al.* (1991) and a host of other studies, in the absence of immobility, SCA (as positive profits or efficiency differentials) is simply not possible.

2nd necessary condition: Uncertainty. Abstracting from the case in which *all* inputs are exogenously given, uncertainty is a necessary condition for competitive advantage. Uncertainty implies that there is almost surely a difference between the price of inputs and their realized value, even if the demand side and the supply sides on factor markets hold similar probability distributions over prices and values (i.e., they have different point estimates). Another factor market aspect of uncertainty relates to "uncertain imitability" (Lippman and Rumelt 1982), where, for example, imitability may be modeled as a parameter of the firm's cost function which depends on a realization of a probability distribution. Likewise, product market uncertainty (i.e., demand uncertainty) influences competitive advantage by introducing deviations in realized productive efficiencies (Lippman *et al.* 1991). As we have noted previously, uncertainty is a necessary determinant of competitive advantage in most interesting cases, that is, those which encompass intra-industry equilibrium differences in efficiency.

Apart from the trivial cases where above-normal profits are essentially assumed, uncertainty may be dispensed with in models that assume input heterogeneity (as in Oi's 1983 models). This is no reason to suggest that uncertainty and heterogeneity is on par, however. Thus, according to Lippman *et al.* (1991), uncertainty may generally be viewed as a determinant of resource heterogeneity. Since the obverse is not true, we define uncertainty as a necessary condition for SCA but note that it might be suspended with by assumption of, for example, input heterogeneity and entry barriers in combination with excess demand.

As previously mentioned, however, we follow Lippman and Rumelt (1982) in viewing immobility and uncertainty as deeply interdependent, a further reason that

we suggest both must be viewed as two necessary conditions for the expression of SCA. For example, Lippman and Rumelt (1982) note that in the absence of uncertainty, the creation of a unique (immobile) resource could be repeated and its uniqueness destroyed.

Additional Conditions

Recall that we defined additional conditions as those causal mechanisms that add to the explanation without being strictly necessary, i.e., those elements of the causal chain which serve to shape the two necessary conditions in the expression of SCA. This is not to say that such additional conditions are unimportant. As we have argued, understanding, for example, the nature of competitive activity in an industry may be essential for explaining the sustainability of competitive advantages in that industry. However, we criticized much RBV reasoning for the tendency to implicitly entangle the two necessary conditions and the additional conditions through which SCA is expressed.

Although in principle, the set of additional conditions is unbounded, we illustrate what we mean by additional conditions by focusing briefly on three important analytical categories that are particularly pertinent to the understanding of SCA. These are (1) the characteristics of competition, (2) information asymmetries and (3) input characteristics.

The characteristics of competition. This category refers to such dimensions as whether competition is Bertrand or Cournot, whether firm strategies are complements or substitutes, the costs of colluding in an industry, the sequencing of entry into an industry, the contents of strategies, the nature of trading processes on factor markets, assumptions regarding preferences etc. — in short, many of those factors that may be put under the rubric of the "protocol" of any underlying game within which competitive interactions are embedded (at least in a stylized fashion), that is to say, the specification of interaction amongst agents.

Information asymmetries. This category refers to the characteristics of agents' information sets, that is, what they know about previous and/ or simultaneous

and / or future moves of other agents and / or Nature, and what can be taken to be private, mutual or common knowledge.

Input characteristics. This category refers to the fundamental distinction between homogeneous and heterogeneous inputs, whether inputs are assumed to be given initially or are created, and whether they are of a stand-alone nature or complementary.

Regardless of what additional conditions are subscribed to, at least with respect to those contained in the above list(s), any combination of uncertainty and immobility may sustain an equilibrium where firms experience SCA.

XXXXXXXX *Insert Figure 3 here* XXXXXXXX

Perhaps it should be noted that heterogeneity, in Figure 3, is present under the heading of input characteristics. Also recall that we hold the opinion that the set of additional conditions is unbounded. Therefore, the list of additional conditions is not meant to be exhaustive. As Lippman and Rumelt (1982: p. 420) noted, "it may never be possible to produce a finite unambiguous list of the factors of production responsible for the success of ... firms." With the slight change that we explicitly suggest immobility and uncertainty as necessary conditions for the expression of SCA, Lippman and Rumelt's (1982) unbounded list comprise part of what we refer to as additional conditions.

There is a further issue, however, regarding the level at which immobility is effective, that is, at the level of products, firms, product groups or industries. Often, product-specific capital is modelled as a vehicle of firm-specific capital but even in a free entry equilibrium when this is not the case, positive profits can be obtained (cf. Archibald *et al.* 1986). So, here we meet a further issue that demands attention in providing appropriate additional conditions. Let us briefly illustrate by considering the possibility of equilibria with non-zero profits in models with free

entry.

In the case of free entry in which firms sell undifferentiated goods, there exists a potential for non-zero profits which emerges when the ratio of minimum efficient scale to market demand raises above some threshold (Archibald *et al.* 1986; Sutton, 1991). Also in the case of monopolistic competition, where preferences are defined over a finite or countably infinite set of goods (Archibald *et al.*'s 1986 "non-address models"), equilibria which reveal differential non-zero profits can be contrived by *assuming* that one product can only have one producer. Then, if any good is not a perfectly symmetrical substitute for any other good, positive equilibrium profits are possible (Spence 1976). These examples show that product-specific capital is only a source of positive profits when indivisibility is introduced by some level of minimum efficient scale with respect to demand (immobility) or, in the monopolistic case, when some rather arbitrary assumptions to the same effect (minimum efficient scale) are introduced. Without essentially assuming the result by introducing minimum efficient scale (introducing immobility), positive profits will be dissipated by entrants (see e.g. Archibald *et al.* 1986; Dixit 1980). In consequence, strategic behaviour is not an issue here since rents either will be dissipated by entrants or, by assumption, are impossible to dissipate. As aforementioned, impossibility by assumption may in effect substitute for uncertainty in yielding equilibria with positive profits (as in our previously contrived "toy" examples).[18]

In free entry models where preferences are defined over the appropriate continuum of goods (Archibald *et al.*'s 1986 "address models"), positive profits are possible in equilibrium when firms behave non-strategically and capital is lumpy

[18] Further examples of models where free entry may be associated with non-zero profit equilibria are found in Eaton (1976), Salop (1976), Sheppard *et al.* (1992) and Sutton (1991). Kaldor (1935) provides an early example. Note that models in this spirit ususally view the emergence of non-zero profit equilibria as undesirable. Moreover, when non-zero equilibria do emerge, the underlying cause is indivisible fixed costs (due to the integer-problem which may break the symmetry-assumption necessary to produce non-zero equilibria), plus additional conditions which introduce heterogeneity. For example, in Sheppard *et al.* (1992), non-zero profit equilibria emerge due to fixed spatial locations (immobility) in association with heterogeneity of spatial regions.

and takes on a specific address, i.e., when immobility refers to the situation where product specific capital is also firm-specific capital. Due to firm-level resource immobility, equilibrium rents emerge when firms behave non-strategically. However, in contrast to "non-address models," where rents were dissipated or unassailable, these rents will induce strategic behaviour with respect to specific capital. So, in the case where agents engage in strategic behaviour, it turns out that the emergence of positive profits hinges on lumpy firm-specific capital (firm-level immobility) and expectations (uncertainty), e.g. regarding relocation when capital expires.

Apart from providing further illustration of our identification of immobility and uncertainty as necessary conditions for the expression of SCA, these examples show the crucial importance in carefully and explicitly stating the additional conditions that must accompany any statement about the possibility of SCA. This particular illustration concerned the level at which immobility is effective, however, our point is a general one which, for example, also includes the particular source of uncertainty, e.g. demand uncertainty, uncertainty associated with acquisition of production-capital, plant relocation uncertainty, etc. Irrespective of the particular source of immobility or uncertainty, the thrust of our argument is that efficiency differentials and / or positive profits may exist in equilibrium in a very broad range of models whenever these twin determinants of SCA are present, a suggestion we find more or less explicitly conveyed in many previous studies (some of which we have reviewed), but perhaps most succinctly in Demsetz (1973).

Moreover, models that rely on the combined effect of immobility and uncertainty goes a long way to explain heterogeneity in equilibrium distributions of size, concentration and behaviour in empirical data (see e.g. Demsetz 1973; Oi 1983). Also more recent evidence as, for example, presented in Caves' (1998) review refers to causes for heterogeneity in equilibrium that may readily be reconciled under the twin determinants of immobility (e.g. complementary, lumpy and discrete assets) and uncertainty (e.g. disturbances that continually affect an

assets productivity)[19].

Conclusion

During the last decade, the RBV has emerged as the dominant approach to strategy content theory. An indication of this is the frequency with which the "value-rareness-inimitability" or "heterogeneity-immobility-ex post and ex ante limits to competition" litanies are now echoed in the journals and professional gatherings. As we have indicated, these lists of conditions do not really stand up to scrutiny.

One problem is that these lists lead to logical problems in the identification of causes of SCA, where necessary and additional conditions are confused. Moreover, we have argued that there is a number of derived mistakes, such as what we called "the uniqueness fallacy," "the 'no-rules-for-riches' nihilism," etc. In addition, empirical research may be harmed (e.g., in the sense of difficulties of replication) by incorrect identification of the causal chain which explains the expression of SCA (i.e., confusing mediator, moderator and independent variables).

To escape triviality, models in strategy research and elsewhere, require some distance between assumptions and conclusions. And managing to create distance between assumptions and conclusions again requires that one gets causality right. Otherwise, the door is opened for assuming the result or introducing *ad hoc* assumptions to the same effect. To some extent, the RBV may be accused of introducing too little distance between assumptions and outcomes. If, for example, heterogeneous cost functions are simply assumed from the outset, one is not too surprised when the analyst concludes that heterogeneity in outcomes will be the

[19] Caves (1998) further points to the essential issue of relating (im)mobility to its determinants in basic conditions of demand and technology. We agree and further add that uncertainty is a ubiquitous feature associated with market demand and technology. It should be noted, however, that Caves (1998) defines mobility in operational terms referring to the standard measure of mobility where the increment in activity levels (output and employment) between *t* and *t+1* is divided by activity levels at *t*. Whereas this mobility definition may suit the need for collecting observable data, it also begs support by identification of underlying causes. In general terms, we submit that these should be found in immobility (sunk cost commitments) and uncertainty (related

result. We believe that beginning with only uncertainty and immobility as necessary conditions for the expression of SCA introduces more distance between assumptions and conclusions than what presently obtains in the RBV. In addition, beginning with only these two conditions, rather than the larger set of conditions usually embraced by RBV-writers, has the added benefit of parsimony. In terms of modeling practice, the suggestion is to begin with immobility and uncertainty as exogenous variables and consider the appropriate set of additional conditions as endogenous variables.

Thus, in sum, our contribution in this paper is to perform an overhaul of the basic RBV analysis, and in this connection to introduce a distinction between necessary conditions for the expression of SCA and additional conditions that are not strictly necessary for the expression of SCA but serve the important purpose of adding focus, particularity and realism to the analysis.

This results in a simpler and clearer causal structure, avoids the existing ambiguities in the RBV, and should pave the way for more rigorous theoretical contributions and applicable empirical research. Perhaps a first step towards a sustainable resource-based explanation of SCA.

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to demand or technology).

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Figure 1a

The Barney 1991 framework

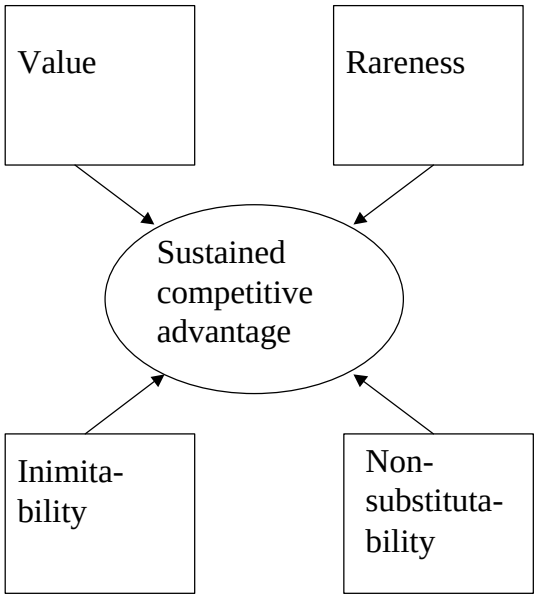

Figure 1b

The Peteraf 1993 framework

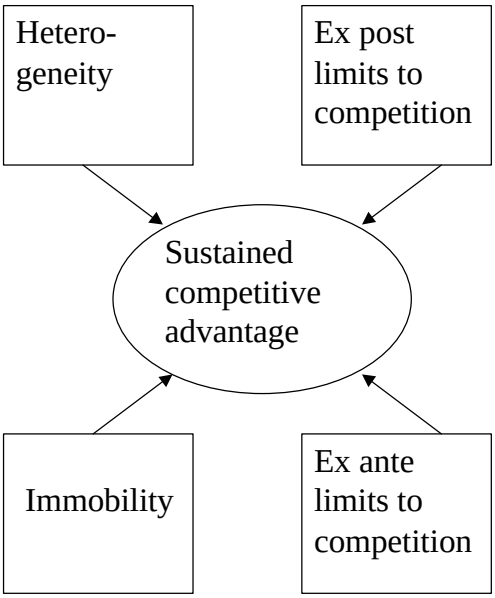

Figure 2

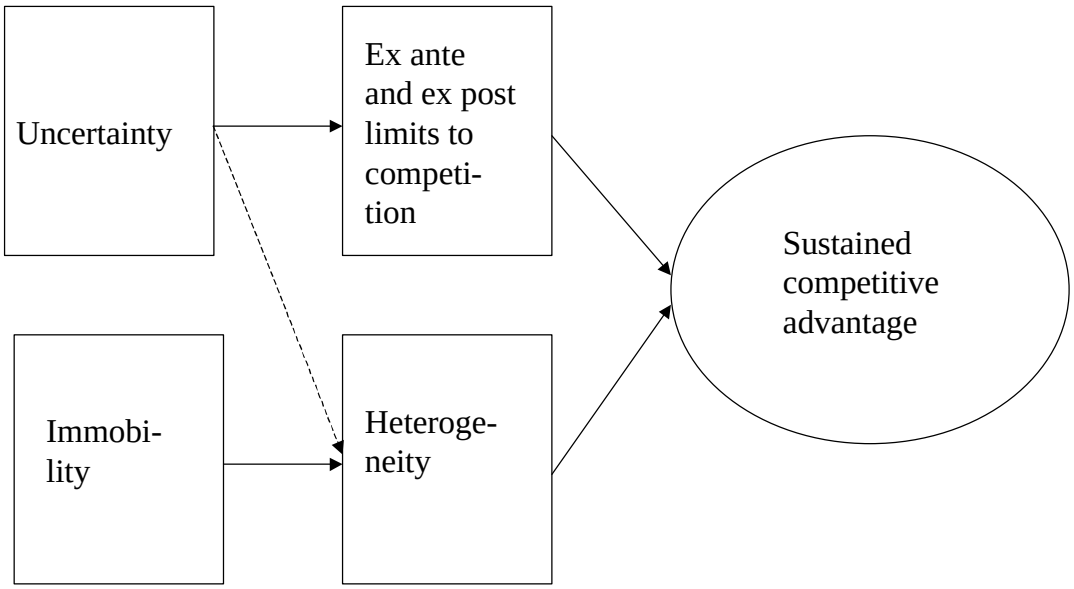

Figure 3