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How do professional-services firms compete?

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What actions can professional-services firms take to create lasting improvements in their competitive performance? This paper looks at Merrill Lynch's success in building a leading investment-banking practice out of an industry laggard and PaineWebber's failure to accomplish similar objectives. The two firms' experiences and previous research are used to specify a model of competition among professional-services firms. Reinforcing feedback between the nature of a firm's client work and its capabilities combined with intendedly rational managerial policies lead to a hierarchy of industry competitors. Analysis of the model highlights two key elements differentiating Merrill Lynch's and PaineWebber's efforts to improve their position in that hierarchy: speed in developing capabilities and discipline in accepting and rejecting client work.

Keywords: capabilities, resources, investment banking, professional services, competition

1.0 Merrill succeeds and Paine Webber fails

In the 1970s Donald Regan and James Davant, the CEOs of Merrill Lynch and PaineWebber, set out to build elite investment-banking practices within their firms. A large fraction of the revenue at both firms already came from underwriting new securities, a key component of investment-banking activity. However, their investment-banking departments were generally populated by less-capable investment bankers who relied on the firms' retail brokerage relationships, and the ability of the firm's vast brokerage network to sell new securities, to bring in new work. As a result, most of their underwriting assignments involved simple issues for small firms and supporting roles as a distributor of securities designed by more prominent banks. They were rarely given the opportunity to handle the more sophisticated and difficult, and generally far more lucrative, equity underwriting and advisory roles that the elite firms filled for large corporate clients.

Both firms spent several hundred million dollars over the following years to upgrade their investment-banking departments. They hired respected equity research analysts and prominent investment bankers, acquired entire research firms and bought established investment banks. Much of the groundwork for their assault on investment banking was accomplished during the 1970s. The firms secured capital by going public within a year of one another in July of 1971 and May of 1972, rose to be among the five most respected

institutional research firms in the early 1970s, and in 1978 and 1979 both acquired small but elite investment banks.

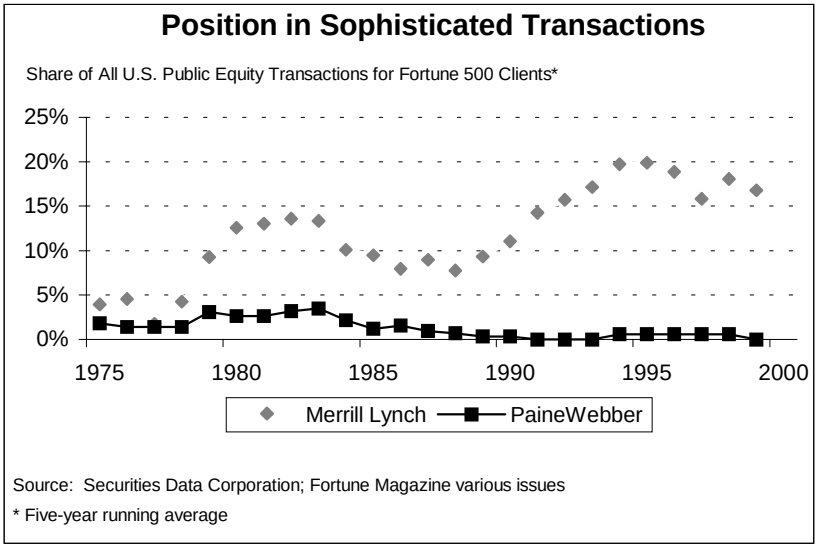

Figure 1a: Share of transactions

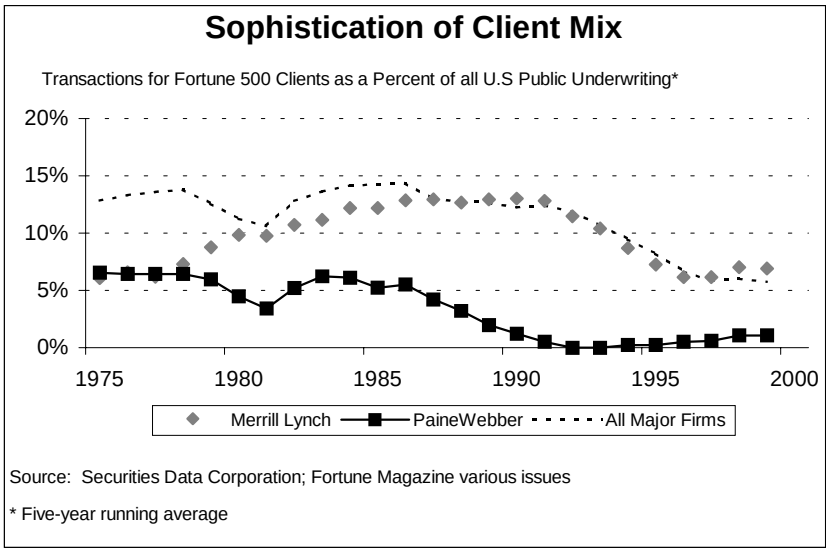

Figure 1b: Mix of transactions

Despite the similarity of their actions in the 1970s, the performance of the two firms increasingly diverged during the 1980s. Merrill Lynch's share of sophisticated transactions for large clients rose while PaineWebber's share fell (figure 1a). Merrill Lynch's emphasis on these transactions climbed while PaineWebber's dropped (figure 1b). By the late 1990s Merrill Lynch stood alongside Morgan Stanley and Goldman Sachs as part of a triad of

dominant investment-banking firms that stood above rivals in the scale and sophistication of their work. It had transformed itself from a firm doing a disproportionately large volume of business for smaller and less sophisticated clients to a real competitor for the sensitive equity transactions of Fortune 500 clients. In contrast, PaineWebber's investment-banking practice ended the 1990s weaker than it had been in the 1970s.

While these two firms provide an unusually clear and striking contrast, their goals were hardly unusual. Securities firms are constantly struggling to upgrade the capabilities of their bankers and the sophistication of their client work. Large investments in personnel and client-development are regularly accompanied by statements that a firm will substantially upgrade its investment-banking practice over the next several years.

Judging by the stability and concentration of industry leadership in investment banking, very few of these efforts have succeeded in upsetting the status quo.[1] Given the many competitive levers available to managers of professional-services firms – product innovation, acquisitions, poaching staff, cutting prices, tying products – can we learn anything fundamental about which levers are likely to be effective and what combination of policies is needed to succeed?

1.1 Moving on up

To evaluate the effectiveness of managerial levers in improving competitive performance we need to start with an operational definition of competitive performance. As the previous discussion suggests, this paper looks at competitive performance in terms of the sophistication of a firm's client work and the capabilities of its bankers.

This definition is chosen in part because relevant financial measures of performance are often obscured by the range of a firm's activities and are subject to huge amounts of unsystematic variation. This is particularly true in the securities business where profitability is hard to assign to specific activities and where a single individual can wipe out the annual or accumulated profits of an entire firm.

A more fundamental reason for defining performance this way is that managers of these firms care a great deal about the wealth accumulated by employees (explicitly so in the case of partnerships) in addition to that accumulated by equity investors. In general a firm with more capable bankers doing more sophisticated work will provide higher levels of compensation to bankers and strong returns to shareholders.

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1 Likewise, and perhaps ironically, managers at many of the largest consulting practices have struggled with the same issue. These firms have long sought to develop the skill sets and access to top executives and corporate boards (and accompanying impressive fees) enjoyed by leading firms such as McKinsey & Company and the Boston Consulting Group.

An investment bank's position in the industry hierarchy is most objectively measured by the sophistication of its client work.[2] Not all client work is equally demanding or rewarding. The skill required to perform investment-banking tasks generally rises with the size of the client, the extent to which future cash flows and risks are not well defined, and the rarity of similar transactions. Standard investment-grade fixed-income securities, for example, are among the easiest to assign a value. The payment stream is set and credit-rating agencies provide thorough research that clarifies the risk of non-payment. Evaluating merger and acquisition candidates, pricing new equity issues, and structuring high-yield debt on the other hand requires an investment banker to develop far greater insight into the prospects of an industry and an individual business. These services also allow an investment banker to charge higher fees.

Before we can hope to explain how a firm moves in this hierarchy we need a compelling explanation for why professional-services industries stratify into a hierarchy of firms. Why don't all firms serve a full range of clients drawing on more or less capable bankers as needed? Several theorists have argued that industry stratification is simply the result of profit-maximizing managerial decisions. Some firms willingly adopt lower-quality standards for their services (e.g., employ less capable bankers), and attract less demanding clients, in order to mitigate price competition and increase potential profits for all industry participants.[3] This logic of rational quality choice is compelling in many competitive settings but does not explain why firms challenge the status quo in established markets. More importantly from a manager's standpoint, it does nothing to explain why managers encounter so much difficulty when they attempt to upgrade their firms' capabilities and market positions.[4]

The experiences of Merrill Lynch and PaineWebber suggest that managers in several industries cannot simply choose a firm's quality level (i.e., its capabilities) directly. A professional service firm's capability level is heavily influenced by the sophistication of its client work.[5] Personnel at firms serving demanding clients and assignments have the opportunity to use and develop knowledge and skills that would not be called upon in the context of less demanding assignments. This individual learning is one of several ways in which sophisticated client work contributes to capability development at the level of the firm. Sophisticated client work tends to improve retention of skilled staff by providing greater financial rewards and intellectual stimulation. Sophisticated client work also improves recruiting at entry and senior level positions. Recruits know they will be provided with exposure to interesting work. If they stay the potential pay scales tend to be higher at

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[2] In recent years surveys by trade magazines and consulting firms have provided a complementary indicator of the hierarchy based on a firm's capabilities.

3 See for example Shaked, A. and J. Sutton (1982).

[4] The term 'market position' is used as shorthand for the sophistication of a firm's clients and tasks.

5 For similar findings in manufacturing see Von Hippel, E. (1986).

firms with more sophisticated client work and if they leave they will be recruited more aggressively.

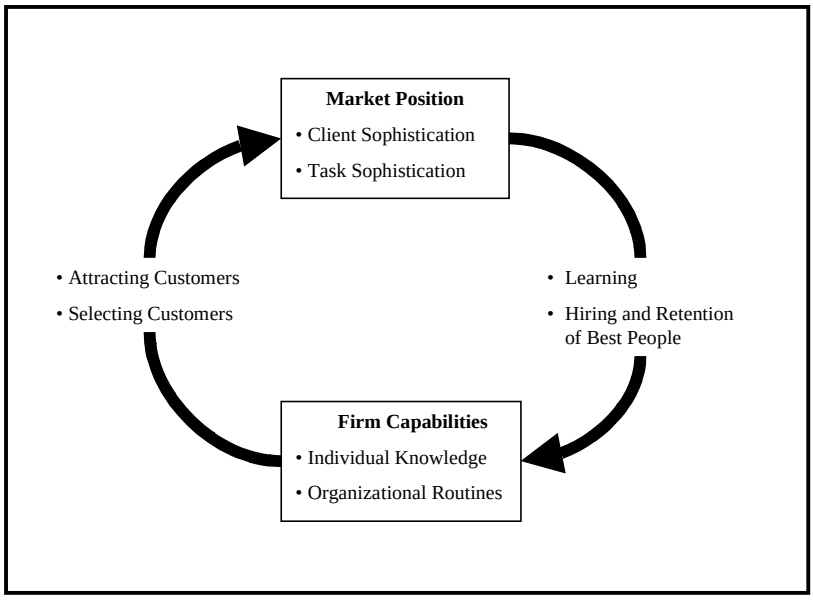

Figure 2: Reinforcing feedback between capabilities and market position

The origins of stratification and the difficulties facing managers become clearer when we recognize the reinforcing relationships linking market activity and capability development. As a firm's capabilities increase it will become more attractive to clients, particularly to sophisticated clients and for sophisticated tasks where stronger capabilities are needed. Managers can use the increased interest to upgrade their firm's market position by being selective in the clients and assignments they accept. Increases in client and task sophistication then reinforce and extend the firm's capabilities through better learning opportunities and improved hiring and retention of the best people (figure 2).

This reinforcing feedback process linking market position and firm capabilities leads to and sustains industry stratification because it runs through a limited, and therefore rival, industry resource. As some firms win an increasingly large proportion of the most sophisticated client work they not only enhance their own skills they also deprive rivals of similar opportunities.[6] This sends firms off in different directions causing stratification to emerge. It also puts managers in a classical Catch-22 situation. The less capable firms need sophisticated client work if they want build up their capabilities, but they also need those capabilities in place in order to win sophisticated client work away from rivals.

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6 Of course this requires managers of leading firms to accurately identify the most sophisticated customers. Failure to do so has been linked to changes in industry leadership. See Christensen, C. M. and R. S. Rosenbloom (1995).

A model is built to explore the potential effectiveness of managerial levers given this explanation for the existence of a hierarchy. The modeling process required a richer and more precise statement of the reinforcing process. Results of policy tests on the model suggest that price competition is a structurally ineffective tool for making lasting improvements and that attempts to improve capabilities directly not only need to be made quickly but should be complemented by an active process of refusing less-sophisticated client work. These results are broadly consistent with the experiences of Merrill Lynch and Paine Webber. The following sections describe the model, present several representative model runs, and review model results in light of the two firms' contrasting experiences.

2.0 A model to explore the potential effectiveness of competitive actions

2.1 Serving sophisticated customers builds firm capabilities

How do we formally model the influence of customers on a firm's capabilities? First, we need a way of representing the different kinds of customers in the market. Second, we need to determine a way of relating the kinds of customers that a firm serves to the strength of the capabilities that a firm develops.

Different kinds of customers are modeled along a single dimension that will be called customer sophistication. Sophistication is an intentionally general term chosen to represent different concepts depending on the specific industry context to be analyzed. Sophistication in a professional-services context reflects the extent to which customers have complicated needs due to the size and complexity of their businesses or the nature of their funding needs.

Customer sophistication (S_j) ranges from very unsophisticated ($i.e., S_j = 0$) to highly sophisticated ($i.e., S_j = 1$). The distribution of customers is modeled with N discrete market segments (M_j, $j = 1...N$) of equal size. All customers within a market segment have the same level of sophistication. The sophistication of customers across market segments, however, increases in equal amounts from $(S_j = 0)$ to $(S_j = 1)$ as we move from segment M_1 to M_N.

Having determined a way to model the different kinds of customers, we still need a way to model their effect on the firm's capabilities. Previous descriptions and theoretical research strongly suggest treating capabilities as a stock that accumulates or decays over time (Dierickx and Cool 1989). Modeling a stock requires an explicit logic for the rate at which the stock changes in response to other elements of a system. These are commonly referred to as rate or flow equations since they govern the rate of flow into or out of the stocks.

To the extent that firms learn from their customers, gain ideas from their customers, have operations that can be disrupted or improved by customers, etc., firms' capabilities will

change in response to changes in the sophistication of their customer bases. The formulation adopted below implicitly assumes that all the clients affect a firm's capabilities equally. This assumption will be most appropriate in settings such as high-contact services where many organizational capabilities rely on individual capabilities and a great deal of capability development is based on individual learning on the job.[7] As individuals or teams work on client issues more sophisticated then their current capabilities they develop new skills and new knowledge. However, when individuals or teams work on client issues less sophisticated than their current capability levels their capabilities atrophy or become outdated and new capabilities (e.g., structuring and pricing and executing of the latest security innovation) are not developed to replace them.[8]

Consistent with these broad assumptions about capability development, when the average sophistication of a firm i's customers at a given point in time $(\bar{S}_{j,i,t})$ exceeds the firm's current capabilities at a given point in time $(C_{i,t})$, the firm's capabilities will rise to meet them (i.e., a positive flow that increases the stock of capabilities). Alternatively, when a firm serves customers whose average sophistication is less than its capabilities those capabilities will wither (i.e., a negative flow that decreases the stock of capabilities). Both client sophistication and firm capabilities are measured in units of skill that is either needed or can be provided.

The fractional rate at which capabilities adjust (χ) will depend on the nature of the capabilities and the industry environment (eq. 1). The adjustment may be rapid in some markets for some types of capabilities (e.g., status in a closely watched industry) and slow for others (e.g., product quality in an industry with long lead-times for product design and factory tooling).

1. $$\frac{dC_{i,t}}{dt} = \chi(\bar{S}_{j,i,t} - C_{i,t})$$

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7 Formulations weighted more toward a firm's most sophisticated customers are warranted when representing firms that have been highly successful in capturing cutting-edge ideas and diffusing them throughout the organization or identifying their most advanced users and designing products around their needs. The difficulty of either of these types of efforts suggests that all customers have some weight in determining firm capabilities.

8 This assumes, *a fortiori*, that the capabilities of the individual are close enough to the capabilities required by sophisticated clients that learning could take place. The staff at McDonald's might be completely baffled by, and unable to learn from, an inflow of very sophisticated diners who normally eat at LeCirque. At best the structure and market strategy of McDonalds' would limit the feasibility of learning from such an influx of customers and at worst capabilities might fall if the staff tried unsuccessfully to understand and accommodate their needs.

2.2 Strong capabilities attract customers

The customers a firm serves, how it serves them, and the characteristics of the products and services it provides to them, define that firm's market position. Managers do have direct levers to influence a firm's market position. Managers can instruct employees to target different customers, pitch different services, redirect advertising expenditures and so on. Ultimately, however, it is customers who decide whether or not a firm successfully changes its market position and managers cannot dictate customer choices.

To understand market position, therefore, we need a model of customer choice. As a first approximation to the heuristics used to guide choice, we can assume that customers evaluate firms' offerings and choose the one that provides the greatest benefit net of the price (utility) given their needs. To the extent that firm capabilities influence that benefit, by allowing a firm to offer unique products and services or common products and services at a lower cost, they will influence a firm's market position.

The utility $(U_{j,i,t})$ that a customer j perceives from the offering of a firm i is allowed to vary over time t in response to five characteristics specific to the firm, customer, and industry (eq. 2a). Weights (α, β, γ) are added to the equation to allow it to represent a range of industries that differ in the relative influence these factors have on utility. Utility is treated as a dollar value for a unit of the product or service (e.g., an investment-banking transaction) with the weights acting to map the benefits from capabilities and sophistication onto dollar values.[9]

2a. $$U_{j,i,t} = A + \alpha C_{i,t} + \beta S_j + \gamma S_j C_{i,t} - P_{i,t} + \varepsilon_{i,j,t}$$

The first element of utility (A) is a benefit common to all customers who might buy from any firm. This represents the value of fulfilling the most basic needs with a basic product.

The second element of utility $(\alpha C_{i,t})$ is a direct benefit of a firm's capabilities valued equally by all customers. Capabilities provide value in many forms, some of which may be valued equally by all customers alike. For example, highly capable firms may be able to provide a service more rapidly. Clients with simple issues and those with complex issues may place an equal value on having insight provided quickly.

In some settings the sophistication level of a customer may increase the benefit that he or she can extract from a product or service. A direct additive influence of customer sophistication on utility (βS_j) will exist when sophisticated users are able to apply the same product more often, more effectively, or to more important issues than less

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[9] α, β are measured in dollars per skill per unit while γ is in dollars per skill unit squared per unit.

sophisticated users have the opportunity to do. For example, larger firms will generally raise more money with each new security issued.

The capabilities and sophistication level of the customers may also interact $(\gamma S_j C_{i,t})$ in determining utility so that stronger capabilities are more highly prized by more sophisticated users. This is particularly true whenever capabilities allow a firm to provide a greater variety of services or more exacting services that meet the needs of a sophisticated user but exceed the needs of an unsophisticated user. In these cases the value derived from capabilities is greater when the customer is also more sophisticated.[10] For example, a firm planning to a large equity issue faces a far greater financial risk than a firm planning to make a small debt issuance.

Finally, the utility that customers perceive from a firm's products or services decreases as the firm's price increases $(P_{i,t})$ and increases or falls temporarily in response to chance occurrences $(\varepsilon_{i,j,t})$. Many chance occurrences that influence a firm's value as perceived by a specific customer—a glowing reference given by a current client to a potential client, a fortuitous friendship struck between an executive and a potential client, a misplaced message and a phone call not returned—are not explicitly modeled. Since these events do occur, and can have a material effect on potential client decisions, the model allows for stochastic shocks in the utility customers perceive from a given firm at a given time.[11]

The random shocks are modeled in a way that recognizes that chance occurrences in the real world have some persistence. A positive reference from one client to another is often considered valid for a long time, friendships can be lasting, and a perceived slight may not be immediately forgiven. Since these occurrences persist they are not well represented by a white noise sequence where the shock in one period is completely independent of those in prior periods (Sterman, 2000). A "pink noise" sequence (first-order autocorrelated noise) is used to model shocks that accumulate and decay gradually over time (eq. 2b).

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10 Multiplying the two terms insures that a customer with highly sophisticated needs cannot get extra benefits from a firm with little or no capabilities to serve those needs, and likewise that a firm with great capabilities cannot provide additional utility to a customer with only the most basic needs. In between those two extremes, the implication is that more sophisticated customers derive greater value from a firm's capabilities than less sophisticated customers derive (i.e., $\frac{\partial(S_j * C_i)}{\partial S_j} > 0$).

11 Random events can, for example, help to sustain industry cycles that would otherwise die out over time and can make it difficult for firms to maintain competitive positions that rely on exacting relationships across firms. While not important to all issues, incorporating random events into a model increases the likelihood that a model will behave similarly to its real-world counterpart.

2b. $$\frac{d\varepsilon_{i,j,t}}{dt} = \xi(\varepsilon_{i,j,t} - \nu_{i,j,t}) \quad \text{where} \, \nu_{i,j,t} = N(0, 0.1)$$

The smoothing process causes each shock to retain some of the positive or negative effects of previous shocks. Different shocks are introduced to each firm's attractiveness in each market segment since many chance occurrences influence one customer or a small group of similar customers.

3. $$\frac{dM_{i,j,t}}{dt} = \theta(M^*_{i,j,t} - M_{i,j,t})$$

$$M^*_{i,j,t} = \frac{\exp(\rho U_{i,j,t})}{\sum_i \exp(\rho U_{i,j,t})}$$

Since a firm's capability level is assumed to derive from the overall sophistication of its customers, we need to track each firm's share of each market segment $(M_{i,j,t})$. A firm's actual market share in each customer segment is assumed to adjust at some fractional rate (θ) toward the long-run market share $(M^*_{i,j,t})$ indicated by the utility it offers to each segment at any given time. Market shares shift gradually as customers become aware of changes in the relative attractiveness of firms' offerings, complete ongoing transactions and contracts, and establish new contractual agreements and relationships.

The indicated long-run market share $(M^*_{i,j,t})$ of a firm in a given segment is modeled using a variant on the traditional logit form. The logit formulation recognizes that there are specific and unmodeled influences on the utility offered by each firm as perceived by each type of customer that do not vary with time.[12] As a result a small advantage in utility along measured factors will not convince all consumers in a given segment to prefer the same firm. As Harold Hotelling pointed out in 1929, "Many customers will still prefer to trade with him [the seller with an apparently less attractive offering] because they live nearer to his store than to the others, or because he is a relative or a fellow Elk or Baptist, or for a combination of reasons."

The one modification of the standard logit formulation is the addition of a parameter (ρ) that adjusts the relative importance of modeled utility factors in relation to the importance of unmodeled factors. For example, a value of zero would imply that customers choose suppliers without any regard for differences across firms in the utility factors modeled. In this case each firm would receive an equal fraction of the market regardless of its price or

12 The unmodeled influences accounted for by the logit formulation differ from the random component explicitly introduced to the utility equation in two ways. First, they do not change over time. Second, they represent variation in utility at an individual customer level rather than at an entire market segment level.

capability level. Large values of ρ imply that customers care solely about the utility factors modeled and are perfectly informed about their values. In this case the firm with the highest utility, no matter how slight an advantage, would attract all customers in a market segment. By varying ρ we can explore the implications of industry settings where prices, customer sophistication, and customer-derived capabilities are more or less important to customer utility and where information about prices and capabilities is more or less easily available and accurate.

2.3 Firms with strong capabilities charge more

A pricing rule is needed to complete the standard utility function used to model customer choice. One means of modeling pricing behavior is to assume that managers select optimal prices that maximize the expected present value of the stream of profits over time. This assumption, however, implies that managers have perfect foresight of all possible outcomes of competition, unlimited and unbiased access to all relevant information, and unfettered ability to process that information (Simon, 1957). In an evolving and uncertain market it is far more behaviorally plausible to assume that managers do not have the resources, time, information or knowledge required to develop optimal policies. Instead managers are likely to follow heuristics that are intendedly rational in that they make sense given available information and the manager's understanding of the situation. Later we can explore how managers might use prices strategically (section 4) given the outcomes achieved with these base policies.

$$\frac{dP_{i,t}}{dt} = \phi\left(P^{*}_{i,t} - P_{i,t}\right)$$

4. where $P^{*}_{i,t} = P_r * g(V_{i,t}, \overline{V}) * h(C_{i,t}, \overline{C}_t)$

and $g(V_{i,t}, \overline{V}) = \left(\frac{V_{i,t}}{\overline{V}}\right)^{\mu}$, $h(C_{i,t}, \overline{C}_t) = \left(\frac{C_{i,t}}{\overline{C}_t}\right)^{\chi}$

Clearly managers want to determine a price $\left(P^{*}_{i,t}\right)$ that will provide the greatest profit for their firm (eq. 4). To do so managers consider a wide variety of factors that are beyond the scope of the competitive interactions treated in the model. These factors include forces that affect costs (e.g., input prices, technology, capital needs), industry demand (e.g., the availability of substitute goods and services, the cost of doing without) and the potential for entry and exit of rivals. These factors are captured in an overall industry price level $\left(P_r\right)$ that reflects the influence of these factors on average market price.

Other factors that go into determining price arise from the competitive process and lead to differences in price across competing firms. Each firm's price may need to be responsive to competitors' prices, promotional expenses, or service quality. However, it is often difficult to gather information about the extent of many of these competitor attributes and even

harder to quantify their effect. In these cases managers often rely on an outcome measure such as volume to capture the combined effect of these unobserved or ambiguous factors.

Competition in the model is based on prices and capabilities. Firms are assumed to be able to measure their own and their rival's capabilities through careful observation of the work each firm performs and knowledge of each firm's internal operations including who their employees are and what technology they employ. Price information, however, is obscured by a host of off-invoice price increases and concessions that are hard to quantify. These include performing additional unreimbursed work, providing financial and physical resources at no cost or below market cost, and taking payment in stock options or other untraditional forms.

To compensate for a lack of direct price information, firms monitor their volume as an indicator of changes in competitor prices. Firms then adjust their prices based on the available information about relative capabilities and relative volume. When a firm's volume is considerably lower (higher) than competitors the managers infer that competitors are taking strong (weak) unobserved actions that require it to lower its price. Similarly, when a firm's capabilities are above (below) those of competitors, managers raise (lower) prices to capture (compensate for) the difference in attractiveness to clients. The strength of those adjustments (μ, χ) depends on the importance of volume, the value of capabilities, and the influence of price in the particular market context.

Since it takes time for firms to perceive and react to changes in volume and customer utility, and time before existing contracts at previous price levels are completed, price (P_i) adjusts toward the desired price over time at some fractional rate (ϕ).

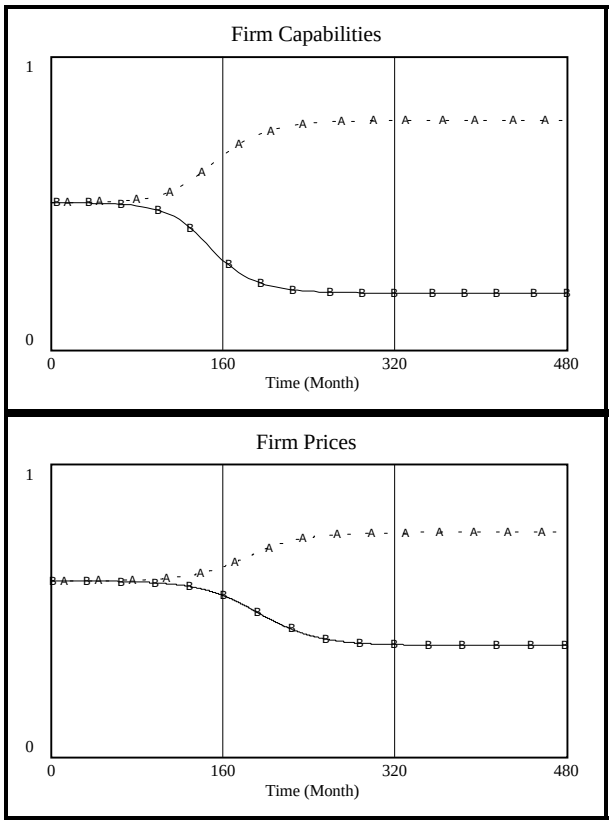
3.0 Markets stratify, pricing bombs, selectivity is critical

The model was first parameterized to represent an investment-banking setting with the exception that only two firms were included for transparency of results. Extensive sensitivity was conducted to determine the robustness of the findings over a broad range of possible parameter values. For a detailed presentation of those test results see Rockart (2001).

Model tests were initialized with a homogenous and equilibrium industry structure where both firms served a cross-section of the potential customer base, had capabilities consistent with serving those customers, and charged the same price. After the introduction of even the slightest noise sequence, firm performance diverges. The simulated industry reaches equilibrium with a stable hierarchy where one firm is more capable than the other, has a higher fraction of the more sophisticated customer segments, and charges a higher price. The hierarchy emerges as long as sophisticated customers place a significantly higher value on capabilities than unsophisticated customers (i.e., $\gamma > 0.5$), firms do not radically alter

their prices in response to small changes in relative volume (i.e., $\mu < 1$), and customers care about the utility factors explicitly modeled (i.e., $\rho > 10$).

The emergence of a hierarchy of firms was expected and is not seen as a central or surprising result of the model. The stratification process and rationale will be reviewed only briefly to leave space for discussion of the effectiveness of policies in upsetting the status quo once a stable hierarchy has developed.[13]



Figures 3a,b: Capabilities and prices diverging

The initially equal capability levels of the two firms begin to diverge as soon as a minor noise sequence is introduced to the model. The divergence continues well after the noise is removed until the capabilities of the two firms reach very different but stable levels (figure 3a). The more capable firm charges a higher price (figure 3b), has a dominant share of the more sophisticated market segments (lines 3,4,5 in figure 4), and a smaller share of the less sophisticated segments (lines 1,2 in figure 4).

[13] For a more detailed discussion see Rockart (2001).

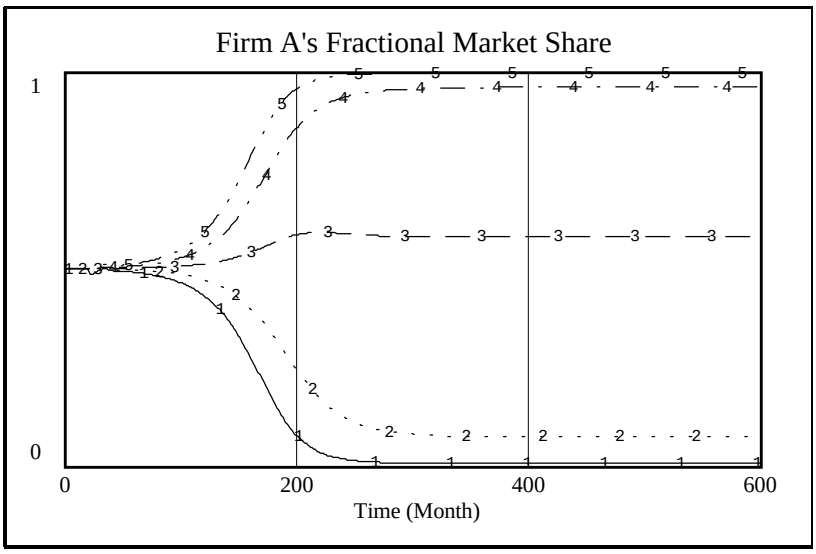
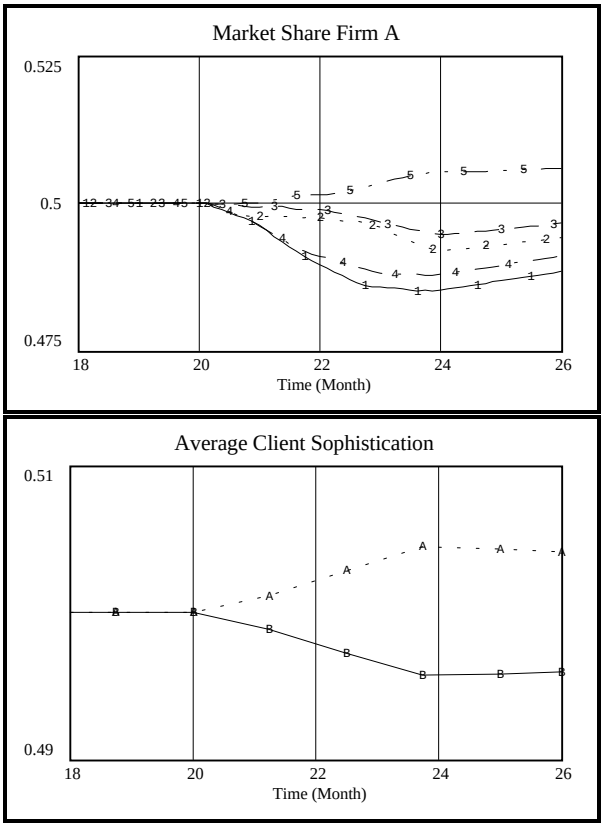


Figure 4: Market share of leading firm by segment



Figures 5a,b: Early development of market share and customer sophistication

Why do even small and temporary random effects lead to substantial and sustained differences in capabilities and market shares across the two firms? The key is the

reinforcing relationship between a firm's capabilities and the average sophistication of its customers. The random influences slightly skew one firm's share (labeled firm A) toward the more sophisticated segments (figures 5a,b). This in turn leads to an increase in that firm's capabilities and a drop in the capabilities of its rival (figure 6).

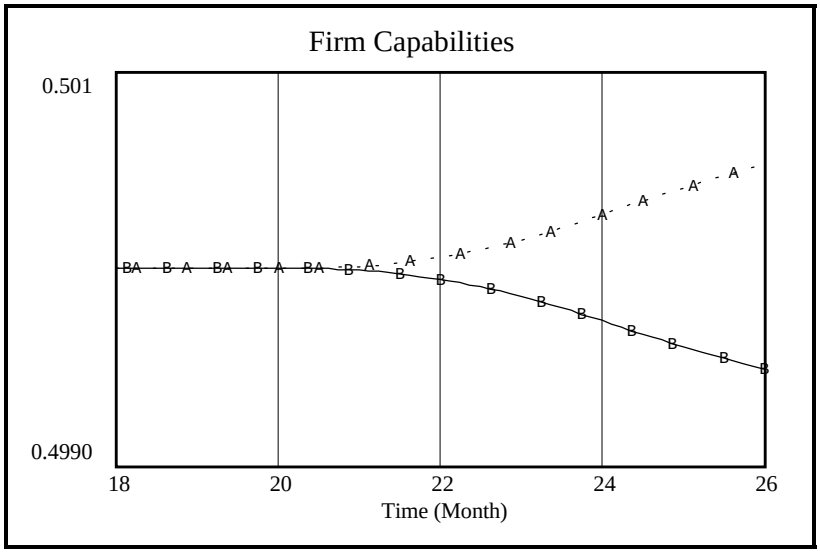


Figure 6: Early development of firm capabilities

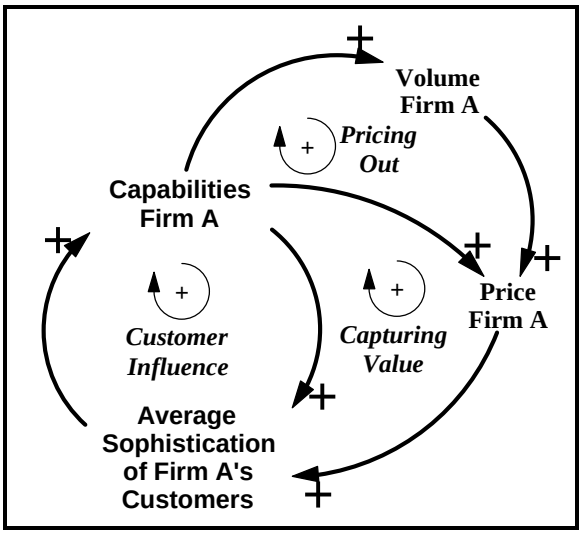


Figure 7: Skewing share toward sophisticated customers

The early pattern of relative price, volume, and capability changes vary from experiment to experiment depending on the precise series of random events.[14] Ultimately, and usually quickly, capability differences become magnified until subsequent small shocks are unable to redirect competition. One firm's temporary advantage with sophisticated customers provides a small capability advantage. If sophisticated customers value the capabilities more than unsophisticated customers (i.e., $\gamma > 0$) the capability advantage will draw a greater portion of sophisticated customers, as illustrated by the *customer influence* loop in figure 7.

The effect of capability differences on customer choices is then magnified by the pricing decisions firms make. With stronger relative capabilities and rising volume the leading firm has incentive to raise its prices to capture more of the value it provides to customers. If unsophisticated customers value the capabilities less than sophisticated customers (i.e., $\gamma > 0$) the price increases will primarily shed unsophisticated customers (figure 7 *capturing value* and *pricing out* loops) and skew share further toward sophisticated customers. The result is that small capability advantages, arising from small shifts in market share, increase over time.[15]

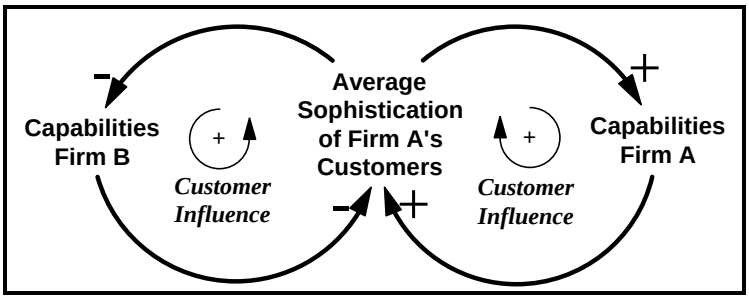


Figure 8: Capability development and rivalry for customers

Gaps open among firm capabilities because market position is rival. Rivalry ensures that increases in customer sophistication not only are amplified for one firm (reinforcing processes in figure 7) but that they set in motion and amplify a reinforcing decline in the market position and capabilities of that firm's competitors (figure 8).[16]

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14 For example, since it takes time for capabilities to develop or decay, a lead among sophisticated customers by one firm can be reversed if quickly followed by unusually long and sustained series of shocks favorable to its rival. As another example, a firm may have its share skewed toward less sophisticated segments while winning more volume overall. This can cause the firm to raise prices based on the high volume resulting in a temporary period where the less-capable firm is also the high-priced firm.

15 In the model capabilities adjust toward customer sophistication without firm expenditures. If firms have to spend money to raise their capabilities (e.g., hiring, training, etc.) then higher prices have a direct positive effect on capabilities by providing the firm with cash without the expense and effort of tapping the capital market. This adds another reinforcing process to figure 8a.

16 Customer heterogeneity keeps one firm driving the other out of the market completely.

3.1 Price cutting is not a path to sustained improvement

Price competition is one of the easiest policies for managers to implement. Unfortunately it appears that they stand little chance of using it to create a lasting improvement in their competitive performance. Price cutting strategies are implemented in the model by adding a new term $(\sigma_{i,t})$ to the pricing policy.

4b. $$P_{i,t}^{*} = P_r * g(V_{i,t}, \overline{V}) * h(C_{i,t}, \overline{C_t}) * \sigma_{i,t}$$

Giving this term a value of less than one for the following firm after the original stratification has occurred mimics the effect of aggressive pricing on capabilities in the industry (eq. 4b).

One test run with a fifty-percent price cut $(\sigma_{i,t} = 0.5 \,\forall t > 600, i = B)$ by the following firm implemented midway through the run suggests that price competition is largely ineffective in an investment-banking setting. The price cut does lead to an increase in the capabilities of the following firm, but it also upgrades the capabilities of the leading firm (figure 9). The cause of both capability increases can be seen in figure 10 for the test run with a ten-percent price cut. The following firm gains share mainly among the least sophisticated clients $(M_j = 3)$ of the leading firm. While this causes the capabilities of the following firm to rise, it also pushes the leading firm's capabilities upward.

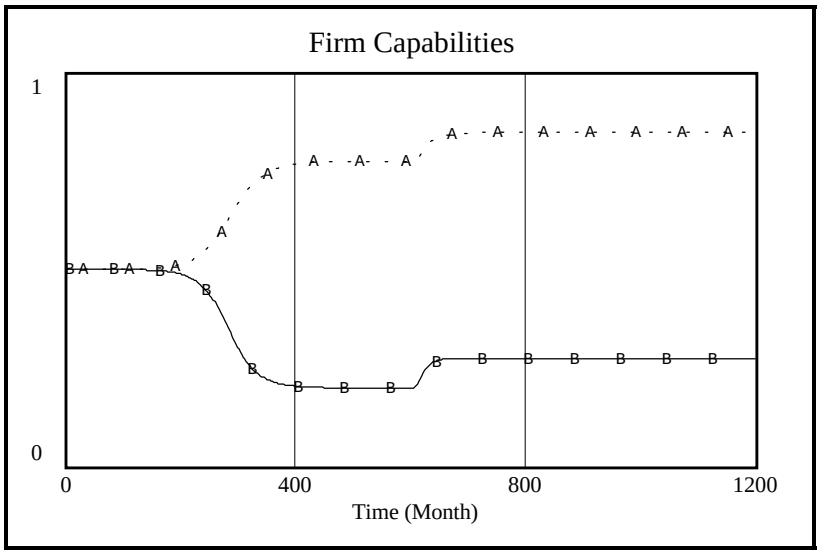

Figure 9: Modest capability improvement through price competition

Why does the following firm gain share primarily among the leading firm's least sophisticated clients? After all, price has an equal absolute effect on the utility offered across all segments. The answer is that there are a great many customers in the marginal

segment $(M_j = 3)$ who see relatively little difference in the value provided by these two firms before the price cut.[17] The price cut, therefore, causes a large portion of the nearly indifferent customers to shift suppliers and only small changes in the share of customers with strong prior preferences. If the goal is to cut prices temporarily in order to challenge for the leading position, a broad-based aggressive pricing policy actually works against the firm's interests by strengthening its rival.

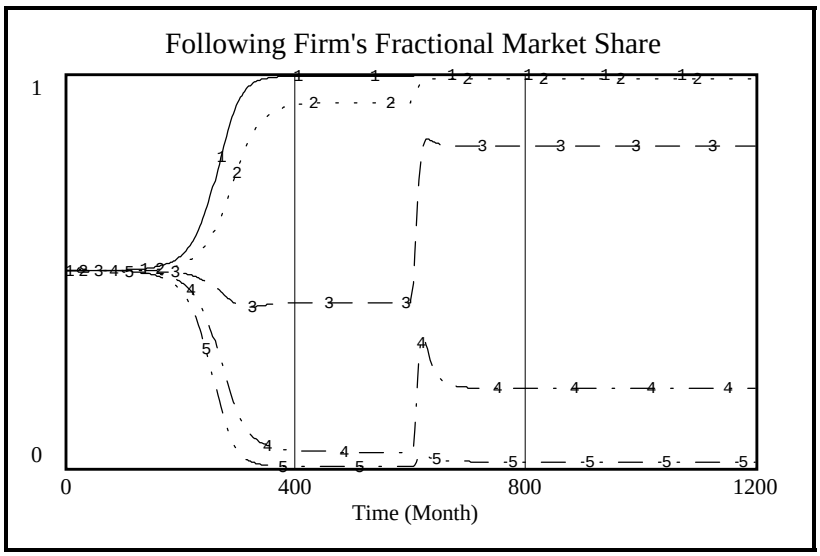

Figure 10: Price competition takes market share at the margin

3.2 Capability building must be done quickly and with market restraint

The focus so far has been on capabilities that are developed through working with customers. In the investment-banking industry the most common means of gaining these capabilities directly is to imitate the practices and hire people away from leading competitors.

Attempts by a following firm to improve in this manner can be modeled as closing a gap between the firm's own capabilities (denoted b) and the capabilities of the leading firm (denoted a). The fractional rate at which the following firm closes the capability gap κ is assumed to be zero if no intended policy is implemented. Once a policy is implemented the fractional rate becomes a positive number whose value depends on the rate at which the

[17] Specifically, the logistic equation assumes that the random preferences that customers in each market segment associate with each firm are normally distributed with mean zero. Changes in the modeled components of utility, therefore, will have a large effect on share when the delineation between firms falls in the dense center of the distribution (i.e., when share is nearly evenly split) and a small effect on share when the delineation falls in the sparsely populated tails of the distribution (i.e., when one firm has a dominant share).

firm can hire away the leading firm's employees and integrate their knowledge into the firm's wider operations (eq.1b).

1b. $$\frac{dC_{b,t}}{dt} = \chi(\bar{S}_{j,i,t} - C_{b,t}) + \kappa(C_{a,t} - C_{b,t})$$

The firm must be able to develop these skills rapidly (i.e., $1/\kappa$ small) or else the potential for closing the gap in capabilities drops dramatically (figure 11).

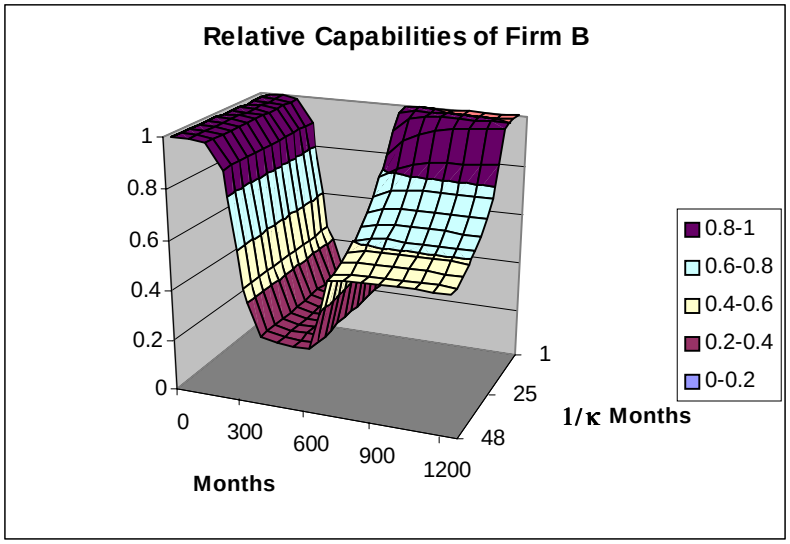

Figure 11: Speed of capability development and competitive standing[18]

Capability development is a more effective competitive tool than prices because higher capabilities are particularly attractive to the more sophisticated clients and therefore at least partially self-supporting.[19] However, the speed of new capability development proves to be of critical importance because a rising firm's capabilities are subject to downward pressure from the gap between the capabilities acquired and the capabilities reinforced through existing work with customers.

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[18] $1/\kappa$ is the adjustment time in months.

[19] The capability development process of the following firm has been modeled as an imitation process with no direct deleterious effect on the capabilities of the leading firm. If the process had a direct effect on the leader (e.g., hiring away key employees) the effectiveness would have been even stronger.

When the firm adopts a gradual process of imitation, adjusting capabilities over 24 months, it finds the capabilities it develops are overwhelmed by the capability influence from client work. The result is a reduced but persistent gap between the capabilities of the leading and following firms (figure 12). In an investment-banking setting, and professional services in general, this often takes place as experienced recruits and high-potential new hires leave in frustration at the rift between the types of work they are capable of executing and the prevailing mix of business at the firm. Eventually the efforts to close the performance gap would likely be abandoned at which time the capability gap would revert to its original level.

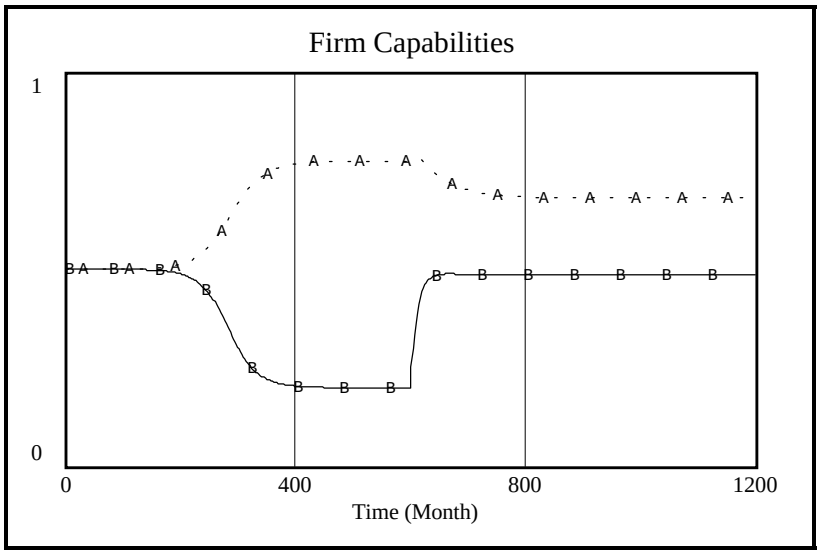

Figure 12: Slow capability development and sustained leadership

When the firm mimics the leading rival rapidly, adjusting over 12 months, it wins market share at the higher sophistication levels and thus is able to support its new higher capabilities. The effect not only increases the capabilities of the following firm it also dilutes the capabilities of the leading firm which takes on customers across the sophistication spectrum. If we allow for random occurrences throughout the simulation run, and the following firm is persistent in building capabilities, it not only draws even but also eventually gains the lead due to the chance occurrences (figure 13a). These chance occurrences will eventually tip competition in favor the following firm as long as the following firm's capability development efforts systematically offset chance occurrences favoring the leader.

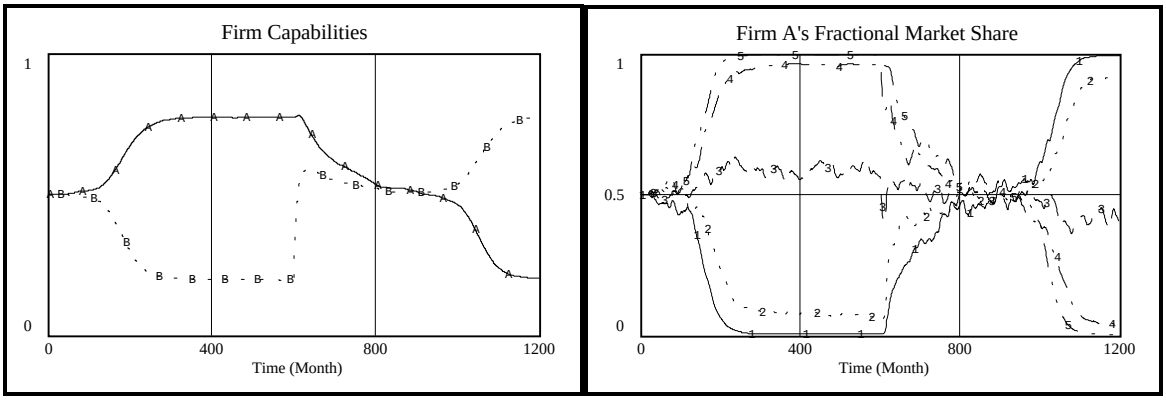

Figure 13a,b: Rapid capability development and turnover in leadership[20]

How might the leading firm respond? Are some reasonable actions capable of halting the following firm's rise or at least raising the complexity of the challenge?

Leading investment banks constantly have to decide to accept or reject offers of less sophisticated and lower margin client work. The leading firm in the previous run not only lost sophisticated clients it also gained share among less sophisticated clients (figure 13b).[21] The leading firm, however, can choose not to accept work from these clients. If the leading firm refused to take on a larger share of less sophisticated client work, its capabilities would not fall as they did in the previous simulation experiment and it might not be displaced.

A firm's willingness to accept clients in each segment is modeled by adding a term $(W_{i,j,t})$ to the market share equation (eq. 3b). The value of the term determines the fraction of customers interested in buying from the firm that it agrees to serve in each market segment.[22]

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[20] The noise sequence runs throughout the simulation obscuring the graphic. As noted in the text, the noise sequence plays a key role in leading to the reversal by giving the challenging firm opportunities to overtake the leader.

[21] The leading firm attracted more of the less sophisticated customers as a combined effect of its rival's and its own actions. As the follower firm became more capable it raised its price to capture some of the value it could provide to clients and to offset its increasing overall volume. The price increase made the follower less attractive to unsophisticated clients. At the same time the leading firm dropped its price to maintain volume and share among the sophisticated customers, making it more attractive to unsophisticated customers.

[22] Rejected customers are assumed to find an alternative means of satisfying their needs outside of the services of the two firms. This assumption provides consistency with later tests in which both firms refuse customers. The assumption that customers do not merely shift suppliers is conservative in that it may underestimate the effect of the policy. If the rival agreed to serve the rejected customers, the leading firm's selectivity policy would have the additional effect of reducing the average sophistication of the follower's customer base.

3b. $$M^{*}_{i,j,t} = \frac{\exp(\rho U_{i,j,t})}{\sum_{i} \exp(\rho U_{i,j,t})} * W_{i,j,t}$$

The term is set so that when the following firm begins its capability push the leading firm refuses to take clients from the two least sophisticated segments $\left(W_{i,j,t} = 0 \,\forall\, i = A,\ j = 1 \& 2,\ t > 600\right)$ and the test is then repeated. The policy is actually quite painless from the perspective of the leading firm. It sacrifices very few customers since it has few unsophisticated customers to begin with (figure 14).

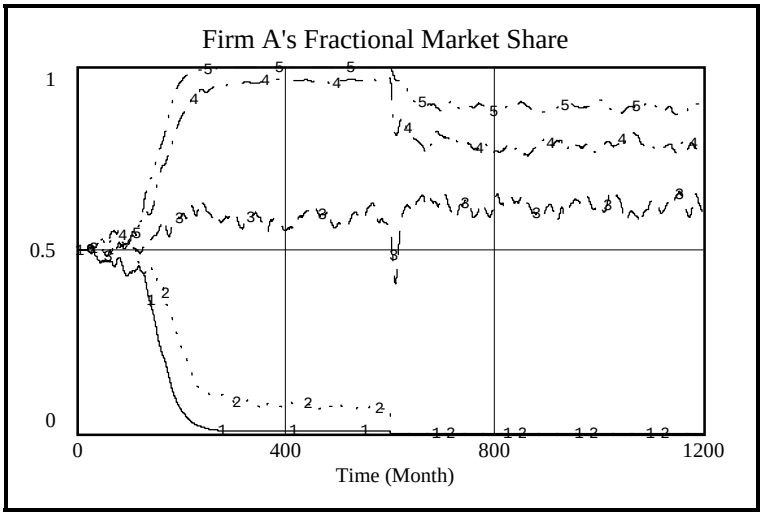

Figure 14: Discipline over assignments and market share

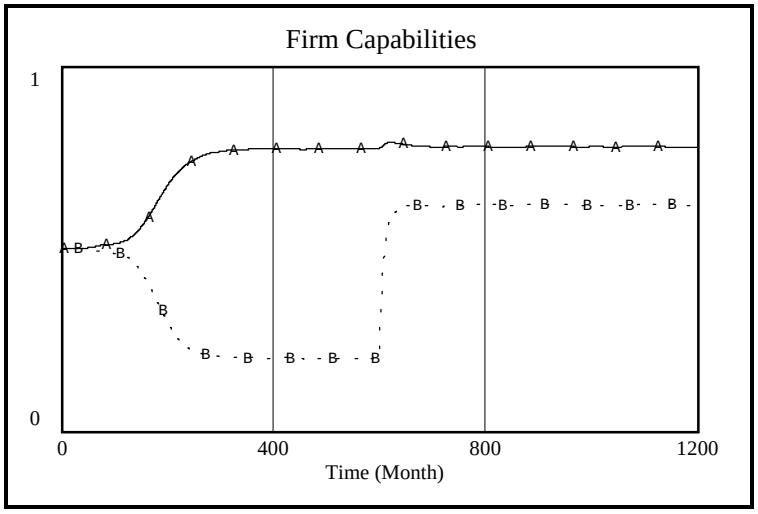

Figure 15: Discipline over assignments and sustained leadership

Without the leading firm's capabilities being diluted, the following firm confronts the same problem it had when it brought on capabilities too slowly. It continues to bring in stronger capabilities but it now has farther to rise before it meets its rival. As a result the follower reaches a point where the downward pull of unsophisticated client work offsets the inflow of capable people despite its relatively rapid capability development effort (figure 15).

Of course the following firm can match these actions. It too can refuse to work on less sophisticated client work. When the test is repeated with both firms adopting this policy $\left(W_{i,j,t} = 0 \,\forall\, i = A \,\&\, B,\ j = 1 \,\&\, 2, t > 600\right)$ differentiation does not arise within the remaining three market segments. Instead, both firms are locked in a continued battle (figure 16).[23]

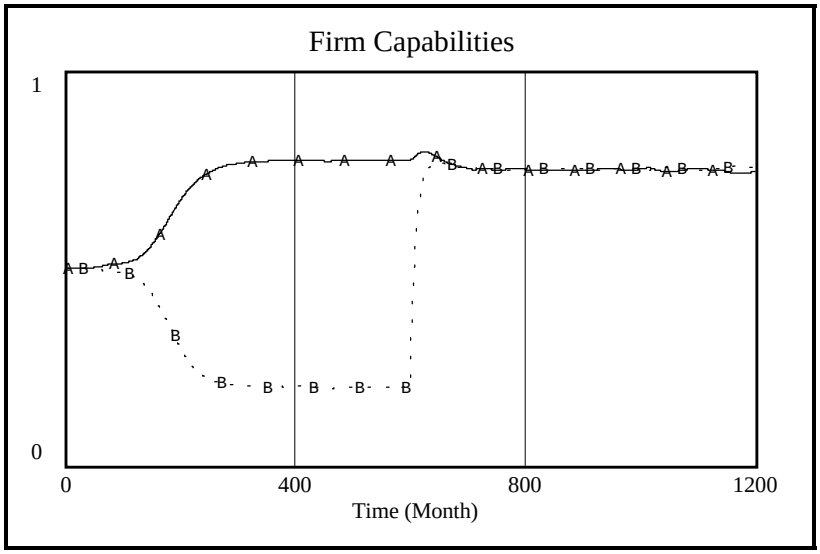

Figure 16: Perfect discipline over assignments

As stated earlier, differentiation relies on a strong interaction term (γ) that reinforces small capability differences by skewing firms' market shares across segments. But (γ) is not the only determinant of the potential power of the skewing effect. The potential strength of the entire interaction effect $(\gamma S_j C_{i,t})$ also falls as the potential spread of sophistication (S_j) and capabilities $(C_{i,t})$ fall. When firms systematically refuse to serve one end of the market they reduce the potential spread of both customer sophistication and firm capabilities and weaken the reinforcing process.

The preceding analysis, however, assumes that the leading and following firms can perfectly identify and weed out less sophisticated client work. In practice it may be hard to implement or enforce such a policy when professionals are being rewarded for finding deals

[23] The following firm takes a far greater revenue loss early on since most of its customers are in these two segments.

and the sophistication of those deals is difficult to evaluate from a distance. The simulation is repeated but both firms are only able to block eighty percent $\left(W_{i,j,t} = 0.2 \,\forall\, i = A, B,\ j = 1 \,\&\, 2, t > 600\right)$ of the business received from customers in the three least sophisticated market segments.

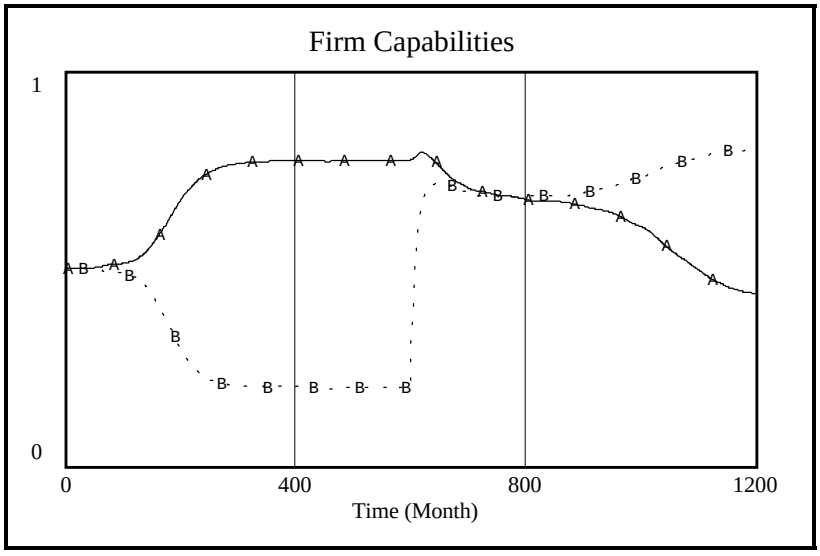

Figure 17: Imperfect discipline over assignments

Once again the following firm displaces the leading firm (figure 17). When the leading firm first institutes the selectivity policy its capabilities rise slightly. However, as the following firm rapidly develops and offers capabilities and prices similar to those of the leading firm the leading firm begins to take on some of the less sophisticated customers it fails to screen out. Its capabilities fall and the following firm begins to take away customers at the most sophisticated levels. This switching reaches a point where the two capability levels begin to draw even.

At this point the industry is once again undifferentiated. Both firms have identical capabilities, serve an identical mix of customers, and charge identical prices. The only difference from the start of the simulation is that they serve a smaller market that is more sophisticated on average and their equilibrium capabilities are higher. Just as at the start of the simulation, chance advantages from small random events become magnified over time until the industry is differentiated once again.

Unlike the start of the simulation, however, the former follower still has a policy of trying to close any capability advantage its rival develops. Therefore, random events that favor the former leader are offset by the actions of the former follower. As a result, only chance events that favor the former follower will grow and that firm emerges as the new leader.

4.0 Results in light of the experiences of Merrill Lynch and PaineWebber

The model tests so far have indicated several conditions for successful challenges to industry leadership in an investment-banking setting and perhaps in other professional-services settings. The following firm is far more likely to succeed by improving its capabilities directly than by cutting prices to attract customers. Speed is a critical component of bringing in new capabilities since prolonged client work at odds with (i.e., less sophisticated than) the capabilities being developed will blunt the efforts. Finally, leading firms can protect their position by refusing to take on less sophisticated customers. However, an imperfect screening process leaves them open to attack if the following firm is also willing to screen customers and is diligent in continuing its assault until chance turns in its favor.

Merrill Lynch and PaineWebber both attempted at times to build their investment-banking capabilities slowly through individual hires. Merrill Lynch found in the 1970s and PaineWebber found in the 1980s that it was hard to hire and even harder to retain people whose skills were well above those of the organization and overall client work.

With the acquisition of White Weld, Merrill Lynch rapidly brought on a group of investment bankers whose skills were competitive with the very best in the industry and it began to win more and more sophisticated clients (see figure 1a). Merrill Lynch exercised restraint in the volume of less sophisticated clients it served. While the firm eventually increased its overall volume of underwriting in the late 1980s (see figure 18), its volume growth in the late 1970s and early 1980s took place entirely at the upper end of the sophistication scale (see figure 1a). This led to an increase in the average sophistication of its client work (see figure 1b).

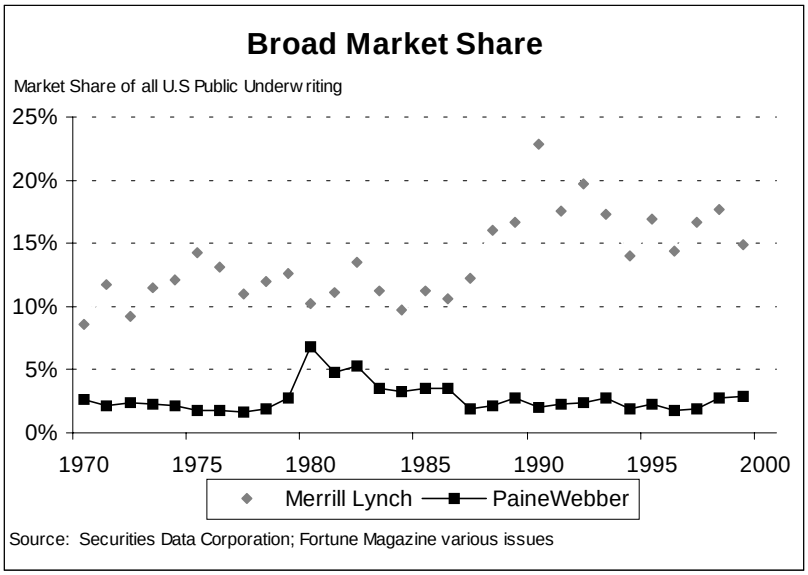

Figure 18: Discipline over assignments

This stands in sharp contrast to PaineWebber's experience following its acquisition of Blyth Eastman Dillon (BED). PaineWebber was unable to retain the more active and able bankers at BED and struggled to build a practice piecemeal without them. In the absence of an influx of sophisticated work, and with pressure to justify an expensive acquisition, PaineWebber increased its share of the overall market in the late 1970s and carried into the early 1980s (see figure 18) by taking on business where they could find it. This led to a fall in the sophistication of the firm's market position from which they never recovered (see figure 1b).

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