Pricing Analysis for Merrill Lynch Integrated Choice

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In late 1998, Merrill Lynch and other full-service financial service firms were under assault. Electronic trading and the commoditization of trading threatened Merrill Lynch's value proposition—to provide advice and guidance through a financial advisor. Management decided to offer investors more choices for doing business with Merrill Lynch. A cross-functional team evaluated alternative product and service structures and pricing and constructed models to assess individual client's behavior. The models showed that revenue at risk to Merrill Lynch ranged from $200 million to $1 billion. The resulting Integrated Choice strategy enabled Merrill Lynch to seize the marketplace initiative, changed the financial services landscape, and mitigated the revenue risk. As of year-end 2000, client assets reached $83 billion in the new offer, net new assets to the firm totaled $22 billion, and incremental revenue reached $80 million. (*Financial Institutions: brokerage/trading. Marketing: pricing*)

C harles E. Merrill founded the company that bears his name in 1914 and charged it with the proposition that the financial markets should be accessible to everyone. Merrill Lynch has delivered on that and is credited with bringing Wall Street to Main Street. One of its major business segments, the Private Client Group, handles the brokerage and lending services (Merrill Lynch Annual Report 1999, Harvard Business School 2000).

Asset gathering has been the Private Client Group's core business strategy since the 1980s. That coupled with a planning-based, disciplined approach imparts a long-term perspective rather than the short-term, day-to-day trading approach. This approach has been quite successful. Client assets have increased at a 16 percent compound annual rate over the past 10 years to nearly $1.7 trillion at the end of 2000. US Private Client (USPC), the domestic side of this group, man-ages nearly $1.4 trillion of this, the rest coming from international operations.

USPC serves over five million households and small- to mid-sized businesses. It provides brokerage, banking, and cash services, such as checking, and ATM and Visa cards through its Cash Management Account (CMA®). Its asset services include stocks, bonds, mutual funds, transactions of several other complex securities and products, and research on domestic and international securities. It serves liability management needs through diverse offerings of mortgage and home equity loans, securities-based lines of credit, and commercial real estate financing. It also offers 401(k) employee-benefit administration and investment services, fixed and variable annuities, variable life-insurance products, and trust- and estate-planning services. USPC is a global leader in the full-service financial services arena with more assets under management than any competitor.

USPC's Business Model—Working Through Financial Advisors (FAs)

USPC's mission is to provide "sophisticated financial solutions" to its clients to "simplify" their lives. It employs a highly trained sales force of nearly 16,000 financial advisors (FAs) located in approximately 750 offices throughout the United States. FAs have strong working relationships with their clients and give them advice and service to help manage their assets. As part of the customization, USPC allows its experienced FAs some latitude in pricing its products and in serving clients. This approach with clients has enabled USPC to gather assets and maintain long-term relationships.

Competitive Trends and Environment

Over the past 25 years, regulatory and technology trends have enabled intense competition in the financial services arena.

Competitive Trends—Discount Brokers

Until 1975, the retail brokerage industry consisted primarily of full-service firms that engaged in all aspects of the investment process from investment advice to execution and follow-up. The deregulation of commissions in May 1975 created the discount brokerage industry. Several brokers, notably Charles Schwab, entered the industry and reduced commissions to almost half those charged by full-service firms. Schwab and other discount brokers focused on providing investors with convenient, low-priced access to securities trading without advice on which securities to buy and sell. They benefited from an increased flow of financial information in newspapers, financial-related cable television, and magazines that created informed investors.

Over time, Schwab added research to its product offerings and arranged to offer its clients initial public offerings (IPOs). It added analytic tools for asset allocation, stock selection, and financial planning to emulate the sophisticated tools and processes used by the full-service firms. To further reposition itself as a "full-service discount broker," Schwab purchased US Trust

in January 2000 to offer new services for its affluent clients. These moves tended to blur the distinctions between discount brokers and full-service firms.

Competitive Trends—Banks and Full-Service Consolidations

In 1977, Merrill Lynch launched its innovative CMA® accounts, which successfully challenged banks for cash deposits, and started a radical change. Until then, as a result of the Securities Exchange Act and the Glass-Steagall Banking Act enacted in the 1930s, firms providing brokerage and securities services had been

By year-end 1999, nearly 31 percent of retail trades were being done online.

separate from firms providing banking and insurance. In the 1980s and 1990s, several banks acquired underwriting companies, and the operational boundaries between brokerage and banking activities began to blur.

The late 1990s saw a consolidation trend among major financial service providers. The merger between Dean Witter and Morgan Stanley in 1997 created a brokerage powerhouse. In 1998, the $73 billion merger of Citicorp and Travelers led to the creation of Citigroup, which offered clients credit cards from Citicorp, stock-selling services from Salomon Smith Barney, and insurance products from Travelers. One-stop shopping for all financial services began to emerge.

Competitive Trends—Electronic Trading

Deregulation and technology in the late 1990s led to the rise of another competitive segment—the electronic brokerage firms. These firms leveraged technology not only in the back office but also in their interface with customers and thus dramatically reduced costs, even beyond what the discount brokers had been able to do. They typically did not have branch offices and relied on purely electronic order entry.

Like discount brokerages in the late 1970s, electronic trading firms were initially viewed as upstarts attracting low margin, active-trader clients. They built up

market share through trading costs as low as $8 per trade (compared to typically $30 for a discount brokerage firm and $200 for a full-service firm). In addition, the upsurge in technology stocks in the late 1990s gave rise to the day-trading phenomenon that fanned the growth of this channel. To meet this challenge, discounters also began offering online trading. By year-end 1999, nearly 31 percent of all retail trades were being done online. Research indicated that even affluent clients were using online services. As more and more clients traded online at very low costs, pressure on margins increased, particularly for full-service firms.

By the late 1990s, competition pervaded the financial-services industry. Regulatory changes had brought banks into the brokerage business and vice versa. Discounters were well established and had gained significant market share and reputation. Technology—especially the Internet—had placed a lot of real-time information at the fingertips of investors. Electronic trading firms were using this technology to execute trades placed directly by clients effectively and at very low costs. Trading volume had gone up as prices went down.

Merrill Lynch Reexamines Its Value Proposition

In 1998, amid this swirl of competitive forces, USPC continued to command the largest share of household assets and a strong share of affluent households (with investable assets of at least $100,000). However, it was becoming increasingly clear that USPC's pricing structure was not aligned with the value delivered to its clients. USPC's value was in the customized advice and guidance its FAs gave to their clients, and yet it charged basically for executed trades (through commissions). When there was no trade, neither the FAs nor USPC got paid. USPC was charging premium prices on trade executions (now rendered a commodity by electronic trading) and nothing for its advice and guidance (its value proposition). As Jeff Bennett, first vice president for strategic pricing, remarked, "It was like charging for the grocery bag, but not the groceries inside" (Harvard Business School 2000, page 13).

John L. "Launny" Steffens, president of USPC and vice chairman of Merrill Lynch, understood the risks associated with changing a highly successful business paradigm. He, like many USPC executives, had risen through the ranks in the sales force and thus was acutely aware of the value of the best-trained sales force in the industry and the strength of its client relationships. But he also had a well-deserved reputation in the industry as a visionary, and he could see the storm clouds gathering.

In late 1998, Steffens formed a task force, led by Allen Jones, senior vice president of USPC marketing, and asked it to recommend a product or service response to the marketplace challenge. The task force

Schwab's $25.5 billion market capitalization overtook Merrill Lynch's $25.4 billion.

was to evaluate all aspects of customer reactions to such an offering. As Jones remarked, "Our challenge was to make the case that in the emerging new economy, price is an integral component of our offer, which we redefined as relationship (based on trust), performance (against client's goals), service (beyond expectations), and price (appropriate to client benefit). We decided to aggressively compete on each of these components, including price" (Harvard Business School 2000, page 13).

Before the task force could get moving, on December 28, 1998, Schwab's $25.5 billion market capitalization overtook Merrill Lynch's $25.4 billion for the first time. Schwab had increased its assets by 39 percent in 1998, while Merrill Lynch's grew only 18 percent. At that moment "Merrill got religion" (Spiro 1999). That was an enormously difficult day in the executive suite. Merrill Lynch had over a trillion dollars in client assets, compared to less than $500 billion for Schwab, and yet their market capitalizations were equal. This added to the urgency for a response.

Jones asked the team for help in deciding on fundamental product features and their pricing that would be consistent with USPC's value proposition, competitive in the marketplace, attractive to our clients, palatable to the FAs, and yet profitable to USPC.

He asked Jeff Bennett to lead the effort and the management science group to participate.

Management Science Group

Merrill Lynch established its management science group in 1986, and it has been part of the USPC organization since 1990. The group helped Merrill Lynch USPC win the 1997 INFORMS Prize for the effective use and impact of management science on the success of the firm. At the time of this analysis, the group had nine members.

The group's mission is to aid strategic decision making in complex business situations through quantitative modeling and analysis. It supports executive management and business units by quantifying the impact of different business strategies by analyzing data on clients, products, services, and the marketplace. Using expert-system models and analytical tools, it helps FAs deliver value-added solutions and enhance relationships with clients.

The group provides analytical and business assistance in many of USPC's core activities. These include modeling clients' investment risk and asset allocation, optimizing mutual fund portfolios, developing investment strategies, financial planning, developing prospecting and cross-selling models, analyzing drivers of client behavior, evaluating promotions, and performing business impact, pricing and compensation analyses.

The management science group focuses on business problems to be solved and employs a broad range of operations research and management science techniques, including optimization, simulation, expert systems, multivariate statistics, and neural networks. To ensure a focus on implementation and responsiveness, it tackles all aspects of the modeling process, including collection and validation of data. It has earned the reputation of an objective, analytical entity that has a can-do attitude.

Problem Overview

The task force was asked to recommend new product structures and pricing options. It focused on two main options. The first was an asset-based pricing option: clients desiring a relationship founded on advice from an FA could select this option and be charged a fixed percentage of the value of their assets at Merrill Lynch. They would no longer pay for trades individually; all trades would be included in the asset-based fee. This option eventually became known as Merrill Lynch Unlimited Advantage (MLUA). It gives clients several advantages:

—Clients' fees to Merrill Lynch would be directly aligned with their level of asset appreciation and investment return—clients only pay more if their assets increase.

—FAs and clients could adjust the portfolios, without the burden of transaction costs.

—Clients would know in advance their costs of doing business with Merrill Lynch.

The MLUA pricing option has a fee-based, tiered structure with separate rates for different types of eligible assets and a minimum account fee (Table 1). Trading is unlimited for eligible security types and subject to change. The option also includes, as part of the overall fee, free or reduced-price access to a number of additional financial services, such as a formal financial plan, portfolio reviews, credit lines, and mortgage loans. These products have been shown in previous internal studies performed by the management science group to reduce the likelihood of client defection. Any ineligible security trades (for example, unit investment trusts and options) continue to be priced on a per-trades basis.

The second potential new option was a direct online pricing option for clients wishing to invest online directly. It represented the other end of the spectrum. This low-cost channel would be targeted to self-directed investors, who do not need the advice and guidance of an FA, value Merrill Lynch's brand name, and want to pay a flat fee for each trade. This option eventually became known as ML Direct. Under this

Eligible Assets	Equity/Mutual Funds	Fixed Income/Cash
First $1 Million	1.00%	0.30%
Next $4 Million	0.75%	0.25%
Over $5 Million	0.50%	0.20%

Table 1: The final MLUA pricing schedule includes unlimited trades on eligible securities. The minimum fee is $1,500. This fee covers all account fees, Visa fees, planning services, and reduced fees on credit products. All numbers are for illustrative purposes only.

option, most trades on eligible securities (stocks and mutual funds) cost $30.

Clearly a critical factor in the ultimate success of either offering was setting actual prices. For MLUA, this was defined by (1) the overall percentage rates clients

Our approach was to simulate client-choice behavior.

would pay per dollars in assets, and (2) the minimum fee for the service. The minimum fee would guarantee Merrill Lynch a minimum level of revenue from investors whose accounts held smaller than targeted asset levels.

However, in addition to the pricing level, several other characteristics of the new offerings had to be evaluated.

Problem Overview—Closed Versus Open Architecture

If Merrill Lynch were to offer both MLUA and ML Direct, clients would have a choice of four service channels. In addition to the two proposed services, they could choose to remain in the traditional transaction-based pricing structure. They could also choose a wrap account, giving the FA or a designated portfolio manager discretionary power over the account, that is, the ability to perform trades according to the investment objectives established by the client. The firm could offer these service channels through two formats. Under a *closed-architecture* format, clients would have to select a single channel and have all their assets covered under the pricing structure for that offering. Under an *open-architecture* format, clients could freely designate specific assets for each channel. Open architecture works to the advantage of the clients, allowing them to put their frequently traded assets in an asset-based account and leave their longer-term assets in a transaction-based account.

Problem Overview—Blended Versus Asset-Specific Pricing

For MLUA, all assets could be subject to a single, blended fee, regardless of asset type. Alternatively,

with *asset-specific* pricing, stocks and mutual funds could be subject to higher rates than bonds or money funds. The blended fee would be a simpler pricing structure to communicate, but the asset-specific fee would make it more palatable for clients to include their fixed income securities in the account.

Problem Overview—Universe of Securities

Clearly, common securities, such as stocks, mutual funds, and bonds, would be included in these pricing options. However, other products, such as unit investment trusts, options, and futures, could either be included or excluded from the fee. If they were excluded, clients would continue to pay for transactions of the excluded securities at traditional rates.

The pricing team faced these questions:

—Should Merrill Lynch offer either or both MLUA and ML Direct?

—At what pricing level should it offer them?

—How should it structure them in terms of closed versus open architecture and blended versus asset-specific pricing, and for what universe of securities?

Objectives of Our Analysis

The questions originally posed to management science were rather broad and directional. The group's first task was to work with the rest of the pricing team and senior management to define the following objectives:

—To determine the total revenue at risk if the only clients choosing the new pricing options were those who would pay less to Merrill Lynch (we called this behavior adverse selection);

—To determine a more realistic revenue impact based on the likelihood of clients' adopting one of the new services, even if it were not the lowest cost option;

—To assess the effect on revenue of various pricing schedules, minimum fee levels, product combinations and product features; and

—To assess the potential impact on each and every FA and identify those who would be most affected.

In formulating this analysis, we had to consider the FAs as well as the clients. Simply providing an attractive and profitable set of offerings to investors was not sufficient if the changes in compensation to FAs

resulted in high levels of discontent and turnover. Senior management needed to know how many FAs (particularly how many top FAs) would be adversely affected by the new offerings. Consequently, it was essential that we include all of USPC's clients in our analysis so that we could aggregate the results at the FA level. A random sample of clients would not address this objective.

Data Collection and Processing

The management science group assembled and evaluated an extensive volume of client-level data. To accurately calculate the revenue impact of the new pricing options, we assembled a 200-gigabyte comprehensive client database. It was constructed using data from 1998, which was the most recent full-year data available and which provided a profile of client assets and trading activity. We gathered information on five million clients, 10 million accounts, 100 million trade records, 250 million ledger records, and 16,000 FAs. For each client, we obtained data for six categories of revenue, four categories of account type, nine asset allocation categories, along with data on number of trades, mutual fund exchanges and redemptions, sales of zero coupon bonds, and purchases of new issues.

The ledger file contains a record for every source of revenue for every account at Merrill Lynch. In 1998, 82 different revenue sources were applicable to the pricing analysis, including trade commissions (from trades in various equities, fixed income, and mutual funds), account fees, asset-based pricing, banking services, insurance services, and planning and special services. We used this data to calculate the actual revenue derived from each client in 1998, and we used these revenue calculations as the baseline for comparisons to the new pricing options.

For both the MLUA and ML Direct price scenarios, we had to classify each of the 82 revenue sources as eligible or ineligible under the new pricing schedules. For example, at the trade level, certain types of trades, such as unit investment trusts (UITs), new-issue buys, and zero-coupon sells were ineligible for MLUA. Also certain nontransaction fees and services, such as account fees, financial planning, Visa card fees, and electronic bill payments, would be part of the bundled offer and no longer incur separate fees under MLUA. We

had to merge the ledger data with other client details for our analyses.

The trades database provides the details of all buy and sell transactions that took place in 1998. We used the data to determine the number of trades eligible for repricing in each account.

We group client relationships by households. What we call a household may be composed of multiple accounts and multiple individuals. A household may

We had found the pricing sweet spot.

have multiple accounts with Merrill Lynch for many reasons: multiple persons (spouses, children, parents, and so forth) in a household may have separate accounts, or people may have accounts earmarked for different purposes (retirement, education, home purchase, and so forth). Since only assets in individual retail accounts were eligible for repricing, we eliminated all business accounts from consideration. Among the individual accounts, we did not consider for repricing discretionary managed accounts and certain specialty nondiscretionary fee-based accounts.

We used the assets in the eligible accounts to determine the fees for the MLUA pricing option. Since the fees are based on the total household assets and calculated on a tiered pricing structure, we had to identify all eligible assets in every account. We also had to break the assets down into asset-allocation categories (for example, equities, fixed income, cash, and mutual funds) so that we could model asset-specific pricing.

The FA database provides profile information on all FAs, including their length of service and number of clients. We used this data to determine the compensation impact of the new pricing options on different groups of FAs. We derived FAs' actual compensation in 1998 for the individual accounts from the ledger records.

We merged, reconciled, filtered, and cleaned data from all these different production databases for our analyses.

Model Overview: Client Choice Data Simulation

Our basic modeling approach was to simulate client-choice behavior. Using this approach, we used an ini-

tial set of system data and the resulting system-output measures of interest as a baseline. We then introduced change conditions to the data and applied a set of business rules to the clients to determine their reaction to the changes and calculated revised output measures.

In our case, the observed system data consists of every revenue-generating component of every account of every client at Merrill Lynch. The system output

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MLUA generated a nearly $50 billion increase in assets and a nearly $80 million increase in revenues.

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measures are the resulting revenue at the firm level, the compensation impact on each FA, and the percentage of clients considered adverse selectors (clients who choose one of the new pricing options and as a result reduce overall revenues). The change conditions consisted of different variations of the two new product structures and pricing options—MLUA and ML Direct.

We also needed to develop the set of business rules that would determine the client reaction to the new pricing options. We had several ideas about how to model these rules and, as a result, developed three different models:

(1) A rational-economic-behavior model (REB),

(2) A financial-advisor-affinity model based on Monte Carlo simulation, and

(3) A financial-advisor-affinity model based on business rules.

We designed the REB model to assess the maximum total revenue at risk. In this model, we assumed that a client would make decisions on a purely rational and economic basis—close to an extreme scenario. (Choosing the ML Direct option meant getting no advice and guidance from an FA—a qualitative attribute. Thus, assuming that everyone who could act on a purely rational and economic basis would indeed do so is a little severe.) Having established an upper bound for revenue at risk using the rational economic model, we added the second and third models to obtain more realistic estimates of revenue impact. We did this by taking account of the strength of the client's relationship with his or her FA (FA affinity) and how this might

affect the client's decision process. In model 2, we used a probabilistic simulation feature to capture the combination of the client's rational behavior with the client's FA affinity. In model 3, we used a set of business rules based on management judgment to translate the FA affinity into zones of price indifference. Clients with high (low) affinity to their FAs would have a high (low) level of price or economic indifference.

Flexibility was a critical feature of all the models. We needed to easily study different pricing levels, architecture of the offerings, eligible assets, and pricing configurations. With any of the models, we needed to roll up the results from the client level to the firm level to assess overall revenue impact. In addition, we had to determine the impact of changes in pricing policy and compensation policy by rolling up the data to the FA level and incorporating the FAs' individual payout rates.

All in all, we assessed more than 40 combinations of pricing offerings and architectures. The turnaround time for analyzing new scenarios with a new set of offerings was only a few hours.

The Rational-Economic-Behavior (REB) Model

The rational-economic-behavior (REB) model estimates the maximum revenue at risk from adverse selection. We calculated the revenue impact for each client and then summed to the FA level and the firm level to determine the upper bound of the revenue at risk. The model assumes that clients always select the lowest-cost option.

We made the lowest-cost pricing evaluations at the household level, usually for multiple accounts. In each household, we assumed people made the decision to go with MLUA or ML Direct pricing on an account-by-account basis (open architecture). Open-architecture pricing complicates the determination of minimum pricing because it permits optimal mixed pricing. That is, the lowest cost option may be a combination of traditional pricing and MLUA or ML Direct pricing, partly because clients can choose for each account pricing decision separately and partly because within each account, some assets and trades may be eligible but others may not (Figure 1).

For the purposes of this analysis, we considered three least-cost household pricing outcomes to be feasible:

(1) 100 percent traditional (the current baseline),

(2) A combination of traditional and MLUA, and

(3) A combination of traditional and ML Direct.

REB—Calculating the Minimum Household Pricing

We determined the minimum household pricing by calculating the cost for each of the three options and selecting the lowest-cost option. Option 1 is the actual baseline revenue for 1998 from the ledger records.

$$\text{traditional pricing} = \sum \text{individual revenue sources}$$
$$\forall \text{ household accounts.}$$

For options 2 and 3, since the client decides to go to a new pricing on an account-by-account basis, the problem becomes a combinatorial optimization problem for which the decision variable is whether or not an account goes to a new pricing option or remains with the traditional option. An account may have assets and trades that are eligible for a new pricing op-

tion, but that does not mean that that option is necessarily a lower-price option. For example, many accounts have assets eligible for MLUA but have little trading activity; by opting for MLUA, the client would pay a higher asset-based fee but receive little benefit from the unlimited trading that this type of account offers.

Traditionally combinatorial optimization problems can be solved using standard integer-programming methods. However, in this case, the problem becomes intractable because it has to be solved for over 5 million households. In addition, it is difficult to formulate as a traditional optimization because of the complexity of the MLUA tiered-pricing structure, the minimum fee requirement, special considerations for the bundled nontransaction services, and the presence of both eligible and ineligible assets. Consequently, we used a heuristic method based on a greedy approach to solve the problem efficiently (see the Appendix for details).

For ML Direct, because of its simpler pricing structure, a more traditional optimization approach would have worked. But because the greedy approach provided an extremely efficient calculation method for evaluating five million households, we also used it for evaluating ML Direct pricing.
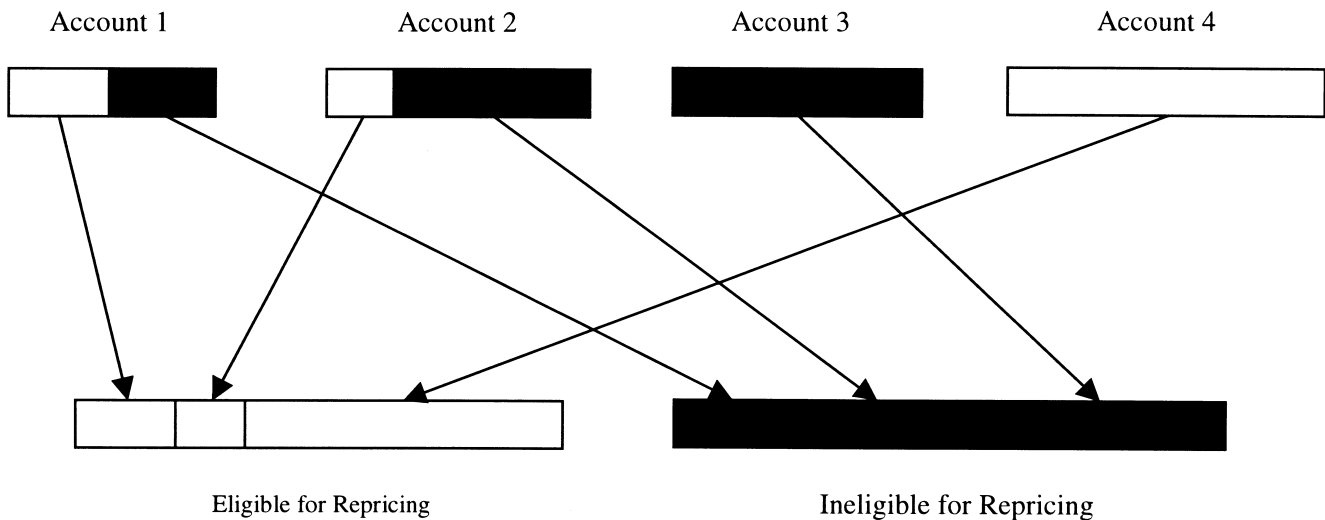

Figure 1: Eligibility for repricing is determined at the account level and at the assets/trades level within the accounts. Accounts 1, 2, and 4 are eligible for repricing but Accounts 1 and 2 each have some assets or trades that are ineligible for repricing. Account 3 is either ineligible for repricing or all of its assets and trades are ineligible for repricing. In practice, this decision is based on discussions between the FA and client.

Once we had completed the minimum-pricing calculations for the three pricing combinations, we chose the lowest for each household, summed over all the households, and subtracted the total from the actual 1998 revenue to determine USPC's revenue at risk:

$$\text{revenue at risk} = \sum (1998 \text{ revenue}$$
$$- \text{minimum cost option revenue}) \quad \forall \text{ households.}$$

Similarly, by summing over households served by an FA and subtracting from 1998 values, we found the revenue and compensation at risk for that FA (Figure 2). These FA-level assessments gave executive management the ability to put faces to all of the aggregate revenue estimates and to determine the specific interventions needed to prevent the defections of key FAs. This added to the risk-mitigation efforts.

FA Affinity Model

We designed the FA affinity model to take account of both rational economic considerations and qualitative factors and thus assess the revenue impact more realistically by incorporating the effect of clients' relationships with their FAs. We defined FA affinity as the strength of the client's relationship with his or her FA based on client satisfaction (measured by a combination of client-behavior data and an ongoing, comprehensive client-satisfaction survey), asset retention, tenure, and recent completion of a formal financial plan. We developed two versions, one based on Monte Carlo simulation and one based on zones of price indifference.

Rank	FA Name	FA Length of Service	1998 PC Quintile	Actual 1998 PCs ($K)	Change in PCs ($K)	Change in PCs (%)
1	FA Name 1	6	1	1,772	−529	−31%
2	FA Name 2	20	1	1,464	−426	−29%
3	FA Name 3	13	1	1,273	−51	−4%
4	FA Name 4	18	1	1,202	−500	−42%
5	FA Name 5	7	2	1,190	−11	−1%
…	…	…	…	…	…	…

Figure 2: This is a sample FA impact report from the rational-economic-behavior model. It shows the impact on the top 200 FAs, ranked by their 1998 production (PCs), if all of their clients chose the lowest cost pricing option. All numbers are for illustrative purposes only.

FA Affinity—Monte Carlo Simulation Model

For both the REB model and the Monte Carlo model, the observed system data consist of every revenue-generating component of every account of every client at Merrill Lynch. The output measures are the resulting revenue at the firm level, the compensation impact on each FA, and the percentage of clients considered adverse selectors. The difference lies in the business rules that capture clients' reactions to the new pricing options.

For the Monte Carlo simulation model, we established likely price-adoption behaviors by doing the following: We segmented clients into 12 segments based on the following three attributes:

—Two levels of FA affinity, high or low;

—Three levels of relative cost of the MLUA option versus actual 1998 cost, higher, same (within 10 percent), or lower; and

—Two levels of relative cost of the ML Direct offer versus actual 1998 cost, higher or same (within 10 percent), or lower.

We assessed likely offer-adoption behaviors for each segment using managerial judgement, based on market research or experience with clients (Table 2), to estimate the client's probabilities of choosing from among the following alternatives:

—Traditional,

—MLUA,

—ML Direct, or

—Leave Merrill Lynch.

We then produced a revenue-at-risk figure and reported the impact on FAs, based on the same process described for the REB model.

FA Affinity—Zones of Price Indifference Model

In this model, we assumed clients have a zone of price indifference, that they view all pricing options within a given distance of the existing traditional costs as having roughly similar costs. For example, clients with high FA affinity may have a large zone of indifference of 30 percent around their current cost, while clients

Cost of Offer vs. Current Costs			Client's Choice (% of clients choosing each channel)			
MLUA	ML Direct	Affinity With FA	ML Direct	MLUA	Traditional	Leave ML
Higher	Higher or same	High	0%	25%	75%	0%
Higher	Higher or same	Low	15%	0%	75%	10%
Higher	Lower	High	0%	25%	75%	0%
Higher	Lower	Low	40%	0%	50%	10%
Same (within ±10%)	Higher or same	High	0%	35%	65%	0%
Same (within ±10%)	Higher or same	Low	15%	0%	85%	0%
Same (within ±10%)	Lower	High	0%	25%	75%	0%
Same (within ±10%)	Lower	Low	40%	0%	50%	10%
Lower	Higher or same	High	0%	50%	50%	0%
Lower	Higher or same	Low	10%	45%	45%	0%
Lower	Lower	High	0%	50%	50%	0%
Lower	Lower	Low	30%	35%	35%	0%

Table 2: This table provides a sample scenario for the FA Affinity Monte Carlo-based model. The probability of choosing a pricing alternative is displayed for each of the 12 client segments. All numbers are for illustrative purposes only.

with low FA affinity may have a smaller zone of indifference of only 10 percent. Based on this approach, the following outcomes are possible:

(1) FA affinity may negate a client's rational choice of the cheapest offer (adverse selection).

—If MLUA or ML Direct is the least expensive option, and if the client can reduce his or her expenses by more than 30 percent (high FA affinity) or 10 percent (low FA affinity) by shifting assets, then the client will make the shift.

—If the cost of the least expensive option is within 30 percent (for high FA affinity) or 10 percent (for low FA affinity) of the cost of the current traditional pricing, the client will forsake the cheaper option and retain traditional pricing.

For example, a client whose current expense is $1,000 might face projected costs for ML Direct of $830 and for MLUA of $1,050. Based on a purely rational response, the client would choose ML Direct and save $170 (or 17 percent). If the client had high FA affinity (a 30 percent zone of price indifference), he or she would not switch to ML Direct, since the 17 percent savings is not large enough to account for the reduction in service or the hassle of switching. A client with low FA affinity (a 10 percent zone of price indifference), however, would make the switch.

(2) FA affinity may activate an MLUA relationship,

even if it is more expensive (benign selection)—only if adverse selection to ML Direct does not occur.

—If the cost of MLUA is within 30 percent (for high FA affinity) or 10 percent (for low FA affinity) of the cost of the current pricing, we assume the client will adopt the more expensive MLUA offer because of the influence of the FA. For example, the client described earlier who had high FA affinity (a 30 percent zone of indifference) would not choose the cheaper ML Direct but would, however, choose the MLUA option for only $50 more per year (a five percent difference). We assume that the FA relationship (affinity) would lead the client to choose MLUA even though it is more expensive.

We used these rules, over and above the process described for the REB model, to determine revenue at risk at the total firm level and for each FA. Because the zones of price indifference were based on management judgment, we also conducted a sensitivity analysis of revenue at risk, using various values for the indifference zone. We varied the indifference zones to identify the breakeven points. This helped us and management to become comfortable with the risks.

Integration of Components

Certainly, sound and innovative mathematical and statistical skills were critical to the success of this project.

Just as important was teamwork—within the management science group, with the other members of the pricing task force, and with executive management.

During this project, members of the team met or spoke with the leaders of the task force daily and sometimes hourly. Before analyzing a single record of data, the group clarified the purpose of the analysis, the key assumptions, the important deadlines, and the ultimate objectives. Management science also worked closely with market research and provided support for its conjoint-analysis survey that helped us to evaluate potential client responses to the features and prices of the new product offerings.

We assembled the results from each run of the model into a summary document and distributed it to the members of the task force. We highlighted key statistics and numbers and developed a common display to enable meaningful comparisons across several diverse scenarios (Figure 3). Using these results, executive management specified new pricing alternatives and arrangements for testing.

The worst-case analysis of the revenue at risk clearly had the most profound impact. These estimates showed that, even in the worst possible (and highly unlikely) case, the total revenue at risk did not outweigh the benefits to be gained through superior market positioning, increased share, and improved retention.

Benefits and Business Impact: ML Transforms Its Business Strategy

Based on the pricing analysis and recommendations from the team, management decided to move forward with both MLUA and ML Direct. On June 1, 1999, Merrill Lynch announced the Integrated Choice service, allowing clients to choose a level of advice and manner of doing business with Merrill Lynch. Subsequent to this announcement, it rolled out MLUA in July 1999 and ML Direct in December 1999.

The benefits were significant and fell into four areas: seizing the marketplace initiative, finding the pricing sweet spot, improving financial performance, and adopting the approach in other strategic initiatives.

Integrated Choice had a profound impact on Merrill Lynch's competitive position. It enabled Merrill Lynch to seize the marketplace initiative and restored it to a leadership role in the industry. Speculation on "How will Merrill Lynch respond to low-cost competitors?" shifted to "How will the industry respond to Merrill Lynch?" We offered a completely new business paradigm for investors—a new way of doing business in financial services. This paradigm shifted the focus from the commoditization of trading to the value of advice, which holds strong appeal for affluent, advice-oriented clients. From a business-strategy perspective, it allowed us to more closely align our revenue and asset growth.

Client Household Asset Range	Revised 1998 Revenue ($M) for New Pricing Structure					
	Traditional FA	MLUA	ML Direct	Discretionary	Other	Total
Under $50K	151	1	8	2	81	241
$50K to $99K	75	1	15	4	9	94
$100K to $249K	163	5	11	17	17	212
$250K to $499K	163	8	11	31	21	234
$500K to $999K	165	11	11	43	32	262
$1M to $2.49M	155	12	10	47	51	275
$2.5M to $4.9M	66	6	4	20	31	127
$5M+	102	3	2	19	60	186
Revised 1998 Total	1,040	47	60	183	302	1,629
Actual 1998 Total	1,443	61	0	182	302	1,988

Revenue at Risk	$358 million
Percent of Clients Shifting Assets to Core	4.2%
Percent of Clients Shifting Assets to Direct	12.2%

Figure 3:   This sample output report for executive management shows the shift in revenue for a potential offering assuming a rational-economic-client response. All numbers are for illustrative purposes only.

In the wake of our June 1999 announcement, many competitors scrambled to develop their own versions of MLUA. For example, Morgan Stanley Dean Witter announced the debut of iChoice in October 1999, designed to compete with MLUA by combining online services with full-service advice and guidance for a single, asset-based fee. Salomon Smith Barney (the Asset One account), Paine Webber (Insight One), A. G. Edwards (Client Choice), and others made similar moves. But none of them came close to gathering the assets accomplished by Merrill Lynch.

This was because we had found the pricing sweet spot. When the management team first started thinking about pricing MLUA, it was thinking of a fee higher than one percent on equities. Without the models and analysis, we would not have found the right price. The one percent fee was the sweet spot because it balanced several factors: the client's price elasticity, our revenue at risk and profitability, competitive offerings, and possible defections among our top FAs.

As a result of the pricing analysis, management better understood the risks and was able to mitigate them. We determined that the revenue at risk ranged between $200 million and $1 billion. Moreover, the top FAs most adversely affected by the new offer would have defected at significant levels. Our analysis identified specific FAs who were most at risk, and we worked with them to reduce the risk that they might defect. We conducted specific and meaningful discussions with them to gain understanding of their issues and concerns. Changes were incorporated into the final offering to address their concerns.

In fact, the introduction of MLUA proved advantageous to our FAs. In the months following the rollout, discussions with many FAs revealed that MLUA had a positive impact on their business. Here are just a few samples of what they had to say.

Eric Bartok: "When I sit down with clients who have been at other firms for the last 10, 15, 20 years, I'm really not having a problem bringing those assets, transferring them over into MLUA, because of the way it's price structured, and the benefits that they're getting" (Merrill Lynch Direct TV Broadcast (DBS), June 26, 2000). "We are adding extreme amounts of value and, ultimately, having extremely happy clients moving forward, who continue to refer more people to walk in the door opening up Unlimited Advantage accounts" (Merrill Lynch Direct TV Broadcast (DBS), July 27, 2000).

Bill Hill: "MLUA overall makes your job a lot easier to do and frees up everyone within the team to do the most important things, which are to service your clients" (Merrill Lynch Direct TV Broadcast (DBS), June 26, 2000). "One of the biggest advantages with MLUA is the resistance level goes down enormously. You don't get asked the question everyone hates to get asked—how much is it going to cost me?" (Merrill Lynch Direct TV Broadcast (DBS), July 27, 2000).

Corby May: "I think it's such a professional way to do our business and . . . this is probably the best deal on the street" (Merrill Lynch DBS, June 26, 2000).

Merrill Lynch has realized a number of substantial bottom-line financial gains since the launch of Integrated Choice. At an aggregate level, through year-end 2000 it made the following gains:

—It gathered $83 billion in assets in MLUA, $22 billion of them new assets to the firm.

—The number of MLUA accounts increased 80 percent between 1999 and 2000.

—Merrill Lynch gathered $3 billion in assets in ML Direct. While this is smaller than the MLUA benefits, ML Direct was intended as an asset-retention strategy for clients who preferred to manage some of their assets themselves.

One concern the firm had in introducing these new products was cannibalization. While some of the financial benefits came from existing clients who migrated to the new offerings, Merrill Lynch achieved a significant amount of growth. This came from three sources: new clients, retention of existing clients, and additional assets from both new and existing clients.

Both MLUA and ML Direct attracted new clients to Merrill Lynch. In the case of MLUA, 48 percent of enrollees during 2000 were new to the firm. In the case of ML Direct, 60 percent were new to the firm.

The second source of growth was increased client retention. It is clear from our market research and the marketplace that a growing segment of clients are looking for these alternative styles of business, and now they can get them without leaving Merrill Lynch.

Third, we found that MLUA induced clients to bring new business to the firm in addition to the $22 billion

in new assets in MLUA accounts mentioned earlier. In a study completed in September 2000, we evaluated the business lift for clients enrolled in MLUA compared to a control group of non-MLUA clients with similar characteristics. The lifts represent incremental benefits that Merrill Lynch derived from MLUA. Applying these results to the total MLUA client base, we found that MLUA generated

—A nearly $50 billion increase in assets and

—A nearly $80 million increase in revenues.

The success of the pricing analysis led Merrill Lynch to adopt the same modeling approach in other projects. Most notably, in January 2001, USPC embarked on an effort to redesign FA compensation, which affects several billion dollars of Merrill Lynch expenses. To support this project, Management Science is leveraging the work from the Integrated Choice pricing analysis to evaluate alternative compensation plans and their impact on individual FAs.

Conclusion

A lot has changed since December 1998 when Schwab overtook Merrill Lynch in market capitalization. Merrill Lynch made a bold decision to shift its business paradigm, and the results have been very positive. As noted in an article in the *New York Times* in January 2001, "Today Schwab is worth $40 billion, about 30 percent less than Merrill, and a growing number of analysts are predicting that the gap will widen" (McGeehan 2001). Indeed, as of May 2001, that gap has widened to over 50 percent. Integrated Choice was an important factor in this reversal of fortune.

The importance of Integrated Choice to USPC cannot be overstated. Launny Steffens, president of USPC, commented, "The decision to implement Integrated Choice was an unprecedented change in strategy for us. Management Science and Strategic Pricing provided the modeling and analyses that enabled me and my executive management team to better understand the revenue risks. This is the kind of thing that kept me up at nights! . . . We have moved forward like a bullet train and it is our competitors that are scrambling not to get run over."

David Komansky, CEO of Merrill Lynch and Chairman of the Board, called Integrated Choice "The most

important decision we as a firm have made since we introduced the first cash-management account in the 1970s."

Acknowledgments

Appendix. Rational Economic Behavior Model: Solution to Combinatorial Optimization

A literature search did not reveal any heuristics that could directly address a problem of this complexity, but the basic pricing problem could be formulated as a variation of the traditional asset-allocation problem, in which case a greedy approach could be used. The problem in using a greedy algorithm was determining what measure to use as the basis for the allocation. For MLUA, the final decision was to use the revenue velocity of the assets eligible for repricing. Revenue velocity is a traditional measure in the financial industry used to determine the profitability of an account. In this case, we calculated it as the 1998 revenue for fees eligible for repricing divided by the eligible assets, that is, the current profitability of the assets eligible for repricing. For ML Direct, we replaced revenue velocity by the number of eligible trades, which is a more appropriate measure for this pricing option.

In the following MLUA pricing example (Table 3), we have a client household consisting of five separate accounts. A household may have multiple accounts for many reasons, such as multiple persons in the household with separate accounts (spouses, children, parents, and so forth) or accounts ear-marked for different purposes (education, retirement, home purchase, and so forth). Account 1 is a fixed-income and cash account and Accounts 2 through 5 are equity and mutual fund accounts.

	1998 Revenue	Assets	Revenue Velocity
Account 1 (FI/Cash)	$150	$200,000	0.0008
Account 2 (Equity)	$1,500	$55,000	0.0273
Account 3 (Equity)	$3,400	$125,000	0.0272
Account 4 (Equity)	$800	$25,000	0.0320
Account 5 (Equity)	$400	$90,000	0.0044

Table 3: In this example, there are five accounts with varying levels of revenues and assets. The revenue velocity of each account is calculated as a proportion of revenues to assets.

The first step in evaluating which accounts should go to the new pricing option is to rank the accounts in reverse order of revenue velocity (Table 4). This allows us to evaluate the most profitable accounts first since they are the ones most likely to benefit from the new pricing options.

	1998 Revenue	Assets	Revenue Velocity
Account 4	$800	$25,000	0.0320
Account 2	$1,500	$55,000	0.0273
Account 3	$3,400	$125,000	0.0272
Account 5	$400	$90,000	0.0044
Account 1	$150	$200,000	0.0008

Table 4: The accounts are sorted by decreasing revenue velocity to evaluate the accounts in order of likelihood that they will benefit from the MLUA pricing option.

We then calculate the new revenue cumulatively for each account (Table 5). That is, we add the eligible assets of each succeeding account to the eligible assets of all of the accounts with higher revenue velocities to calculate the new MLUA pricing since MLUA tiered price breaks are based on all eligible assets in a household.

	1998 Revenue	Assets	Revenue Velocity	MLUA Revenue
Account 4	$800	$25,000	0.0320	$1,500
Account 2	$1,500	$55,000	0.0273	$1,500
Account 3	$3,400	$125,000	0.0272	$2,050
Account 5	$400	$90,000	0.0044	$2,950
Account 1	$150	$200,000	0.0008	$3,550

Table 5: The eligible assets for each account are added to the eligible assets of all the accounts with higher revenue velocities and repriced using the MLUA pricing option.

We then calculate incremental revenue associated with adding each account's eligible assets to the total MLUA eligible household assets (Table 6).

	1998 Revenue	Assets	Revenue Velocity	MLUA Revenue	Incremental Revenue
Account 4	$800	$25,000	0.0320	$1,500	$1,500
Account 2	$1,500	$55,000	0.0273	$1,500	$0
Account 3	$3,400	$125,000	0.0272	$2,050	$550
Account 5	$400	$90,000	0.0044	$2,950	$900
Account 1	$150	$200,000	0.0008	$3,550	$600

Table 6: The incremental revenue associated with each account is calculated by subtracting the MLUA revenue from the account immediately preceding it.

We rerank the accounts in the reverse order and compare the incremental revenue for each account to the 1998 revenue (Table 7). The first account for which the incremental revenue is less than the 1998 revenue keeps the new MLUA pricing as do all of the following accounts.

	1998 Revenue	Assets	Revenue Velocity	MLUA Revenue	MLUA Incremental Revenue
Account 1	$150	$200,000	0.0008	$3,550	$600
Account 5	$400	$90,000	0.0044	$2,950	$900
Account 3	$3,400	$125,000	0.0272	$2,050	$550
Account 2	$1,500	$55,000	0.0273	$1,500	$0
Account 4	$800	$25,000	0.0320	$1,500	$1,500

Table 7: The accounts are resorted in order of increasing revenue velocity and a search is conducted until the first account with an MLUA incremental revenue lower than the 1998 revenue is identified. This account (Account 3) and all the accounts that follow (Accounts 2 and 4) will benefit from the MLUA pricing option.

In this example, Accounts 1 and 5 are better off staying with the traditional pricing whereas Accounts 3, 2, and 4 are better off under the MLUA pricing for a total cost of $2,600 compared to $6,250 under the all-traditional pricing. By evaluating the incremental costs rather than the cumulative costs, we ensure that low-velocity accounts like 1 and 5 are left in the lower traditional pricing schedule.

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Launny Steffens, President, US Private Client, Vice-Chairman, Merrill Lynch and Company, 4 World Financial Center FL 32, New York, New York 10080, made the following comments during the Edelman competition and in a written memo: "The decision to implement Integrated Choice was an unprecedented change in strategy for us. Management science and strategic pricing provided the modeling and analyses that enabled me and my executive management team to better understand the revenue risks. The overall risk ranged from $200 million to $1 billion in revenues. This is the kind of thing that kept me up nights! The risks were also very critical at the individual financial advisor levels.

"Analysis of many scenarios, with different pricing points and how the offering should be structured in terms of open vs. closed architecture, blended vs. asset-specific pricing, and universe of securities and services,

helped us to mitigate these risks. This helped me and the board of directors to make the final decision to proceed with both Unlimited Advantage and Direct offerings. It was also used to help convince the sales force that Integrated Choice was the right strategy for the long term.

"ML Unlimited Advantage has been an unqualified success. To our clients, it delivers the total financial relationship for one simple fee. For us, it puts renewed power into our asset gathering engine. MLUA had leaped to $83 billion under management by the end of 2000, and accounted for $22 billion of net new money. And it allowed us to seize the initiative in the marketplace. We have moved forward like a bullet train and it is our competitors that are scrambling not to get run over."