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INTEGRATING THE ACTUARIAL/INVESTMENT FUNCTION

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- o While there is little disagreement that these two functions cannot operate in complete vacuums separate from each other, the optimal degree of integration and/or coordination is a subject likely to engender considerable debate. This session will attempt to elicit such debate by presentation of diverse opinions and actual experiences.
 - Initial concerns from each side
 - Needed initial and ongoing coordination
 - Effect of company philosophies
 - Realized and potential results
 - Pitfalls

MR. DAVID E. (TED) STEVEN: I want to talk about integrating the actuarial and investment functions, and I think you're going to find that the methods will be company specific. They will depend on your organization structure -- whether you're centralized or decentralized, the line of business or the functional. They'll depend a lot on the business mix. How important is it to integrate -- how closely and how intensively? Have you got determinate or indeterminate liabilities? Are they interest-sensitive? Are you in highly competitive marketplaces? Is a group or individual, pension or insurance product? What is your distribution capability? What is the focus of your senior management? Is it a growth strategy for the corporation or is it niche marketing? Are you after earnings and is there an importance to the stability of earnings? (Some of us in stock companies have found this out.) Additionally, the integration of these two functions will depend on the corporate culture that's within your organization structure, and how people in divisions and departments deal with one another. And, finally, what's the role of the investment division? Is it a profit center? Is it integrated within the line of business? Is it coordinated with the line of business, or is it a world unto itself?

Let me mention some things about Great-West Life before I go into further detail. Looking at assets, we're the largest stock company in Canada. We're the third largest life insurer in Canada and about sixteenth in North America. We have a billion and a half dollars in separate accounts, and five billion dollars in Canada and six and a half billion dollars in the U.S. that we're managing in our general

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accounts. These cover the individual and group business -- life, health and annuity -- in both Canada and the United States. Our main focus portfolios in the U.S. are GICs, where we've got 1.25 billion single premium annuities, the lotteries' business, and structured settlements. We've got a large group tax sheltered annuity (TSA) portfolio, some universal life, some interest-sensitive whole life, and some corporate-owned life insurance (COLI) business that didn't get loaned (and that's important). We used to have a lot of single premium deferred annuity (SPDA) business, but it was distributed by brokers and it seems to have gone by the boards.

Great-West Life is organized into separate line operations within Canada and the United States. Within those line operations are subdivisions into group and individual, and specialties within those include annuities and insurances. The investment division is separate, as is the corporate finance and control division -- that includes our controller, the valuation function, and the tax people. Within this structure there is a shared responsibility for profit. The line of business earnings targets reflect investment margin expectations, and we're all compensated on the results opposite line earning targets. We distribute investment earnings through the lines of business, and our actual versus expected experience is monitored. I think the best description I can provide of the way in which we integrate these two functions is something like "cooperative autonomy." It's in our mutual best interest for our significant organizational demarcations to cooperate as effectively as possible.

The asset/liability (A/L) management function evolved in the investment division, probably because it was simpler to bring in the product expertise through an actuary and train him or her opposite the investment functions, rather than try to convince a bond trader or an equity person that he really had a future understanding the products. There's a high degree of effective and multi-directional communication. The easiest thing is daily rate communications. We're constantly telling people how the markets are doing and what is available today. The department functions mainly as a translator. We try to translate product design into investment policies because investment policies are generally set in the investment division. We try to make information available on new investments to the product people, so they can design products that take advantage of those.

Similarly, we try to convert pricing requirements, which the actuaries understand and utilize, into investment language so our professionals can go about their business in the most effective way. We have to translate investment performance results as we see them into valuation information for the corporate finance people. We have to turn taxation knowledge into investment strategies. We're not telling the investment people what to do, but, rather, how to do it most effectively for our particular situation. Sometimes we have to translate economic analysis, which the investment professional will make as a matter of reflex, and discuss with them any financial reporting impacts that may impede the execution of what looks to be, on the surface, the right economic maneuver. Our role is to facilitate direct communication and translate where necessary. We also coordinate the overall investment policies of the corporation with investment policies desired by the lines of business, when they do not match. Finally, we get involved in business planning, asset allocation and future directions.

I would like to provide you with some detail on our regular processes. Every quarter we review and reassess asset acquisition programs for the full year. Our lines of business follow their business plan for the year and generate

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planned net insurance cash flow. We're really trying to accommodate a liability drive in this particular sequence of events. We generate the asset cash flows in our own area, because we have easier access to the investment systems than anyone else. We separate this information by notional segments. We have five real segments. Our Canadian life and health general accounts are separate, our U.S. life and health general accounts are separate, and we have a wholly-owned Kansas subsidiary -- Great-West Life and Annuity. But within the general accounts we have no real hermetically sealed explicit segments at this point. However, we do have notional segments with certain assets tagged as belonging to them. The GICs make up one of these segments; the group voluntary or TSA retirement plans, the SPDAs, and universal life are lumped together in the second one; and the life annuity business and long-term structures and lotteries are incorporated into the third one.

Our focus in this process is either on new business or being repricing oriented. It's dealing with highly interest-sensitive, but predominantly determinate, liabilities. We then take these two sets of cash flows for the balance of the period and flush them through our investment policies. These policies will apply certain asset mixes and will change from time to time depending on volatility, experience, or other perceptions, as well as on new directions and new alternatives made available to us. After we've done that, we put them through what I'll refer to as portfolio adjustments. I'll talk about how we arrive at our conclusions for that at a later point.

The result of this process is recorded as a detailed program for each of the key segments. It's converted into understandable terms for execution by the investment professional. It tells them the terms to maturity, or the duration of the security we're looking for and the dollar volume we're trying to acquire. It's split into public bonds, private bonds, Government National Mortgage Association (GNMAs), Federal National Mortgage Association Mortgages (FNMA's), and Planned Amortization Classes (PACs), synthetic assets (swaps for interest rate or currency swaps) and commercial mortgages. So they now have a "shopping list," if you will, in the fixed income and equity departments of the investment division, of how much of what kind of assets we want to acquire over the time period.

Once those programs are in place for a business year, or updated for a quarter, we monitor four things on a weekly basis -- we call them the progress opposite our objectives -- the pace of asset acquisition and liability acquisition, the hedging positions and the yields achieved. Our progress report details where we are opposite the most currently planned program year-to-date. So for each of our major segments we review the assets that have been allocated to those segments by the type of security and by the terms specified in dollar volume.

Our pace report relates the speed at which we are acquiring assets, or completing those asset programs, against the rate of liability acquisition. Our liability people get involved and they are effectively checking their progress opposite their business plan by giving us an update on the liabilities acquired in the most recent week. After we've gone through that process, we've updated both sides of the balance sheet on the new business programming, and the results include hedging activity that has taken place to date. For example, in the GIC account, as soon as a sale is reported the hedge is put in place. As soon as a permanent asset is acquired for that segment the hedge is released. After we're through with that process, we then get an indication of whether, in any or all of these

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segments we're in a balanced position, or holding a naked asset or a naked liability position.

Then we move forward to the hedging. What, if any, changes do we want to take in the hedging positions we've established? Well, we base those decisions on the pace result. Where is the segment and what is our outlook? Here's where we get to play a little bit on the investment side. What is our outlook for interest rate movements in the very short term? What's our outlook for changes in spreads? Do we want to overhedge, underhedge, or take another kind of position? Then we move forward and choose the instrument (and, generally, we're dealing in cash treasuries, or long/short future positions) depending on what the segment needs, what our outlook is, what the dollar volume shortfall or surplus is, what the desired duration effect is, and what the desired financial reporting effect is. If you've got a U.S. stock company, you might want to use futures instead of cash hedges, so you don't take capital losses against your income statement in the year as a result of pure hedging.

Once we've completed our hedging then we're in a position to review our yield achievement compared to pricing requirements. We tabulate all the assets acquired for the segment to date, and the yields associated with them. We take the hedge positions and we artificially "clear" them to produce the desired term and mix of assets that we're looking for on a permanent basis in that segment. We adjust for carry costs and we also provide a spread-narrowing provision, so that if spreads do narrow we don't get any financial surprises. Then we have an adjusted performance on assets acquired year to date. The line-of-business people provide comparable information on the liability requirements for all the liabilities acquired to date. We're looking at parallels on both sides of the sheet, and the comparison will indicate whether we've got an excess, a shortfall, or whether we're right on target. This is helpful. It enables us, if we're short or heavy, to do some corrective pricing -- either increase or decrease the prices, get more competitive or less -- depending on where we are. We can anticipate the earnings impacts that are going to emerge by year-end if the valuation actuary continues to see whatever he's seeing, and that could be a surplus or a deficit -- more or less strain than anticipated. We can make some strategic changes in what we're doing on the investment front or on the product front.

I referred to portfolio adjustments and these do impact the quarterly review of our acquisition programs. These are determined on the basis of an interest-sensitivity analysis that we conduct every quarter. The lines of business provide forward liability cash flows for a twenty-five-year period. We in the A/L area project our asset cash flows for comparable time frames. These flow projections are based only on the existing liabilities at that point in time, taking into account renewal premium income, but not any new business not written as of that date. We also project these cash flows separately under multiple, but so far relatively simple, interest rate scenarios. As a matter of course, more in the sense of having a norm, we do compute Macaulay durations for both the assets and the liabilities, but what we find as being more important to us are what we call the implied duration and the implied convexity. These are measurements that we derive from an analysis of the cash flows that we ourselves have forecast. So they're unique to the assets and liabilities held by the account we're looking at in Great-West Life and to our own particular sense of how those assets will behave or misbehave under the interest rate scenarios we're examining.

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Once we've got this information, we can then alter what would otherwise have been a satisfactory new business asset acquisition program to reshape the portfolio characteristics as we choose. This approach has an additional advantage. It lets us distinguish very clearly between the income effects that are attributable to new business by itself, which is what we would have done if we hadn't entered into this portfolio adjustment, and, separately, what we're doing that we can attribute to the old, or in-force business. It's very helpful to our valuation actuary in reviewing and updating his assumptions for prior year's business because it allows him to observe if the margins are real or if they're too heavy or too light. Also, when we're analyzing income, we can tell whether we're getting a kick one way or the other from old business that was not properly matched in the first place, or whether it's a new business investment problem or opportunity.

The final area I'll touch on is our development approach to A/L information. We're currently in the process of developing a system which will simulate asset segmentation opposite specific liability groups. We begin with very hard, very specific liability segments. The corresponding liability and asset cash flows proceed through the programming process and are converted into investment language, the result of which is the acquisition of assets. The question is, "What do you do with those assets?" We thought we'd like to avoid losing the economy-of-scale and other suboptimizations that you get with a lot of small segments. With six and a half billion in the U.S. and a desire for eight, ten, twelve product segments, suboptimal portfolios are sure to occur. After engineering this approach in A/L management, we reached agreement with the investment professionals, the line of business liability managers and our corporate finance group, that it was the most reasonable compromise of the separate preferences and concerns of each of those groups. It is by no means perfect. It is not the right way, but it is a way. What we're doing, effectively, is segmenting our assets, not by liability group or liability pool, but by the characteristics of the assets themselves. As we look forward, we expect to see our liability segments participating in those pools that are appropriate to their businesses in the manner and degree to which they feel it is appropriate.

This has been a relatively short time frame, but I hope I've given you a reasonably clear picture of the ways that Great-West Life has chosen to integrate its actuarial and investment functions. What you do, the degree to which you do it, and the intensity and the frequency with which you do it will be very unique to your own company in its particular circumstances. The means will vary, but the end, which is effective integration, I believe, is essential to success and even to survival.

MR. DONALD A. KING: I'd like to do three things. One is to offer some general comments on A/L management, discuss what we think we're asked to do when we engage in this practice, and describe the two major functions of asset and liability management as I see them. Second, as Ted has said, A/L management is really company specific, in that what you do will be largely determined by your abilities and your corporate culture. But I'd like to offer some observations on how we view the process at the Equitable. The third and final thing I'd like to do is look at the actuary and the investment professional and ask, "Who has the appropriate skills to do what?"

Let me start with the generic side of things. Simply stated, I think what we've been asked to do is to manage the interaction of assets and liabilities, the

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interface of the two sides of our balance sheet. I think this is a function that's long overdue in this industry, as the banks have been at it a long time.

When we develop and sell a product, what are we doing? We're giving the policyholder options. These options have value. The policyholder can borrow, he can bail out, he can surrender, or he can switch to equities. He or she can do a lot of things, and, clearly, those are valuable options to the policyholder.

All of your assets have options, too. If interest rates drop, your bonds and commercial mortgages are going to be called away from you unless you have protected them. In your private placements you have double-up features for principal and interest. You have options to convert fixed equities and sell them. The wonderful thing about this world is that the values of options change on both the asset side and the liability side, and they change as the external environment changes, and that is expressed through a change in the price of money or in interest rates.

Our job is to understand options, and to understand the behavior of options in different interest rate environments. It's to understand A/L interaction and thereby understand, anticipate, and manage our risk exposure as our external environment changes. Our objectives are to understand and control risk, and to maximize return to the policyholder and to the company. So that's the generic task I think which has been put before us.

Of the two major functions of A/L management, the first is the modeling of assets and liabilities to assess their interest sensitivity, and the implications of this for business results. The beginning of this modeling process is good information, which most of us don't have. That's the inventory stage. On the liability side, it begins with reading contracts, collecting information on the liabilities, and producing economic summaries and product analyses of all your major products. On the asset side it means maintaining extensive records on assets. We have millions of assets and millions and millions of pieces of information on those assets and their options. Beyond the data, we've also got to understand financial practices, accounting practices, and tax practices.

Once you have the information, the next step is writing the models that track the interface of assets and liabilities. The long-term scenario projections come out of this, segment by segment. Models will project the financial impact of different external environments and different business policy decisions, both of which affect your bottom line.

If you have this modeling you're ready for the third step and that's to make judgments about whether your portfolio is too long or too short, and whether you've got too much or too little liquidity. You can also make judgements as to how price sensitive assets are to interest rate changes. I don't know about your company, but in my company almost anyone who can talk has an opinion on those subjects. When we reach that stage with the modeling function, it seems to me that we can now write meaningful investment policy statements to really drive our investment friends to produce the results we want and manage them more tightly in regard to their performance. Modeling also provides a real tool for analyzing our business. We can look at the bottom-line impact. We will have real profit and loss statements. We'll understand everything in stat, GAAP, capital strain and all those good things. To me the modeling function is a crucial cornerstone or linchpin of this whole process.

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The second generic function in asset liability management is what I call the liaison function between the insurance people and the investment people. They don't always talk the same language. I see this function working with product managers, modeling technicians, and others to analyze the product and determine asset needs. The liaison people work with the investment people to explain insurance needs and they work with the investment people to identify and determine what is available to satisfy product needs.

I think this job begins with cash flow management segment by segment -- all our outflows, all our inflows, and what's available for investing. It then steps into the allocation function. What are you going to tell the investing organizations to do? What specifications are you going to give them in terms of maturity, expected yield, quality and so forth? If you're going to allocate, then you have to monitor the allocations. You have to see that the money is getting out in a timely way and you have to see that the investing organizations are actually doing what you asked them to do.

There is an ongoing responsibility for this liaison function and I see that as an integral contributor to investment strategy. What's the risk profile, and how do you communicate your willingness to absorb risk to your investment manager? If you're going to do this you have to have views on liquidity risk, credit risk, maturity risk and so forth. You have to establish policies and strategies that tell whether you want to go longer or shorter, whether you want lower quality or higher quality, and you have to do that in the context of what's available out there. For example, we can't get the BAA quality bonds that we want. We can get very low or we can get very high, but if we're shooting for the middle -- we just can't wish that that happens. Somebody also has to have a view on synthetics, derivatives, hedging, and all of those good things, and that's a function.

Another function of the liaison role is, in our company anyway, an analysis of big, complicated deals. As an example, we have an equity real estate portfolio involving some complicated participating mortgages. We have orange groves and wineries that are brought to us. Somebody has to decide, besides the investment professional, that these are indeed the things that are appropriate for our portfolios. Lastly, as we set up this liaison function in our company, we've also made this function responsible for insurance regulation compliance, such as 130 and 126.

Let me turn to the second topic I wanted to discuss, and that is the practice of A/L management at the Equitable. Basically, our perception is to view A/L management as a kind of continuum across the crossroads of the company where the assets and the liabilities meet. Let's take a look at where some of these things come together, at least in my mind. Product development and design and expected policyholder behavior drive the risk tolerance of your company, your appetite for liquidity, your willingness to take on high-yielding assets, and your willingness to extend maturities. Risk tolerance drives investment management. It determines sector selection and asset selection and it reflects the investment management capabilities you have as a company. If you have risk tolerance in product design and asset selection in investment management, that translates into earnings on assets. This drives your interest crediting rates, interest crediting rates drive your sales and your lapses, and so forth.

Crediting rates and, in particular, renewal pricing, are fundamental to portfolio management because pricing decisions determine the mix of your business and

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the structure of your liabilities. Thus, pricing drives A/L management. Now, the point of all of this is that you have a loop that is both dynamic and interactive and whose parts are interdependent.

Let me move to the third topic that I want to address. Let's look at the actuary and the investment professional and ask, "Who has the appropriate skills to do what?" I happen to be of the opinion that the actuary and the investment professional have very important complementary skills. What I'm trying to do is strive for a balance and a blend in a cross-fertilization between these two bodies of expertise, because the essential thing in A/L management is, of course, knowing both sides of the balance sheet. The asset buyer -- the investment professional -- must know the liabilities, and the asset owner -- the actuary -- must drive the investment process.

Let's look at the process functionally and ask, "Who is best equipped?" Look at asset investment policy. I believe that this is the responsibility of the asset owner, the actuary. Who else can define the risk tolerance curve, the trade-off between incidence of earnings risk for greater potential return? Who else can specify the character of the liabilities, their puts and their calls? Who can establish financial targets for the investing process? Who is responsible for the earnings results? So investment policy determination is, in my view, the role of the asset owner and, in this case, the actuary.

With regard to investment strategy, I give the nod here to the asset buyer. The investment professional not only appreciates very well the target measures for matching, whether it's duration, cash flow, convexity, bar bell, immunization, or whatever; he knows what's in the market. He knows what the market is giving, and he knows what's coming in the new world of asset classes, derivatives, synthetics, and the like. So investment strategy is, in my mind, basically the responsibility of the investment professional.

Cash flow analysis and forecasting are, again, the actuary's domain. He knows sales and marketing objectives and efforts. He understands capital strain management. He knows tax issues. He knows accounting issues, and he knows the business financial issues in general. You can't expect the investment professional to know those things. With regard to asset allocation -- whether you want fixed income securities (public bonds, private placements, or commercial mortgages), common stock, or real estate -- I think that's the actuary's domain. He is responsible for pricing, and the pricing structure is the driving force. It's the fundamental statement of where your business wants to be on that risk tolerance curve, and that's important to appreciate.

However, once sector analysis is determined, then I think it's the investment professional who looks for specific asset allocation. Again, he knows what's rich and what's cheap. He is responsible for designing and executing investment strategy and he is charged with thinking about portfolio management and investment cycles.

Lastly, there's risk management. I see this as a joint responsibility between the actuary and the investment professional. What is the profile of risk you're willing to assume? Each type is different. We're all familiar with credit risk, our fear of default or downgrade. We're all familiar with its cousin, which is concentration risk, or lack of diversification. There is liquidity risk. Do we have adequate funds to meet unforeseen market contingencies? Can we dispose of assets without large capital losses? Can we find a buyer at a reasonable

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price in a timely fashion? And then there is maturity risk and reinvestment risk, which are really the same thing. These are a family of risks associated with mismatches in durations of assets and liabilities, again resulting from changes in interest rates. In short, the investment professional must work with the actuary in understanding and managing a portfolio risk, so that the actuary can define, in fact, where he is or wants to be on that risk tolerance curve.

At the Equitable, I think we are moving towards striking a good balance between the actuary and the investment professional in our A/L group. In our modeling function we have three actuaries and four investment professionals or technical people. In our liaison function we go the other way. We have four actuaries and three investment or asset-related people. If you leave our A/L group and go to the investing organizations, we are organized in subsidiaries. We have DLJ and Alliance Capital, which really are not in the A/L management process at all. They run special funds for us, special pools of money, but my group is responsible for monitoring them. If you'll look at the investment subsidiaries that really work with the A/L managing process, there are about fourteen investment professionals with a portfolio focus. They're directly committed to the A/L managing process. They do not trade bonds and they do not do deals or kick tires. In the fixed income subsidiary, Equitable Capital, we have nine investment professionals committed to the process. In the real estate organization we have three, and in our agra-business organization we have two.

In summary, I think the investor, more so than the actuary, brings to the table an appreciation of volatility and risk, the ability to value options, and the knowledge of value in the marketplace. He should be on the cutting edge of what's going on with capital market evolution. I think the actuary especially brings the appreciation of liabilities and options on liabilities and second, the appreciation of the business plan, the goals, the marketing and the client and agent relationship. Furthermore, the actuary brings to the table an appreciation of the accounting constraints on statutory earnings, as well as Insurance Department regulations.

I don't want to say that any of those things belong exclusively to one or the other, but I'm just looking for the emphasis of who does what perhaps the best. If we have to make a decision as to whether we emphasize the actuary or the investment professional in the leadership role of asset and liability management, I think that the swing factor should be the simplicity or the complexity of the product. If the liabilities are simple, let's say they're fixed payment to retirees, then the asset buyer can obtain the complete specification of the liabilities and he can effect the desired match. However, the more complex the product -- the more puts and the more calls -- the more the actuary is needed to unravel the financial targets for the asset buyer.

In judgment, whatever we do, we must not separate the investment professional and the actuary. I do not believe we can divorce the crediting rate from portfolio earnings or we'll end up with the worst of all worlds. Competitive pressure will drive us to go longest when interest rates are lowest, and shortest when interest rates are highest. Competitive pressure will drive us to pay out all the returns earned on high risk assets while we keep all the risk in our portfolio.

MR. JUAN M. OCAMPO: I'll try and keep my talk brief and touch upon some very good points that both Ted and Don have made. There are several basic subjects I want to cover; first of all, the historical context of where A/L

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management has come from in the life insurance business over the past few years. Then I'll discuss my own personal scorecard, as an outsider, where I feel you as an industry stand right now. I'm going to oversimplify to do it because, as Ted said, each company does things differently. Finally, I'm going to sketch out an alternative, as of yet an untested approach (which, by the way, is going to tell you that the scorecard is not going to be an A plus). Hence, this is a sketch, not a recommendation.

Every time I see somebody do an era analysis it always comes up with three eras, so I'm not going to buck tradition. I'm going to break down what's been going on into three buckets. The first is the world from the beginning of time until the late 1970s, then the turbulence of the 1980s, and, finally, I'm going to talk about today and beyond. There's always the good old days and, in this case, the good old days apparently ended roughly in 1978. Before then we had stable interest and foreign exchange rates, and limited and stable investment alternatives and investment products. What was there had been there for a long time. Long bonds were available and hadn't changed that much, and we had predominately stable long-term liabilities.

The insurance products also had nice long features which didn't change all that much. That basically allowed for an A/L management technique for the industry which was a kind of loose and independent, but predictable, management of assets and liabilities in their own separate worlds. As long as those worlds were pretty stable that worked well. It allowed for stable crediting rates to be used in liability pricing.

Now, we all know what happened: volatile rates; growth of interest rate sensitive liability products, which partially grew out of those rates and which heightened competition; deregulation or some of the other financial industries that you compete with; and an expansion -- explosion might be a better word -- of places to park your money, many of them very complex and not well understood. Some companies are still using the old world approach of quite separate management of assets and liabilities. Most, though, have gone towards a linking mechanism.

What Ted and Don both described was a linking mechanism that differed in some ways, but basically had some common hallmarks to it. One of them is liability primacy, which is the idea that the liabilities that we create in the business ought to drive that asset allocation. The assets are, therefore, secondary.

The second is portfolio segregation. Before, we heard about actual portfolio segregation and notional portfolio segregation by liability groupings. That's something that comes out of that liability primacy. Ted, on the other hand, mentioned that right now they're moving towards some kind of asset grouping in the actual asset management, and that's something I'm going to talk about because I think that's a very important development. I think that, in general, those in the industry who are on this cutting edge are taking a look at portfolios to be managed that are defined by liability classes which those assets support.

Finally, life company A/L management techniques have generally included attempted duration and/or catch matching of each portfolio.

In terms of where we are today and where I think we're going, first I see continued competitiveness and complexity in liability products and continued expansion of investment opportunities. I don't see that waning. I see it

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changing, and that would be a subject in itself. Second, you've got two important forces out there, globalization and securitization, both of which are going to continue to feed new types of investment vehicles for life companies to buy. Third is the availability of risk management products, primarily through derivative instruments. That's important, because those are not a means of parking your money. They're a means of managing your risk. Before, you could always manage your risk to some degree by parking your money in different places. Everybody knows that, and that's a lot of what the asset management function has been about, but it's a rather clumsy weapon for doing it. The increased availability and the increased liquidity in these derivative instruments, I think, will make a very big difference in being able to really manage risk in a tailored and powerful way.

Lastly, I see improved investment analytics. I think Don touched on this quite a bit when he was talking about the good information and the good analysis, and if you don't have that you can't take advantage of these increasingly powerful tools. Nobody has it good enough, including the best of the investment banks who have invested a great deal of money in the analytics, which are still going up the learning curve. That's fine. I think that it's going to be a very, very rewarding learning curve for those who do pursue it.

There are two subclasses of analytics that I want to talk about. One of them is framework; in other words, the concepts themselves that you would use to analyze your risks and divide them up so that you can do something about the risks. The second are portfolio indices. That's basically just increased public information of a useful sort that you can operate from once you've got the framework in place for understanding risk.

Not all that long ago, there was very poor historical information about even basic individual securities. What had they traded at? What were they really worth? What were they worth in relation to others? Over the past fifteen years or so that information has been commonly available for basically all classes of securities. What's newer, though, is the availability of that same kind of information for entire portfolios. This is critical to the alternative I'll soon sketch out.

Let me backtrack a moment. The question I would like to pose is whether we should change our A/L management technique, or continue to refine that liability primacy portfolio segregation approach that I think most companies are now pushing. To do that I've assembled a scorecard.

I think there have been three very important benefits from the approaches being taken right now. One is that there has been a significant reduction in exposure to cash flow and interest rate mismatches. It's a realized benefit. Second, there has been improved insurance product line profit reporting. In other words, since you can now track assets to liabilities, you can do a more realistic type of profit and loss (P&L) analysis that's going back to those products. It's not perfect, but it's a step in the right-direction. Third, there is better awareness of liability structures themselves in those analytic terms that both Ted and Don have been sharing to you -- terms that are increasingly used commonly by people on the investment side as well as on the liability side. That means understanding cash flow duration and imbedded options and quite a bit more. I don't think we understand our liabilities yet, but I think we now know what we don't know, and that's an important step.

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The net of all these three is a very important downside floor on the risks inherent in your individual product offerings. However, this downside protection has come at the expense of fairly significant expected returns in investment performance, and that's why I think we can try and push for, perhaps, a modification of this solution to get that performance back. It comes from two general areas. The first one, which follows straight from portfolio theory, is that as you disaggregate your portfolio you tend to create excess liquid reserves. You get into inefficient trading as one portfolio manager is getting out of one security that another one's getting into, and you tend to shift toward lower risk, lower return assets. Yes, you can counter these actions within the context of your current asset and liability approach, but countering them takes extra work and leads to increased complexity in the asset management function, which I don't think you can afford.

The second problem area stems from a misalignment of the investment management function down at the individual's job. First of all, there tends to be a lack of clear individual responsibility in the lengthened investment decision process. By lengthened, I mean the day to day process has become really quite long, so that an asset manager who's trying to run general account money has got a much, much more complex moving target than his or her colleague would running pension money in an independent money management firm. That makes the job much, much tougher and really reduces some of the accountability.

That accountability is further reduced, typically, because right now there's an inability to measure portfolio management effectiveness as it now stands. Part of it is that since that chain has been lengthened as much as it has, who's responsible for what leads to a lot of gray areas, again unlike the independent money managers who tend to have total return targets that are right out there etched in stone. That just doesn't exist for the portfolio managers as a whole in this industry.

Finally, the portfolio manager's scope, definition of the job, tends to hinder skill building. That's true when the portfolios that they're managing are defined by liability classes. Supporting those liabilities means a host of diversified assets. The problem there is that you can very easily become a jack of all trades and master of none. You know a little bit about mortgages, a little bit about corporate bonds, a little bit about different government instruments and so forth and so on, but I think that the demands are such and the basic change is such that if you want to be an excellent asset manager, you've got to focus much more along asset classes.

Is there an approach that can capture the best of both worlds? In other words, an approach that can keep the matching of assets to liabilities while allowing some more flexibility in the day-to-day assignment of roles within the investment function? I'm not talking so much about the global job at the A/L management office, but rather the people who are in charge daily of trying to get that extra return in the investment function without throwing out all the advantages that have been won to date.

For that, we search for an analog, and there is an analog in the commercial banking industry. The large money center banks were dealing with a problem some fifteen years ago with their treasury function versus their lending function. Who had to purchase money was also running their investment portfolio and who had a lot of ability to handle interest rate risk?

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That business tends to be more asset driven on the customer side, while yours is liability driven. But they basically have the exact same problem, which is how to untangle the day-to-day complexity of the flows back and forth between the assets and liabilities so that you retain a match of the business and control your total risk, while allowing the professionals in the asset area to concentrate on a day-to-day, moment-by-moment basis, on their type of risk, which is credit risk. The treasury people who are primarily liability people, are, likewise, allowed to concentrate on their own type of risk, which is interest rate risk.

What they came up with was a matched opportunity rate for funds, which I'll explain shortly. There are three steps that they follow in running that kind of transfer mechanism. The first thing they do is provide funding for the businesses out there. In this case, it's lending businesses, but it's just the same thing as you giving a crediting rate to the liability businesses.

Second, there's a net position management. In other words, once you've aggregated all the exposures that occur from day-to-day business, from customer driven business, how do you go out into the market and, in the case of a bank, fund yourself and hedge yourself to get to the degree of exposure that you want in terms of risk and return?

Finally, there's the actual funding decision itself of how you're going to go out and do it. That's totally analogous to the actual investment decision that you're going to make in an insurance company.

The transfer rate mechanism that these banks use is a yield curve. At any given point in time any loan that's made has a given duration that they estimate, and it is funded with money that exactly matches it. That gives a spread between the cost of that money the Treasury's providing and the amount of revenues that the bank is making on the loan. It's a spread that the lender, the business manager, can keep from then on. It's interest rate sensitive because it's been matched, so he or she's got a P&L right now that is stable and which focuses only on their type of risk, because from then on it's going to be a function primarily of credit losses, which they manage.

Now, the treasury function is obligated to basically make a market for any and all kinds of business that comes in from its customers, whether it's liability business in the form of deposits, or asset business in the form of loans. It's highly unlikely that the durations of those two customer businesses match in any way. Every bank has a different kind of duration which varies over time, depending on the results from its day-to-day customer business, but most of them find themselves asset long.

Now, you've got a policy decision as to whether you're going to close that gap and how. That policy ought to be set, frankly, by the CEO. How wide are you going to allow people to set that band? Treasury tends to execute it and can play with it within the narrow band and, typically, what you'll find most of the large commercial banks doing is that they short fund. They short fund, typically, because sometimes they think that they know where interest rates are going. Those guys tend to lose money over time. But there is a liquidity premium that's imbedded in these yield curves and they try and take advantage of it. They will not match. Even though they've given pricing out to the business units which is matched, they themselves take a risk and then try to generate profit against that risk. They're big boys and if they fail in that,

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that's a performance quip against them. Once again, the degree to which you allow the Treasury function to widen that gap is a big policy issue.

By the way, I think that since these fifteen years that have gone by, the report card on that particular approach and on the commercial banks that have used it is very good. People kicked and screamed during the introduction period. There were incredible fights between treasury and lending. But those things just don't get questioned right now, and I think that it's been a major tool for them to be able to deepen their skills in both interest rate management, on the one hand, and credit management, on the other.

Can we apply this kind of thing for the needs of an insurance company which are so much more complex? How can you get some independent transfer pricing that's useful? The answer here is more complex, so that these three steps that I showed you for the bank -- the fund pricing, the net position management, and the actual investing or funding -- stretch out into five, with the yield curve becoming instead a transfer portfolio. First, the liability structure of each liability product (and you can define them as narrowly as you want) is analyzed using the same analytic tools that basically form the bridge between the actuarial and the investment professionals. By the way, a lot of the investment research that goes on in some of the major trading houses comes from papers written by actuaries many years ago, so there is more linkage as far as I can tell than sometimes meets the eye.

Once the liability is understood, those products are then matched by customized index portfolios that best match the liabilities. Those are paper asset portfolios essentially whose performance can be tracked publicly over time. You don't have to actually own the bonds and equities to know what happens to them. Once you've done that for every single liability class in your general account, or whatever you're trying to manage, you then aggregate your portfolio. That can be done, because now you're talking about assets which basically can be thrown into a single aggregated portfolio. That's a paper transfer portfolio. Since the components were publicly trackable, that's also publicly trackable. You need some pretty good computer system to do it, but it can be done.

Now, how do you go from the paper portfolio to the real one? You desegregate it, but along asset lines. You desegregate it along lines that are custom tailored to what that specific portfolio manager needs in order to best understand his or her market and deepen his or her skills. As you've done that, you've also provided some bench mark that comes from that transfer portfolio against which you can monitor performance.

I have two additional points on this. When you actually do the desegregation you now have gone from a paper portfolio that's publicly trackable into some segments which will include investment instruments that are not publicly trackable. You've also got some securities, if you will, or trading that is not asset specific, but more risk transfer related, and that gets into managing the derivatives themselves. The actual investments are made by each one of the portfolio managers, managing their defined assets. Once again, it's a policy issue as to how far you will let them deviate from their own benchmark subportfolio, in the same way that short funding the bank was a policy decision. Once you've done that you've got a real portfolio out there that you can aggregate. You can compare its real returns with that target one and construct P&Ls back to each liability class business that reflect those P&Ls.

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To give an example of how that might work, consider three products. A, B and C, each of which had publicly trackable indices that were constructed to try to match their liability characteristics. Product A to a portfolio which created a total return of 10%. Product B had 11%, and C had 12%. When you aggregated them all together, that led to an aggregated transfer portfolio rate of 10.25%, because there's much, much more business in A. Suppose that the investment function actually delivered a true total return of 10.75%. That's fifty basis points over their target, and I would say you just allocate those fifty basis points back pro rata on top of their specific subindex portfolio, so that everybody gets a 50-basis-point benefit. Product A goes from 10% to 10.50%, and so on. Basically, what you can do then is track profit and performance at the asset management area, but you can still give that performance back, and you know how to do it.

Now, there are three problems that I would anticipate right here. The first is how you identify specific assets to match back to these liability pools for the purpose of regulatory reporting. You can do that in two ways. One way is to actually track back through the individual investments to try to find out which specific decisions were being made, even though they were made in asset defiant pools. Determine what the waiting effectively was from each liability portfolio and allocate the assets accordingly. That should give you a reasonably good match.

The second way that you can do it is through factor analysis. This is one of the tools that you can use from your overall analytics to ask, "How can I best segment specific individual investments from the real investment portfolio back to each one of the products?" And that's what you would report. It's an additional process, but this is something that can be set up and cranked out, I think, without too much in the way of judgment calls.

The second problem is how to get good public indices to actually do this stuff. The indices have been getting a lot better. Not every day, but continuously, the investment banking firms are putting more and more information out as to what types of investment assets they're going to track on a public basis. Right now, they've been fishing for business doing that and they're not giving as much information as you'd really want to have for this kind of tool to work really well. On the other hand, if there was a sizeable enough demand, I think that information would be provided by the street. It's theoretically there and I think it's good enough to get this thing launched.

The third problem is how you handle instability in the liabilities. At the beginning of the year, you go through products A, B, C. You do a liability analysis, you match it, and one month later you throw that liability analysis out the window. That's going to happen. There are two ways to do it that you use in conjunction with one another. First, go back to some of the subassets. You want to define some of those to be very liquid subportfolios of assets that you can trade in and out of quite a bit. The managers in charge of those portfolios will be subject to very frequent changes in the amount of money that they're going to be managing. That's going to make their life harder, but you at least insulate the others from it and you, basically, inflict the pain on those portfolio managers who can best stand the pain.

The second thing that you can do is use an overlay function to manage overall portfolio needs, not so much in terms of cash flow, but in terms of risk rebalancing. This is something that some pension funds are now doing and I'll

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illustrate what they do. They select investment managers whose performance they like -- those investment managers who typically specialize in types of asset classes. They may have somebody, for example, who's very good at managing Over-the-Counter (OTC) equities and you've got a lot of your pension money parked with a specific manager who's been beating the OTC indices. However, as the pension fund manager, you don't like the look of OTC equities at all, vis-a-vis other instruments. You can synthetically short that overall position, so that you can try and lock in that manager's return over the hedgeable index and basically convert your base return into some fixed income security, for example. This is something that is being done to an increasing degree by pension managers. There could be people who are actively trading in the market, primarily in synthetics, who try to shield the day-to-day asset managers from too much instability in the targets that they're looking for.

That's the problem that I see most -- that the cost of giving people fuzzy targets and job definitions that are unactionable is going to cause a real drain on total returns that you can't afford. Once again, I really want you to take this as a thought starter, not an answer.

MR. EHRLICH: If I can try to sum up, at Great-West, we have here an actuary who was transplanted into the investment side of the house and retrained to provide, among other things, a translation function. The bottom line responsibility for asset/liability management and investment performance seems to be shared. Therefore, one of the things this A/L area has to do is mediate disagreements over investment policy which might arise, e.g., from disappointing levels of return. You told me that your area looks at whether the pricing is to change or whether the strategies should change. I'd bet that not everyone in the company agrees which is the right way to go when you're in that situation.

At the Equitable we have an economist/investment professional who now heads the A/L group within the insurance companies. He sees the need, in the performance of this integration role, to rely on one "group" or the other, defined as the actuaries or the investment professionals, depending on the task at hand. One difference that I think I picked up on was that at the Equitable the investment policy is determined on the insurance side.

The thrust of Juan's remarks as I understand them was that when you get to the execution on the investment side, there shouldn't be any integration. Define what you want in such a way that the investment professionals can then take it and run with it, but without clogging their minds with sales expectations and things of that nature.

MR. GREGORY S. STRONG: I'll describe a situation I had with a prior employer, whose investment function was consolidated in New York for all of the American subsidiaries of this particular corporation. We looked very hard at the kind of model that Juan described. We were talking about it as pseudo-segmentation. The insurance companies liked the concept. The investment people liked the concept, but because they couldn't agree on who was going to be held accountable for what piece of the results, the whole thing fell apart. We worked on it for about eighteen months. Any suggestions on how that situation might be rectified on a theoretical or practical basis?

MR. OCAMPO: Without knowing exactly what the arguments were on which side of the table, I would say that the investment professionals should be held

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responsible for the deviation from their total performance and I would try to make that as close to total returns as possible against that transfer index, that transfer portfolio. For the insurance people it's not as clean, because, frankly, they're responsible for the whole darn thing. It's really their business and you're going to get that fifty basis points back in extra credit, or more likely it's going to be a drag. The drag is going to result from two things. Number one, these index portfolios are priced on the bid side of the market and there's an actual transaction cost that is easy to understate and, number two, there's taxes that have to be paid on this kind of stuff as you execute, so trailing a well-constructed portfolio is no sin. That may be the best you can possibly do. I would say that the insurance people basically get the whole thing. I'm just trying to get cleaner targets to the asset managers. Whether that's feasible or not I don't know.

MR. EHRLICH: I'd be interested in hearing where you think the process fell apart if Juan didn't hit it.

MR. STRONG: The process basically fell apart because the insurance companies were not prepared to take responsibility for the total result if the investment people were only getting the deviation. I think a lot of personalities got involved at the CEO level of the corporation. The product managers and the actuaries were much more willing to adopt the kind of approach that Juan described. I don't think it was necessarily a logical failure, which is one of the difficulties I see in integrating these actuarial and investment functions in companies, because, unfortunately, it isn't always a logical situation when you're dealing with two professional groups.

MR. OCAMPO: There is an analog in the commercial banks. If you'll remember, I said that an awful lot of arguments and fights went on between the treasury and the lending people. The lenders had several arguments. The first one was that the Treasury was going to stiff them because they were going to give them rates that were artificially expensive. That was a bigger problem for them, because an individual bank's liability curve is not publicly available. That's why I've gone so much toward public indices to try and avoid that source of torment. The second one was that they didn't want to be held responsible for the bad bets if they were going to be folded back in. That's, I think, what you're talking about right there. Finally, what typically happened was that CEOs would come around and say, "Look, guys, you're going to be responsible. If the investment performance is going to lag over time against your competitors, you're basically going to see yourself losing your market, period. So whether you want to measure it or not doesn't matter. It's your responsibility deep down." I think that when you finally have people at the top who take that point of view and then use a bit of force, it seems to work.

MR. FRANK J. LONGO: The remarks that Ted and Don made imply to me -- that your performance measures are total return based. Is that true?

MR. KING: We're not total return based yet. We have some subportfolios that are total return based, but overall, I would say we are not. We haven't satisfactorily been able to break out our cash according to ownership on an effective and timely basis at enough level of detail to do that. I would say we're probably a year away from that and it's a generic objective for the organization.

MR. LONGO: How about you, Ted?

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MR. STEVEN: We're not near total return either. In the formation of those ultimate asset pools I described, we would have the capability to look at the total return of the pool and let the fund manager manage the pool for total return as well as some other constraints.

MR. LONGO: I would like to ask Juan this next question, since he's sort of an industry observer. To what extent do you see life insurance companies moving in the direction of total return based performance measures and how long will it take before significant numbers of companies get there?

MR. OCAMPO: I'm a biased observer for the first question, because that's what I tell them to do. I do think a lot of the thinkers in the industry want to go that way and they're really making steps to do it. Time will tell if they do it, or if I'm wrong. How long is it going to take? I frankly don't know, but I think it's more in the two to three-year period as opposed to eight to ten years -- if that's a help in terms of a yardstick. But I don't think I'm the best person to really give you a feel for that as a survey at all.

MR. KING: If I may just comment on that. When you're dealing with specific asset classes and there are pretty clear definitions, it seems to me a total return measure is very valuable. As you move away from that you have to start asking yourself, "Total return measure for what?" We may have some very large portfolios and we may have sixteen subportfolios going on in that very large portfolio, all of which are related to different kinds of liabilities doing different kinds of things. While total return might be a valid measure, at that level of disaggregation it doesn't seem that it's going to be very helpful to you at a more aggregated level, because they are such different types of portfolios. So I don't think we're going to see total return being the only thing that we're focusing on as we move forward and get a little more sophisticated in how we array our assets and liabilities.

MR. JAMES G. STEWART: I'm an actuary reporting to a chief investment officer and director of investment planning. We have an approach which lies somewhere between what Ted is building at Great-West and what Juan Ocampo is advocating. First of all, we use a true segmentation. We have nine segments in our life and health branch. One of those is a corporate treasury function which acts as the overall liquidity manager for all the business segments, so that deals with one of the major suboptimization issues right there. The corporate treasury function gives us a daily cash position, a notional bank account, if you will, for each of the operating segments and all of the flow transactions clear there.

Second, our investment function is structured on an asset manager basis. We have an equity manager, an equity director, a staff, specialists according to Canadian and U.S. equities, preferreds, and so on, and a public bond area which also oversees the money market operations. Then we have specialists, directors of mortgages, real estate and private placements. Now these last three, of course, in Canada and, in particular, the mortgage operation, are not public markets. At this time we do not have the developed secondary market and mortgage product that you have here in the U.S., so that's one distinction.

Now, in my area, we're responsible for overall investment policy and for the framework of investment strategy on a global basis for the firm and for each of the segments. We're responsible for the overall risk management and hedging decisions. At a more local level, the asset managers are responsible for managing their asset category, be it Canadian equities, U.S. equities, the Canadian

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bond portfolio, the Canadian mortgage portfolio or what have you within defined boundaries.

For the public market portfolios, bonds, equities, and money markets the asset managers have a high degree of freedom to manage on a total return basis as their primary objective (and we take an intermediate to longer term view there) with some second order constraints relating to taxes and current statutory earnings. So the public market asset managers have, if you will, a large number of degrees of freedom.

So then the question becomes, and this is one of the things that Juan's and Ted's approaches are trying to deal with, how do you remove the constraints or correspondingly increase the number of degrees of freedom of the asset managers who don't have a public market, a private placement shop, the real estate shop in Canada, or the mortgage operation? The approach that I've developed is that we make up an order book or a strategy framework for the kinds and categories of assets that we wish to acquire -- term structure, credit quality, etc. We give this broadly defined order book to the directors of real estate, mortgages, and private placements, and then they operate their shops as production facilities and asset management facilities within those constraints. They're responsible for their credit decisions, for their mortgage underwriting, for their real estate selection and for their balance within this overall strategy framework between income producing real estate and development projects.

My area, as the overall risk manager for the corporation, globally and for the segments individually, determines on a case-by-case basis, either by specific allocation or random allocation processes in the case of residential house loans, which assets go to which portfolios at which point in time. And because we manage both the overall risk process, globally for the company and individually for the segments, we're able to look at funding alternatives in the wholesale market, the construction of derivative securities, internal coupon stripping and things of that ilk in order to distribute the actual investment product in a way that best meets the objectives as agreed upon for each of the segments.

We're able to undertake hedging and other generalized risk management activities as required. So it seems to me that we have some of the advantages which Juan was citing in his matched opportunity rate concept since we do have this aggregation at an organizational level and we have, in fact, effectively freed the asset managers from the complexity of the liabilities. We have given them somewhat more actionable targets against which to manage their portfolios and their returns. I wonder if any of the panelists would have comments on this approach.

MR. OCAMPO: I think that you've met in your approach at least two of the three goals I was trying to achieve. Number one is to make the investment managers more actionable by aligning them by asset-delineated portfolios, and that you've done. The second is to give them as clear a target, a benchmark total return target against some kind of index, so that you can really see their performance over time and give them incentives. I'm not so sure that you've done that, but I think you have from what you were saying. Maybe it's fuzzier in some areas than others. The third aim, and I didn't stress this as much as I should have earlier, is to try to relax the day-to-day linkage, and, to use Scelig's point, go to a delinkage between the asset and liability managers.

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I was trying to increase the quality and the linkage, not on a day-to-day basis, but on the basis of product design on the liability side and overall risk management at the total entity level. You can do this best when you have very good clarity of the assets and liabilities. The transfer tool is not only a tool for funding rates and so forth, but also gives a benchmark against which you can track how a new product is going to impact that total risk, against something that's out there that's easier to see and measure with more degrees of detail. Now, I don't know how much more that's worth. It sounds like what you've done is really get at least 80% of the way there and judge whether it's 80% or 92%, I'd have to get into the fine details of how it's managed.

MR. KING: I think that you're probably a little further ahead than we are, Ken, in terms of putting more investment return and performance measurement on your asset managers. The role that you describe that you are taking on in terms of risk management for the company and for the portfolios is pretty much what I see my liaison function doing. We're just not mature enough yet to have pushed that far, but I think we will be doing that as we go forward. I would say that I can't go as far as Juan wants to go, but I'm probably headed more in that direction.

MR. JONATHAN E. MILLER: At our company we have what we call asset pools, and the product managers for each segment choose the pools in which they want to invest. I think what that means is we have a very much smaller actuarial/investment interface than a lot of other companies. The investment department gives us what I like to think of as closed-end mutual funds, and we do all of our pricing based on what those closed end funds are expected to be earning. Then the investment people have, basically, as much freedom as the investment department and upper management will give them to fill those pools with whatever they want. As a mutual company we end up not really making profits as much as passing the gains and losses on to the customers and kind of surviving, so that may change our approach from a lot of other stock companies. I'm having a hard time trying to figure out what we would gain by going to something as sophisticated as what Juan Ocampo is suggesting.

MR. EHRlich: I don't want to speak for Juan, but it sounds to me like you've captured some of the essence. We haven't gone into the details of how you're general account looks, and how you manage the cash flow and how you tell them how much money is coming into mutual fund A and B and C, but it seems that you're doing basically what both Ted and Juan were saying is the proper way to free the investment people.

MR. OCAMPO: I don't know how you're actually doing it day to day, but the one concern that I would have is whether the asset managers were responsive enough to the needs of the liability people. If they've got pools of assets that they negotiate with senior management on a relatively infrequent basis and they do what they want within those pools, that gives them a lot of freedom. But frankly, that may not be giving the proper match to liabilities and to investment opportunities as changes on the liability side occur. Either you're going to get a mismatch as a liability manager is forced to choose from a limited set of assets in these mutual fund pools, or, which is just as bad, given the asset constraints of mutual fund equivalents, you'll either restrict or redesign your products to fit.

I think that you've got to have responsiveness -- and this, by the way, did happen in a number of banks that were using funds transfer mechanisms early

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on. The liability people were basically saying to the lender, "You can't lend at that maturity, because we can't fund it at that maturity." Well, you can if you work harder, but the point is that they were designing their job too much, so I think you have to keep the tension, and that's one area about which I'd have a little concern.

