Risks Considerations for the Allfinanz Organization

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Abstract

"*Allfinanz*" is the German expression used to describe an integrated financial services provider (Edwards [11]). Such *allfinanz* providers are becomingly increasingly common here in the U.S. and abroad. As firms redefine themselves through such integration, we must also redefine the way we evaluate such firms.

This paper will discuss many of the risks faced by an *allfinanz* organization and then look at the impact imposed by those risks. We will then review some important interrelationships between the various components of an integrated firm. We conclude by briefly discussing a question at the heart of the dynamic financial analysis of such a company: Which risk and performance measures are most important for such a firm?

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I. Introduction

Due to the growing level of integration within the industry, financial services corporations are increasingly comprised of units and subsidiaries in a variety of specific businesses. With respect to insurance, corporations often include multiple insurance subsidiaries for market segmentation, regulatory, and other purposes – and to a large degree always have. However, large property-liability (P-L) insurance corporations are now frequently more than just a collection of regional P-L insurers, or a property-liability and a life insurer, or even an insurer and a bank. A "full-service" financial services organization may include any or all of the following (and possibly more) units and subsidiaries:

- A property-liability (P-L) insurer
- A life insurer
- A reinsurance company
- A banking or asset management unit
- A unit devoted to helping clients arrange alternative risk transfer and integrated solutions
- A services unit, which might sell, on an unbundled consulting basis, a variety of financial- or insurance-related skills, including risk engineering, risk assessment and identification, claims handling, etc.

The reality is that the trend in the financial services industry seems to be toward this type of "full-service" approach. The challenge for everyone involved – corporate management, regulators, investors, etc. – is to analyze such organizations in an integrated and cohesive way. This involves recognizing and measuring the interdependencies and correlations between a diverse collection of economic, financial, and operational variables, and then identifying relative "success" measures to guide future changes in operational strategy.

In particular, this paper will look at the risks faced by a full-service financial enterprise. And for purposes of this paper, a firm of the "retail" or "main street" variety that may offer personal and small commercial

lines property/liability coverages, life and health insurance, and personal and small business banking products and services, will be contemplated. After identifying many of the risks faced by such an organization, we will look at the impact of those risks to the firm followed by a discussion of some of the interrelationships of these risks within an integrated firm. Lastly, we will conclude this paper with a brief discussion of performance and risk measures.

II. Identification of Risks Faced by an Integrated Financial Services Organization

The integration of various components of an organization often means the integration of different cultures and languages. For example, the term "credit risk" conjures up one definition in the banking world and another to insurers. Thus, it is not only important to identify all of the risks facing the organization, but it is also important to define those risks such that everyone understands them the same way. The various risks faced by integrated financial services firms are identified (in alphabetical order) and robustly defined here as:

- ***Asset/Market risk*** – the risk to earnings arising from changes in the market price of assets held. Asset/Market risk is intended to include changes due to such things as overall market fluctuations, bond defaults and other factors, but for purposes of this paper is intended to exclude changes in asset price relating to changes in interest rates (which is defined as Interest Rate risk). However, these risks can be combined into one risk definition/category at the DFA professional's discretion.
- ***Credit risk*** – as defined here, refers to the risk of default or nonpayment by counterparties, but does not include the risk of such default/nonpayment by reinsurers or those with whom the firm has entered into hedge or other risk-sharing transactions (defined separately under "reinsurance/hedge risk"). The reason for this division of definitions is due to the varying levels of such risk between banks and insurers. As will be discussed later, the largest risk faced by retail banks is credit risk relating to loans, credit cards, and other such instruments. In the context of using DFA to evaluate credit risk, it seems prudent to separate this definition of credit risk from that associated with reinsurers, hedge and other risk-sharing partners.

- ***Economic risk*** – the risk to earnings arising out of changes in the economy.
- ***Foreign exchange (FX) risk*** – the risk associated with fluctuations in currency exchange rates. (Note: any counterparty risk associated with FX risk hedge transactions is intended to be included under the definition of Reinsurance/Hedge risk).
- ***Insurance risk*** – the risk that insurance operations will not perform as predicted. In a P-L context, this risk is comprised of the "reserving risk" and "premium risk" which the NAIC RBC calculation tries to capture. For life insurers, this risk is referred to as "business risk" in the NAIC RBC calculation and also tries to reflect the "underwriting" risk of a firm. This risk could also include any risk associated with the business cycle(s) of insurance lines written by the firm.
- ***Insurance affiliate investment and Off-Balance sheet risk*** – combined, this risk is the total encapsulated risk faced by affiliates, including any guarantees provided by, or contingent liabilities arising from, affiliates as well as any off-balance sheet risks.
- ***Interest rate risk*** – the risk to earnings (and to asset and liability values) arising from changes in interest rates.
- ***Legal risk*** – the risk associated with any instability in the legal process. Many would consider this to be part of Operational/Business risk, but as many P-L actuaries know, this risk is significant enough to be considered separately.
- ***Liquidity risk*** – the risk that a firm will be required to sell assets at an amount less than their market value in order to meet immediate liquidity needs.
- ***"Measurement" risk*** – the risk we incorrectly measure or that we measure the wrong thing as part of our strategic planning and/or DFA process. It is akin to the parameter risk associated with selecting and measuring strategies. If we use DFA as a tool to measure a firm's global performance, the "parameter" risk associated with this tool becomes increasingly important in the context of the integrated firm.

- ***Operational/Business risk*** – is defined here using the Basel Accord definition (Basel [6], p.2). It is "the risk of direct or indirect loss resulting from inadequate or failed internal processes, people or systems or from external events." This risk is often considered a "catch-all" bucket of risk and incorporates a broad range of risks ranging from business interruption to lawsuits to theft to natural disaster. In fact, some of these sub-divisions of operational risk are so significant that many are defined separately in this section.
- ***Political risk*** – the risk to earnings due to political instability.
- ***Prepayment risk*** – the risk of prepayment by mortgage or credit card holders. For example, a mortgage beneficiary (e.g. bank) holds an asset involving cash flows that are a function of underlying principal repayments. If unexpected changes in the mortgage prepayment rate occur, this will cause the beneficiary to receive cash flows either earlier or later than originally anticipated, and thus fail to earn the anticipated rate of return.
- ***Reinsurance/Hedge risk*** – the risk of default/nonpayment by reinsurers, hedge partners and/or by other risk-sharing partners. An example of "other" risk-sharing/hedging partners would be counterparties to swap transactions. Included in this definition of risk can be any "basis risk" arising from the use of derivative instruments (or this risk can be classified separately).
- ***Regulatory risk*** – the risk that changes in the regulatory environment will negatively impact a firm. Changes in the regulatory environment have been the condition precedent to the integration of financial services firms. Also, the recent happenings with Enron Corp. and the resulting threatened changes to accounting treatment of off-balance sheet risks/investments have increased awareness of regulatory risk. As such, the risk of changes in various regulations is an important consideration to the DFA practitioner.
- ***Reputation risk*** – the risk the firm's reputation will be sullied, perhaps causing an increase in one of the other risks listed in this section.

- ***"Shareholder" risk*** – the risk associated with fluctuations in the firm's market capitalization due to outside investors. It is, for example, the risk of a massive sell-off of your firm's stock over a short period of time. The importance of this risk relates to the firm's resulting cost of capital and ability to raise additional capital.
- ***Strategic risk*** – the risk that a given strategy or set of strategies will fail such that it impacts current or future earnings.

III. The Impact of Risks on the Organization

As can be seen from the previous section, there are a tremendous number of risks faced by *allfinanz* organizations. In this section, we attempt to add context to these risks by looking at their overall impact on the organization. In order to do this, we will first look at how some of these risks are treated by the various regulatory risk-based capital (RBC) requirements. This should provide a relative magnitude for these risks as well as provide insight into which risks the "experts" say are of most concern. After that, we will discuss those risks not specifically addressed in any RBC requirements but impact the organization nonetheless.

Risk-Based Capital

Property/casualty actuaries are well informed about the five risk components included in a P-L insurer's required National Association of Insurance Commissioners (NAIC) RBC calculation. Some important reminders with regard to these requirements are that "reserving risk" is generally the largest risk faced by P-L insurers. Asset risk associated with insurance affiliate investments and off-balance sheet risks is noteworthy as it is the only component outside of the co-variance adjustment (i.e. not subject to the square root) and therefore any increase in this risk will increase the overall RBC requirement by more than an equal increase in another risk charge. It is important to mention that much of the credit risk faced by P-L insurers involves the uncollectibility of reinsurance (and is thus included herein under

"reinsurance/hedge risk"), whereupon 50% of the charge is its own charge while the remaining 50% is added in with the reserving risk charge under NAIC RBC.

The RBC requirements for life and health insurers are similar to those used in property-liability. An excellent comparison of these requirements versus P-L requirements can be found in the AAA's "Comparison of the NAIC Life, P&C and Health RBC Formula" (AAA [1]). One important note is that there are separate RBC requirements for life and health insurers, respectively. For life insurers, invested asset risk is typically the largest driver of the required RBC. Insurance risk or "underwriting" risk has the largest RBC charge for health insurers.

The invested asset risk for life insurers is split into two separate covariance items: 1) common stock (which has its own charge), and 2) all other invested assets including bonds, mortgage investments and other invested assets. Mortgage investments are more common, and therefore pose a greater risk, for life insurers than P-L insurers; and are especially important for health insurers that own hospitals, clinics or other real estate. For life insurers, the "other" invested asset charge also includes reinsurance credit risk. For health, the credit risk from reinsurance and capitations are combined in the invested asset charge inside the covariance formula.

While not explicitly incorporated in the RBC calculation, asset risk is also of concern to life insurers due to its effect on disintermediations. Disintermediations increase when returns on other assets go up as such returns are more attractive. Although disintermediation is an important consideration, it should be noted that variable life policies are reducing the risk of disintermediation (Browne, et al [7], p.10), and therefore the relative size of such a book of variable life business should be considered when modeling either the asset or disintermediation risk of a firm.

One important note is that "interest rate risk" is only reflected in the life RBC formula, and not for health or property-liability insurance. This is due in part to the magnitude of such risk faced by life insurers. Some reasons for this are a greater percentage of portfolios held as stocks and mortgage investments, a

much higher asset/surplus ratio than P-L, as well as much longer "duration" for liabilities than P-L. Further, the interest rate risk charge is added to the invested asset risk charge of the NAIC RBC calculation before adjusting for covariance due to the higher covariance that exists between these two charges. The result is that these two charges strongly dictate the required RBC for life insurers.

Banking institutions are subject to different, yet just as strenuous, regulatory oversight and many countries mandate banks calculate their required RBC and submit it to a supervisory authority. The banking RBC formula used varies by country. However, the Basel Accord (established 1988, then revised in 1996) is considered to be foundation for these formulae. While the RBC formulae of the Basel Accord have often been criticized (refer to Matten [17] for further details), it is still regarded as the universal RBC standard for banking institutions.

Interestingly, the original Basel Accord RBC calculation only contemplated credit risk. Credit risk, especially with respect to loan and/or credit card holders, is the largest risk most banks face. Credit losses also tend to have a highly skewed distribution (James [15], p. 20). As such, the Basel Accord was concerned with defining the necessary minimum capital to be held to protect a bank from adverse credit experience.

Under the Basel approach, assets are assigned weights between 0% and 100% according to their riskiness. For example, most government-backed assets are given zero weight, most bank-backed assets are assigned a weight of 20%, property-backed assets such as mortgages are given 50% weighting, and most other assets are given a full 100% weight. Basel also specifies techniques and conversion factors for translating off-balance sheet exposures into their on-balance sheet equivalents so that the counterparty risks associated with such exposures are captured. The amount of eligible capital must then be calculated. Capital held is split into two tiers. Tier 1 capital consists of shareholders' equity plus disclosed reserves (including retained earnings) less any goodwill. Tier 2 capital is all other capital held. The total capital is the sum of these two tiers with the proviso that Tier 1 capital must be at least half of the total capital held.

The Basel Accord requires banks to maintain a ratio of eligible capital to risk-weighted assets of at least eight (8%) percent (Basel [4]).

In 1996, the Basel Accord was revised to include market risk as part of the RBC calculation. "Market risk" here is basically used to describe both "asset risk" and "interest rate risk" and includes several risk categories, such as interest rate, foreign exchange, equities and commodities. Basel allows banks to calculate the required RBC associated with market risk following either a set of Basel-prescribed guidelines, or banks may use their own internal models as long as those models meet certain criteria, including Basel-specified parameters such as holding periods and confidence intervals. By far, the most common models used for calculating the market risk faced by banks are Value-at-Risk (VaR) models (Matten [17] and Basel [4]).

Other Than Risk-Based Capital

Financial institutions of all kinds are confronted with myriad risks. Some of the most significant such risks are described and addressed by the various RBC formulae. However, RBC does not (nor does it intend to) capture all of the risks faced by insurers and banks and non-financial enterprises. Some other noteworthy risks for the DFA professional and their impacts are discussed below:

Perhaps the most important risk faced by each unit of our conglomerate but not addressed in any RBC calculation is operational risk. To a degree, one could argue that the "business risk" or the "reserving" and "premium" risk faced (and captured in RBC) by life/health and P-L insurers, respectively, are forms of operational risk as such risks are at the essence of their operations. In any event, according to the definition of operational risk above, insurers certainly face operational risk beyond underwriting risk.

The Basel Accord has clearly defined operational risk as one of the three most significant risks faced by banking institutions and Basel has reopened somewhat the issue of operational risk. In particular, Basel sought input on whether and how to determine the necessary RBC charge for such operational risk. While the Basel Committee on Banking Supervision has provided a consultative document on operational

risk, the inclusion of operational risk in RBC was ultimately tabled, primarily due to the difficulty in quantifying this risk (Basel [6]).

Regardless, operational risk remains an important risk commonly faced by each of the core financial facets of the "integrated" financial services firm, including any non-financial unit(s). Thus far, the non-financial components of our organization have been scarcely mentioned. While operational risk is an important concern in managing insurance and other financial operations, it is often the most important concern for the risk manager of any non-financial firm. Various operational risks ranging from competition to supply chain management to product liability often represent the biggest risk faced by non-financial organizations.

One other important risk faced by the *allfinanz* organization is liquidity risk. Such risk is generally interrelated with asset, interest rate, credit and other risks. Generally speaking, liquidity risk should be higher for organizations that face greater variability in the timing of obligations becoming due (not to mention receiving amounts or supplies owed from others). This would suggest that such risk is higher for insurers (both life/health and P-L), less so for banks, and then even less so for non-financial companies. One important difference for non-financial companies, however, is that many non-financial companies often have a greater percentage of their cost of total revenues, as well as the volatility of those revenues, tied to external parties or other factors largely outside of the firm's control. For example, many service firms' largest cost of revenue relates to employee salaries, most of which is owed on a set schedule, whereas the income from job assignments may not be as predictable. So while the nominal liquidity risk may be greater for financial institutions, it can still be an important consideration for the non-financial entity.

A little-mentioned but noteworthy risk that should be considered in modeling any organization is shareholder risk. A big issue in evaluating this risk is the amount of equity capital held (and the "cost" of such capital) in comparison with debt capital. As a rule, banks tend to have a much larger portion of their

capital base in the form of debt capital than insurers, which would suggest that banks might be less exposed to this risk. (It should be noted that the level of debt capital for non-financial firms can vary significantly). However, a rapid shareholder sell-off could result in a bank ending up in a not-so-favorable highly leveraged position, which could result in higher borrowing rates, a higher cost of capital, and perhaps invite acquisition of the firm. Regardless of the organization's function, a rapid sell-off can have an important effect on things such as credit rating, liquidity, employee morale and the firm's ability to execute its strategic plan, especially if that plan calls for raising additional capital in order to (e.g.) grow market share in a particular line of business.

Reinsurance/hedge risk as defined above is yet another important consideration for the DFA practitioner. It has been mentioned that such risk is captured for life, P-L and health in their NAIC RBC requirements. While banks do not use "reinsurance" per se, third party credit risk from risk-sharing partners is a significant issue. In particular, counterparty risk has become an important issue among banks with respect to derivatives, hedge instruments, etc. A default under these instruments will occur when a party to the contract owes a payment under the contract and the counterparty cannot obtain timely payment (Hentschel and Smith [14], p.11). Banks are increasing their use of derivatives and other instruments to hedge against various risks. To the extent this usage increases, so does any concern with respect to the creditworthiness of the counterparty to these transactions.

One last risk discussed here is economic risk. Like many categories of risk, economic risk is interrelated with other risks. Here, we are looking at how the firm's fortunes are affected by changes in the economy. For example, a receding economy may affect revenues and loss experience from homeowners and personal auto insurance. There is evidence that policy surrenders increase and purchases of life insurance products decrease if the economy weakens (Browne [7]). Loan and credit card defaults increase when the economy sours. Reciprocally, loan prepayments (associated with prepayment risk) go up when the economy is strong.

As can be seen, there are a number of important risks faced by the various aspects of financial services. When using DFA in decision-making, the key is to understand these risks and their impacts. The table below provides a summary comparison of the relative impact of risks (within each function) discussed above:

Table 1 – Risks and Overall Impact on Components of the Integrated Firm#

Risk	P/C	Life/Health	Banking	Non-Financial
Asset risk	Medium	Medium-High	High	Low
Interest rate risk	Medium	Medium-High	Medium	Low
Insurance risk##	Medium-High	Medium-High	Very Low	Very Low
Credit risk	Low	Low	High	Medium
Operational risk	Medium	Medium	Medium	High
Reins./Hedge risk	Low-Medium	Low	Medium	Very Low
Liquidity	Low-Medium	Low-Medium	Medium	Medium
Shareholder	Low	Low	Low-Medium	Low
Economic	Low-Medium	Low-Medium	Medium	Low-High

 # It should be noted "Low" in the table above does not imply that there is no risk at all, nor does it imply that there is not any catastrophic risk. "Low" here simply means the overall expected value of risk is low.

Insurance risk refers to "business risk" in the context of the Life/Health NAIC RBC requirement and refers to the combination of reserving risk plus premium risk as defined under P&C RBC.

IV. Interrelationships Among Risk and Corporate Variables

After identifying many of the risks faced by the various "components" of our integrated firm, the question becomes how these risks relate to each other now that we've put these components together. We can also ask what sorts of issues should be incorporated into the dynamic financial analysis of an integrated firm?

There is an ancient proverb – adopted by Chaos theory – about how the flap of a butterfly's wings in one part of the world can cause a hurricane in another part of the world. The point is that everything in life is related. So too is everything in the integrated financial services firm.

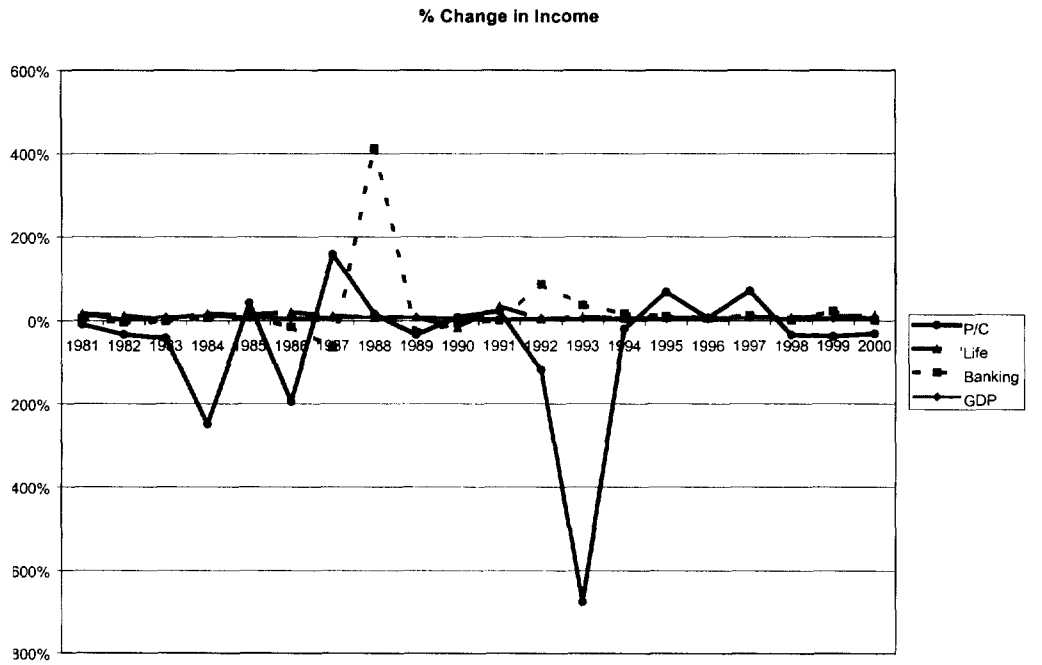
The primary motivator for integrating various financial units involves the strategic placement of the firm for success. That is, the trend toward integration seems to be driven by firms' desires to increase product offerings, leverage capabilities and fulfill other retail aspirations – whereas risk is seldom mentioned as a primary motivation. Risk, however, is a very important aspect to the firm, and identifying the effects of integration on the risks faced by the global firm will be equally as important. A good place to start is by looking at the specific risks discussed above and some of the ramifications of integrating all of the components of the firm with regard to these risks.

One obvious interrelationship question is to what degree will the risks and rewards of the integrated firm be leveraged versus diversified? This question goes to the very heart of the integration strategy. Presumably, integration means the potential for positive synergy as well as a way to diversify risk. But to what extent does such synergy or diversification take place?

On a macroeconomic basis, we could anticipate that different types of businesses might provide a natural diversification effect when combined. For example, due to differential reactions to economic and financial phenomena, different business segments might "complement" each other, perhaps even by having profit performance of opposite sign for a given set of economic conditions[*]. If this occurs for our integrated financial services firm, then by virtue of integrating multiple disciplines we are reducing the susceptibility of overall profits to annual volatility. In particular, this would imply that the integration of the firm has diversified our economic risk.

[*] A classic pedagogic example would involve the two businesses of daily umbrella sales and suntan lotion sales, which one might expect to have opposite signs regarding revenues for a given weather situation.

As a brief diversion, we can take an initial litmus test with regard to the level of diversification that might exist on a macroeconomic basis. The graph below compares the percentage change in income for the U.S. P-L insurance, life insurance, and banking industries for the past 20 years. The percentage change in GDP (U.S.) is also included as a very rough gauge of the diversification of economic risk for these financial segments.



Sources:
1. 1998 Life Insurance Fact Book (published by the American Council of Life Insurance)
2. Life Insurers Fact Book 2001 (published by the American Council of Life Insurance)
3. Best's Aggregates and Averages 2001
4. FDIC (http://www2.fdic.gov/hsob/)
5. Bureau of Economic Analysis (http://www.bea.doc.gov)

The respective correlations for the changes shown above are as follows:

	P-L	Life	Banking	GDP
P-L	N/A	-0.06261	-0.02709	-0.01684
Life	-0.06261	N/A	-0.09741	-0.01610
Banking	-0.02709	-0.09741	N/A	0.092463
GDP	-0.01684	-0.01610	0.092463	N/A

The information used shows only a very faint, negative correlation between the change in income for the three respective financial disciplines; and shows no real relationship between economic changes and the income changes for these disciplines. Given the raw nature of this litmus test, it is not very clear to what extent any particular segment(s) will diversify each other, if at all. This is clearly an area where additional research would prove useful.

On a more microeconomic or internalized note, we can intuitively determine which risks are being magnified and which are being diversified as a result of integration. The magnification of risk can also be referred to as the aggregation of risk. This risk aggregation can come in many forms. It can come in the form of increased risk to the extent that "*Allfinanz* Corporation" has the same customers among its various functions. Perhaps due to adverse selection, customers who generate poor P&C loss experience will do the same for health insurance or for mortgage default. Certainly credit risk of customers could magnify to the extent a particular customer may not be able to pay amounts owed in a timely fashion (or pay at all).

The topic of customer aggregation could impact strategic planning beyond risk aggregation. Whether certain types of customers produce different financial results may give rise to the need for some sort of "class"-mapping technology. Different financial disciplines classify their customers in different ways, but most do use some sort of classification system. For example, a P-L personal lines insurer may classify auto risks by age, sex, and territory; a life insurer might classify whole or variable life insurance risks by age, sex, and whether that person smokes or not; and a retail bank would use credit scoring to classify credit card customers. The ability to "class"-map in order to connect the various "classes" of

customers/insureds could be valuable in understanding the financial relevance of certain types of customers. Or, perhaps the firm could even create a universal "class" system for its customers and then develop rates/costs for various products for each of those classes. This approach would probably not be recommended for rate filings, but could be valuable in the strategic planning process and certainly could be an important consideration in modeling strategic outcomes.

Risk aggregation can also come in the form of leveraged reinsurance/hedge risk to the extent the firm uses the same reinsurers or other risk-sharing partners across functions. In addition, reputation risk would be magnified as the reputation of one unit may now affect other units. Imagine, for example, what the affect on Andersen Consulting (now Accenture™) would have been if it still had been a part of Arthur Andersen during the ongoing Enron debacle?

Along the same lines of reputation risk would be shareholder risk. To the extent that shareholder's equity is now co-mingled under the integrated firm, a sudden decrease in such equity would now affect multiple operations. If the total required capital/equity for the integrated firm is less than the sum of the needed capital/equity for each subdivision on a stand-alone basis, as many would expect, then shareholder risk could very well increase as a result of integration, especially due to any possible contagion that might occur if a rapid sell-off were to occur.

Converse to the risk aggregation mentioned above, there are clearly some risks that would be diversified as a result of integration. One risk that is likely to be diversified as a result of integration would be liquidity risk. The diversified operations should mean the firm is less susceptible to liquidity risk as it will now have more flexibility in how it meets any liquidity needs as they arise. Foreign exchange risks would also be diversified to the extent revenues are drawn from a greater number of countries.

Arguably, strategic risk would be diversified under the notion that the integrated firm should be more able to sustain one strategy gone bad. Also, if one were to treat each strategy as an independent random variable, then such strategy risk would be diversified as long as the distribution of individual probabilities

for the strategies does not diverge as a result of integration. That is, if the distribution of success for the strategies stays the same, then our risk would diversify as we add each additional strategy. However, if the distribution of strategy "successes" did change, then it is possible strategic risk would be exacerbated by integration. It is unclear, however, whether the distribution of strategy successes would change solely due to integration in general.

The above paragraph regarding strategic risk ignores the human element of such risk. When evaluating strategic risk, one should consider the strategizers themselves. If integration results in the wrong people now creating strategy for the greater firm, strategic risk could very well increase, and vice versa. The same could be true to the extent that senior management chooses a strategy or set of strategies that could be construed as "putting all the firm's eggs into one basket." Many consider the human element to be un-model-able (not to mention a very sensitive topic in general), but it can still be an important consideration in any final analysis.

One risk that does not appear to have a clear answer whether integration will magnify or diversify the overall risk is operational risk. Using the definition above, will an *allfinanz* organization be more or less likely to suffer direct or indirect loss resulting from inadequate or failed internal processes, people or systems or from external events? On the one hand, one might argue that a larger, integrated firm would be more likely to withstand any loss arising from operational risk. On the other hand, such risk may be greater to the extent that the integrated firm now has to learn to cope and operate within its integrated structure. According to Frick and Torres, merger and acquisition destroys value for the acquiring company more than fifty (50%) percent of the time, while spin-offs and alliances produce similar results (Frick and Torres [13], p.1). However, Arnslinger, et al. [2, p.4], suggest that some forms of restructuring, such as IPO's and spin-offs, on average create value. While "integrating" various disciplines may not be identical to merging, acquiring, or restructuring, a lot of the same dynamics and challenges are involved. The point is that integration is not guaranteed to succeed and therefore the risk of integration failure should be considered as part of the strategic planning analysis.

An interesting consideration that arises out of integration is the effect on interest rate risk. At first blush it would seem that one could predict the overall direction in risk based on the percentage allocation of various asset types. Generally speaking, the interest rate risk for a stand-alone life/health insurer will be higher than that of a P-L insurer, which will be higher than that of a bank using duration as our measure of interest rate sensitivity and assuming that each discipline will carry assets with durations similar to that discipline's duration of liabilities. As the duration of a combination of instruments is equal to the weighted average of the durations of the individual instruments (i.e., duration is additive) (Noris [19]), then the integrated firm's overall sensitivity to interest rate risk will be somewhere in-between the individual disciplines' sensitivity. This also means that regardless of whether a liability is insurance-related or banking-related, one can "immunize" the firm's surplus against interest rate risk for the integrated firm by matching the product of the asset portfolio value and the duration of the entire asset portfolio with the product of the total liability amounts and the overall duration of liabilities for the firm.

The use of derivatives can throw a wrinkle into the interest rate risk faced by our firm. Derivatives, for example, are often used to hedge against interest rate risk, asset risk, and foreign exchange risks. The obvious irony here is that many derivatives themselves are subject to potential losses due to changes in the price of the underlying assets or changes in interest rates. This risk is sometimes also called "pricing risk" (Hentschel and Smith [14], p.4). This means that this underlying "pricing risk" and the effectiveness of the hedge/derivative should be incorporated into our modeling methodology, perhaps through the use of some kind of subroutine. At a minimum, the incorporation of derivatives and other hedge instruments warrant consideration and can make for a complicated asset/liability model for our integrated firm.

Regulatory risk presents a topical risk for all *allfinanz* organizations. Changes in regulations have been a huge impetus in the creation of (not to mention legal ability to create) financially integrated firms. Because of this dependence on regulatory oversight, regulatory risk can impact our *allfinanz* organization

if it rears its head. What if important current regulations were to change and what might the effect be? For example, what if there was a change (perhaps in light of the Enron ordeal, for instance) in how off-balance sheet risks were accounted for? What would the impact be to the balance sheet and income statement going forward? What if a change in regulations caused a necessary shift in current operations? Or what if such a change gave another competitor a new advantage in a certain market? These all are important questions at the heart of the regulatory risk faced by our firm.

One last source of interrelated risk not defined above is referred to here as "self-insurance risk." Self-insurance risk refers to the risk the integrated firm takes on when it self-insures against any exposures relating to their own operations, including those of subsidiaries. On the one hand, the integrated firm will likely be able to retain more risk due to its presumably diversified operations and more efficient capital base. On the other hand, what if our hypothetical services arm began to offer certain professional services that required professional liability insurance to be in place, and our firm self-insures much or all of this risk? Or what if a general increased "net" (of reinsurance) position is taken by the firm? The latter question is a favorite topic of DFA and any aggregation of this risk can be an issue, as can an overall shift in business practices to emphasize the offering of third-party services.

V. Brief Discussion of Measures

This paper has dealt with the risks associated with an integrated financial services firm. For purposes of strategic and operational modeling of such a firm – e.g., for purposes of doing dynamic financial analysis – identification of the specific risk characteristics of an integrated firm is a critical early step in the process. A great deal of additional work is required beyond that, however. In this concluding section, the selection of risk and performance measures is discussed briefly, and some commentary is provided. It is hoped that future research will provide additional consideration of these issues.

Which performance and risk measures should we use?

DFA has been defined as a systematic approach to financial modeling which projects financial results under a variety of possible scenarios, showing how outcomes might be affected by changing business, competitive, and economic conditions (CAS [9]). One of the goals of DFA is to provide management with a quantitative look at the risk-and-return tradeoffs inherent in emerging strategic opportunities, and to examine how these tradeoffs affect the entire organization. Many DFA models currently in use for P-L and Life insurers examine these tradeoffs by establishing both return (i.e. performance) and risk measures. Presumably, management can then evaluate their strategic opportunities by setting minimum and target thresholds and seeing how the firm holds up against these criteria when affected by changes in their business, competitive, and economic conditions.

There are a number of approaches to measuring and reflecting the interrelationship between risk and return for DFA or other application purposes. Some of these measures are uniquely used for specific financial services functions whereas others are used more universally among the gamut of financial services firms. Several examples of commonly used measures are:

- ***Probability of Ruin***
- ***Capital "adequacy" measures*** such as Risk-Based Capital, Best's Absolute Capital Adequacy Ratio, S&P's CAR calculation, or other similar internally developed measures.
- ***Risk-vs-return plot*** – many such plots are used to exhibit DFA results using such variables as expected profit, ROE, and ROA (e.g.). Also common are results encapsulated as probability density functions (p.d.f.'s) of a key financial measure such as the amount of surplus, profit, or ROE (e.g.). It should be noted that life insurers commonly focus on assets and/or the return on assets as a key performance measure (Browne [7]) as do many banks. Risk-vs-return and p.d.f. plots have the obvious benefit of being easy to understand and often provide excellent context in the risk versus reward tradeoff.

- ***Risk-adjusted Return on Capital (RAROC)*** – and other risk-adjusted measures try to incorporate the risk-vs-return tradeoff in a single measure. Like the efficient frontier (see below), the intent of such measures is to state returns on an apples-to-apples basis whereby the potential return is weighed against the risk of a particular asset, strategy, or whatever may apply. (For insight into how one large banking institution uses RAROC is assessing the performance of individual unit, see James [15]).
- ***Efficient frontier*** – the efficient frontier faced by a firm can be stated (e.g.) in terms of return on assets, usually from the investors' perspective (i.e. how will a firm's return to shareholders for a particular strategy compare to that of the returns offered by other investments given the same level of risk?). The efficient frontier can also be relayed (e.g.) in terms of economic value as well as other bases.

In addition to the above, I would like to provide further comment on two other important risk measures:

- ***Expected policyholder deficit (EPD)*** – the EPD concept works for not only P-L insurance, but can also be applied easily to life/health insurance exposures. But the contiguous term "policyholder" suggests that EPD may not be the best measure, or perhaps phrase, for banking or other non-insurance financial services functions. In terms of looking at capital adequacy of the integrated firm, however, the EPD concept of capturing both the probability and impact of insolvency makes sense regardless of the type of firm being analyzed. As such, perhaps the concept of Expected "Creditor" Deficit (ECD) as a more universal measure is appropriate? ECD would use the EPD concept, but be incorporated for all creditors. ECD could perhaps have a "tiered" result structure based on the security level of each creditor – for example, one tier for insurance policyholders, another for other secured creditors, one for general creditors, etc. While not called ECD, many financial ratings firms such as Moody's and Standard & Poor already perform a similar type of analysis for all types of firms, bond issues, etc. ECD would perhaps present such analyses' results in a slightly different manner.

- ***Value-at-Risk (VaR)*** – As mentioned previously, VaR is a risk measure commonly used by banking institutions, especially with regard to market risk. In this context, VaR is often used to evaluate the

probability of a decline in the asset portfolio value (e.g.) by more than some percentage (e.g., five [5%] percent) over a stipulated period of time (often a very short period of time such as one day, but can be evaluated up to one year). Fallon [12] provides an excellent (albeit fairly technical) presentation of four VaR methodologies in use as well as offers his own VaR methodology to be used in banking risk management.

The use of VaR has now spread to life and P-L insurers alike. In fact, its use is already being scrutinized. Artzner et al. [3] (and Meyers [18] explains) show that VaR is not a "coherent" risk measure as it does not satisfy the subadditivity axiom. (The subadditivity axiom basically says that for all [bounded] random losses X and Y, the risk measure "amount" for X+Y combined {defined as $\rho(X+Y)$}, will be less than the sum of the individual risk measure "amounts" for X and Y, respectively {i.e. $\rho(X+Y) \leq \rho(X) + \rho(Y)$ }. Without question, Artzner et al offer important considerations when selecting risk measures. The authors also suggest the use of Tail Conditional Expectation (TCE) as an improved risk measure that satisfies all four of the coherency axioms/requirements (for more about TCE, see Artzner et al. [3] or Meyers [18]).

Before dismissing the use of VaR entirely, however, it is important to note that VaR does not fail to be subadditive every time – it is just not subadditive 100% of the time and really depends on the nature of the random variables X and Y (e.g. see [3] Remark 1, p. 14 as a limited example). Intuitively, many would expect that the overall risk of an *allfinanz* firm would be diversified as a result of integrating various functions. While it may be counter to this diversification expectation, the use of a "coherent" risk measure begs the question: what if such risk is not diversified? As discussed above, there are many possible dynamics within the integrated firm that would actually magnify the overall risk faced by such a firm. Again, while not immediately intuitive, if the overall risk of the firm is not diversified, then perhaps the use of non-"coherent" risk measures makes some sense.

One other interesting question the use of VaR for the integrated firm might raise is how should VaR be defined for such a firm? For example, if we verbally define VaR to be the most X we are willing to risk for a certain period of time (T), the question becomes what should X be for the integrated firm? In banking, the X is often the threshold for loss in asset value over the period (T) of one day. Should X be something different for the integrated firm? Perhaps market value or surplus should be used. Also, what should the threshold amount be and what time period (T) should be used? The reason that one day is often used for VaR purposes in banking is because it is commonly held that one day is the maximum amount of time it will take a bank to modify its portfolio holdings in order to stave off any further decrease in the asset portfolio. But for insurers, how long does it take to react to any precipitous fall in a particular balance sheet or other item? Given the length of policy periods, possible long-tail exposures, etc., the answer is unclear other than it could take a very long time. For this reason (as well as others), VaR may not make sense for the integrated firm – but its use certainly raises some interesting questions at a minimum.

Each of the above has its advantages and disadvantages. DFA in the context of the integrated firm can, however, result in these risk-return approaches having different advantages or disadvantages versus when used for one individual (or silo) financial services function (e.g., P-L insurance). Two important considerations in selecting a risk-return framework in an integrated-firm context are:

- ***Does the measure make sense for all aspects of the firm?*** For example, Carlton [8] states that non-financial firms should use a measure of risk that focuses on cashflow shortfall or cashflow-at-risk rather than variance in the market value of the firm's assets. Also, according to Browne, et al. [7], life insurers have historically focused more on returns than on risk.
- ***The purpose of the analysis.*** For example, a strong regulatory focus in an analysis might lead one to concentrate more on solvency-based measures such as the probability of ruin or the expected policyholder deficit.

Also, the performance measures used do not necessarily have to be in a risk-versus-reward tradeoff format. For many of the couplings above, one can simply strip the coupling of its risk metric and use the performance measure only. Or, the performance measures used could be in the form of "balanced scorecard" measures, such as the increase in customers, customer retention, market share, etc. The "balanced scorecard" measures have the benefit of being easy to understand, easy for the employee stakeholders to adopt, and in some cases are more in concert with a company's strategic objectives than the more financially-related measures originally discussed. That is, many chief executives verbalize a course for their firms based on objectives such as increasing the number of products per customer, rather than on achieving a certain position above the competitive efficient frontier.

The use of such measures does not mean they cannot be evaluated against risk measures. Such risk measures can certainly be added. For example, the performance measure of "doubling the number of products offered" can be used in conjunction with the risk measure of "a five-year standard deviation of calendar-year ROE of less than 0.10." One will certainly want to choose logical couplings; but DFA allows the freedom to choose the performance and risk measures that are most important to a particular firm.

VI. Conclusion

With the integration of the financial services organization comes new risks and a need to look at these risks in a more global context. This paper hopefully provides useful "food for thought" to the DFA professional and others regarding the risks faced by the integrated financial services firm, the impact of those risks, and the interrelationship of such risks within an *allfinanz* organization.

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