Modigliani, Miller and Mortgages

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Abstract

The Modigliani-Miller Theorem about irrelevance of the mode of financing in its effect on the value of a firm has been simultaneously extensively used and spectacularly ignored in modern finance. Yet its significance cannot be understated. If we do know that change of financing of an activity alone cannot produce new value, why then are so many economic agents so involved in such financing activities? Is it because they believe that they can create value, or is it because they believe that they can get away with subtracting value?

This paper asks the Modligliani-Miller question regarding the mortgage markets. More specifically:

- Do mortgage-backed securities and mortgage derivatives add or subtract value and why?
- Do reverse mortgages add or subtract value and why?

The most general and most important question addressed is:

- How do financing activities revolving around real estate affect taxes, default cost and agency cost of the economic agents involved?

The answer proposed is simple: We must no longer allow practice of risk without actuarial supervision.

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Introduction

Securitization of home mortgages has been, to a great degree, a uniquely American, and economically powerful phenomenon. In the 1970s, a perceived funding shortfall in the home mortgage market provided the impetus for the original securitization efforts. The demand by homeowners and potential homeowners for mortgages exceeded what thrifts and savings & loans were able to supply. This led the financial markets to seek a more efficient way to move funds from the suppliers to the mortgage demanders. That way was provided by the development of the mortgage securitization securities, in which the interest and principal payments from a group of individual mortgages were transformed into cash flows of newly created, sold to the market, more liquid securities. The development of these securities and the market for them appeared to be a form of a "free lunch" for the economy:

- More potential homeowners were able to obtain financing for their dwellings,
- More investors had the opportunity to earn relatively high level of interest income on securities backed not just by solid real-estate collateral, but also by the need of borrowers to keep living in that real estate piece they borrowed against, and, most importantly,
- Public policy objective of high level of home ownership was supported by guarantees on mortgages and mortgage-backed securities offered by the Federal Government, but those guarantees were believed to be inexpensive, and only exercisable under practically unimaginable circumstances of falling real estate prices and disappearance of liquidity in the residential mortgages market that was perceived to be the second most liquid market in the world, second only to the securities issues by the United States Treasury.

Over time, it also became clear that all three pieces of this wonderful free lunch provided by the American economy could (and indeed should) serve additional tasty dishes:

- As long as lending standards were strict and mortgages offered carried fixed interest rate over long-term amortization, many potential lower income borrowers were shut out from this most effective housing wealth accumulation mechanism, thus leaving a large potential market unexplored.
- Potential lower income borrowers could be charged higher level of interest, due to their higher risk of default, and could potentially pay for a part of their risk by giving up the option to have a fixed rate mortgage, and instead taking on a variable rate one, eliminating the high level of interest rate risk embedded in traditional mortgages. That risk was one of the major reasons for the savings and loans crisis, and is the major investment risk for most American insurance firms. Eliminating it by offering adjustable rate loans seemed like a very attractive opportunity for investors.
- Finally, the public policy objectives of widespread home ownership were clearly not realized just with conventional financing, and in fact were realized in a regrettably regressive fashion, a most of the mortgage tax deductions and support for mortgage backed securities accrued to taxpayers who already possessed significant wealth, while leaving out the low income borrowers lacking access to conventional financing.

Beginning with the Community Reinvestment Act of 1977, and culminating with the Fannie Mae's and Freddie Mac's decision to accept non-conventional subprime mortgages into portfolios subject to their guarantees (Holmes, 1999), these three new dishes were gradually added to the "free lunch" of the American dream housing market. What followed can only be summarized in the immortal words of the former Prime Minister of Russia, Victor Chernomyrdin: "We wanted to do good, but it all turned as before."

In a free enterprise economy firms exist in order to make profits. In fact, the objective is the same in a command economy, but there it is carefully hidden, with levels of discomfiture far exceeding any Victorian deliberations concerning sex education. On the other hand, every firm also has a mission concerning what it actually does for its customers. The mortgage industry's mission is to offer mortgages so that its customers can possess and increase their housing wealth. Or, more directly: *Housing wealth of customers is the mission of the mortgage industry.* It is unimaginable to propose that a bank, a mortgage originator, or a mortgage investor would presume to deal with a borrower for the purpose of leaving that borrower homeless and destitute. That perception may be what social science classes widely preach, promoting the concept of "predatory lending," but a homeless and destitute client does not produce profits for the lender and is a terrible advertisement for the same. To add more insult to this already big injury, homelessness and destitution are costly negative externalities for the national economy. The objective of mortgage lending should always be to build the housing wealth of the borrower, while earning as high of a profit as possible. Anyone who considers these two goals to be contradictory, misses the key feature of predatory Capitalism: the objective is not to prey on the customer, the objective is to bring the customer great happiness, while destroying the competition.

The mortgage derivatives market has been hailed for its innovation. After its fall, it is blamed for its predation. What this paper would like to propose is that, instead, it should be blamed for its lack of innovation, and lack of true predatory instincts. Why? Because in restructuring mortgage cash flows into derivatives it rarely, if ever asked these two fundamental questions:

- Does this derivative structure contribute to growth of housing wealth of the borrower? If the answer is no, the level of innovation offered is pitiful. A portable computer hard drive known commonly as "iPod" is innovative because its producer offers greater value to the consumers, not because consumers can be tricked into buying it. In fact, consumers do not need to be tricked into buying it precisely because it is innovative.
- Does this derivative structure contribute to the profits of the lender? If the answer is no, the level of predation offered is embarrassing. Predators, who do not care about having food, even if the food (called profits in this case) arrives in the future, do not survive. If pursuit of profits is perceived as predatory, one must remember that a lioness kills what she needs to feed her lazy husband (for a business that's the passive investors and the government) and the cubs (the cubs of the business are called *employees*, whose share of profits is called *wages*), and no more, because she will need to feed herself and her own tomorrow and the day after tomorrow, and in the foreseeable future.

Let us be precise here. The questions do not concern the mortgage itself, or the underlying real estate collateral, or even the lender and the borrower. The questions are only about the derivative structure. Let us offer an analogy to explain this. Imagine being a homeowner with an existing mortgage obtained from a friendly bank or a mortgage originator. Suddenly, at 14:55 Zulu time exactly, that mortgage becomes a part of a pool used for creation of a series of mortgage derivatives. Quick: look at your house, do you see that your housing wealth has declined by nearly $12,750 as a result of this transaction occurring at 14:55 Zulu time exactly? Did you see the money disappearing, to quote the immortal words of Nancy White (1990) “like the socks in the dryer”? Has the transaction made you uncomfortable and worried? It probably should.

Modigliani and Miller

Modigliani and Miller (1958), in a secular work affecting most of modern finance, showed that, under specific conditions, the value of the firm is invariant with respect to the leverage policy, or the method of financing of the firm, in general. Modigliani and Miller (1958) proved this, commonly referred to as the “invariance” result of corporate finance, using an early "no-arbitrage" condition. We will now present the basic version of the Modigliani and Miller Theorem. Consider a simple leveraged firm in which there are two basic claimants to the firm's income:

- Bondholders, whose security allows them to claim the coupon C at each time t as long as default is not declared.
- Equity holders (the owners of the firm), whose security allows them, once bondholders have been paid, to claim the residual cash flow (if positive) in dividends as long as default is not declared. We also assume that all the residual cash flow, when positive, is distributed to equity holders as dividends.

Bondholders are paid before equity holders, but their claim does not allow them to receive more than the coupon, no matter what the net result is. On the contrary, dividends received by equity holders may be very high when the net result is very high but can also be very low or zero when the net result is very low. In this situation, equity holders are called the residual claimants since they own the residual income of the firm, i.e., what remains when employees, bondholders, and government have been paid. The sum of bondholders’ claim value and the equity holders’ claim value at t is called the value of the firm at time t. The central question of Modigliani and Miller (1958) is whether the method of financing, most importantly the leverage policy, affects the value of the firm? The answer provided by the seminal work of these two authors is that, in absence of taxes, bankruptcy cost, or agency costs, the value of the firm is fundamentally determined by its earnings, and not by the way the firm is financed, i.e., by its leverage policy. Subsequent research (e.g., Modigliani and Miller, 1961, Stiglitz, 1969, Stiglitz, 1974, Tirole, 2006, and Braouezec, 2008) has pointed out that taxes, bankruptcy costs, and agency costs do affect the value of the firm; and if the method of financing influences the tax costs, bankruptcy costs, or agency costs (especially the incentives of all the stakeholders of the firm, or the structure of distribution of information among those stakeholders, given information asymmetries among them), then the leverage policy becomes relevant. Over time, more specific research of how these factors affect the value of the firm developed. Modigliani and Miller

(1958) already recognized that the effectively preferential treatment of debt by the tax code in the United States implied that an optimal capital structure would require a greater leverage than that observed in reality. But subsequent research has also pointed out the costs of bankruptcy as offsetting the advantage of debt. Increasing leverage brings about value increases in the form of tax benefits, but also raises the probability of bankruptcy. This suggests an optimum level of debt, balancing the two costs. There has been also a substantial body of research concerning the assumption of no agency costs, or "frictionless markets," in investment terms. The most widely studies "friction" arises from asymmetric information between providers of financing and their agents working in the firm, e.g., adverse selection and/or moral hazard between them. For example Townsend (1979), Gale and Hellwig (1985) show that in costly state verification models, standard debt was shown to be the optimal contract. Casamatta (2003), Cornelli and Yosha (2003) and Schmidt (2003) show that convertible debt and stage financing have desirable properties for innovative firms backed by venture capital. Kaplan and Stromberg (2003) showed the need for contracts with sophisticated covenants to allocate control and cash flow rights between venture capitalists and entrepreneurs in various contingencies. In addition to the incentive properties, capital structure decisions have been shown to be possible conveyors of information, as they can reveal the superior information of managers or entrepreneurs about the profitability of the firm's investment opportunities. Leland and Pyle (1977) show that the amount of equity retained by the entrepreneur can signal the profitability of the firm's investment, while Myers and Majluf (1984) show that issuance of equity is interpreted by the market as a bad signal, since owners with superior information tend to sell their shares when the market overvalues them. Batthacharya (1979) points out that the dividend payout decision can be far from irrelevant if dividends act as a credible signal of the company's profitability. Tirole (2006) presents extensive analysis of these issues in the context of corporate finance. Most strikingly, one of the creators of this theory, Miller (1988) himself, when reconsidering his work with Modigliani 30 years later, stated (p. 100): "The view that capital structure is literally irrelevant or that 'nothing matters' in corporate finance, though still sometimes attributed to us (and tracing perhaps to the very provocative way we made our point), is far from whatever we actually said about the real-world applications of our theoretical propositions. Looking back now, perhaps we should have put more emphasis on the other, more upbeat side of the 'nothing matters' coin: showing what doesn't matter can also show, by implication, what does." Braouezec (2008) and Pagano (2005) provide a thorough discussion of that perspective.

Mortgages and Mortgage Derivatives

Imagine yourself to be a new homeowner. You actually are the owner of a firm that we will call *Home*. The firm is financed by the equity provided by you, the owner, and debt from mortgage lender. You might protest that this is not a firm, because firms enjoy a separate legal status and limited liability. Alas, mortgages issued in the United States are no recourse loans, so that the mortgage lender can only recover the specific property that the loan was obtained against, but the lender does not have a general claim to other properties of the homeowner. This protects the homeowner from unscrupulous lenders. It also effectively makes your *Home* firm a limited liability entity. *Home* also enjoys a tax shield, as interest paid on debt financing of *Home* is tax-deductible to *Home* owner. Modigliani-Miller tell us that the value of *Home* does not depend on the method of financing it, as long as tax expenses, as well as bankruptcy and agency costs do not matter, and the method of financing does not affect the productive capacity of the

firm, i.e., *Home.* Of course we immediately see that taxes do matter, because of the tax shield of deductibility of the interest expense. This means that the homeowner has every incentive to increase leverage, to maximize the tax shield. In the case of a firm, increased probability of bankruptcy acts as countermeasure to increasing leverage. In the case of a homeowner, bankruptcy has much higher cost, as it results in a loss of a place where one lives. Government interferes in the process in the case of traditional mortgages insured by an agency such as Federal National Mortgage Association (FNMA) by providing insurance against default, but interestingly that insurance is provided to the lender, not the borrower. Thus the result of the contract structure promoted by the government involvement (tax laws and agency insurance for investors) is to increase the probability of bankruptcy of the borrower, while simultaneously lowering its cost for the lender. The moral hazard of the insurance scheme is that lenders will be willing to offer more loans and higher amount of them, expecting to be bailed out by the government, while borrowers will be seeking more loans and higher amounts of them because of the tax shield provided by the borrowing. One more consequence of the government involvement is that the mortgage contract is no longer a one-on-one contract between the borrower and the lender, and has an omnipresence of the government in it. This omnipresence has important consequences. If the borrower experiences financial difficulties, the traditional first recourse for the most of the history of mankind has been a direct appeal to the borrower for some form of renegotiation of the terms of the loan, be it in the form of some payment delay, term extension or refinancing. Bank clients traditionally sought relationship banking precisely for that purpose. This remedy is less likely to be available if the lender has the government insurance, and is less likely to be sought if the borrower has to deal with both the lender and the government. In fact, given that the government is both a party to the contract and its arbiter, a more efficient route for any party seeking any form of renegotiation or remedy is to lobby the government directly, especially if this can be done in cooperation with other similarly affected party in the national economy.

The incentives to renegotiate are nearly gone if the mortgage is securitized. Once this happens, the borrower faces a myriad of investors on the other side of the contract, investors often living in places all over the world, without any connection to each other. If the borrower experiences any credit difficulties, renegotiation with the existing creditors is physically impossible. This means, effectively that the process of securitization *increases* the probability of default of the borrower. Interestingly, it would seem that the supposed creativity of the derivatives industry that was used to disassociate the borrower from the lender could be applied to bring them back together—in the developing credit crisis a natural derivative product would offer existing payments to the holders of existing mortgage derivatives in return for renegotiated payments from borrowers. Such derivative product has not appeared on the market. Any current renegotiation efforts are generally lead by non-profit organizations, not by any mortgage derivatives originators. Since the federal government is already so heavily involved in the mortgage industry, one possible direction for more productive use of massive subsidies provided by it to this market would be toward that type of products.

Of course, one could note that most of defaulting mortgage derivatives are actually collateralized debt obligations (CDO), not collateralized mortgage obligations (CMO) based on conventional fixed-rate mortgage with long-term amortization. CDO are based on adjustable-rate, subprime mortgages. When those securities were issued, they may have appeared to be an improvement over CMO and traditional mortgage-backed securities (MBS) precisely because of

relying on adjustable rate mortgages. Such variable rate securities eliminate interest rate risk, a substantial risk faced by most American financial intermediaries, and thus appear to lower the risk to the investor holding the mortgages. But this perspective is incomplete. As acknowledged in the risk-based capital formula for life insurers, interest rate risk and credit risk are complimentary: generally we increase one of them by decreasing the other. CDO have higher credit risk. This is addressed by creating tranches of CDO with varying levels of credit risk. Does this reshuffling change the level of credit risk of the entire package of all tranches? One might propose that the answer is: no, because the aggregate package is unchanged by the process of creating the tranches. But, this process also separates borrowers from lenders, thus eliminating the possibility of renegotiation and increasing credit risk. Furthermore, expansion of offering of adjustable rate mortgages in the national economy creates greater aggregative credit risk of the borrowers.

In fact, the mortgage industry and the national economy experienced significant systematic risks from the mortgage markets. The economy is heavily damaged by massive insolvencies of not only mortgage borrowers but also lenders and mortgage derivatives originators. It turned out that creation of mortgage derivatives has been damaging to the world economy by creating dependencies where none, or almost none previously existed. We have witnessed probably the first such situation in history, where mortgages in distress in the United States have affected the national economy in Iceland, while in turn the banking sector in Iceland has affected international currency markets and possibly mortgage defaults in the United States. These, maybe always existing indirectly, dependencies, have now become direct through mortgage derivatives markets.

We must realistically acknowledge that the mortgage derivatives industry by its very nature is damaging to the credit standing of borrowers, and to a lesser degree of the lenders and derivative originators. This calls for credit enhancement mechanisms to be bundled with existing products in order to balance that situation. How do we enhance credit? Realistically, there are only two ways: collateral and strong guarantor. We should consider mechanism for additional collateral. For example, maybe mortgage and mortgage derivative originators should be required to post some form of margin deposit with a higher-level intermediary or a regulatory agency. Additionally, no recourse nature of mortgages in the United States limits the collateral available for remedies in case of borrower's default. While this no-recourse nature may seem to be a benefit to the borrower, the severity of the credit crisis serves as a warning about the risks of this situation. In the future, we might want to consider whether borrowers should provide specific secondary collateral, or some other secondary guarantee, in addition to the standard real estate collateral. An alternative is some form of a guarantor for both the borrower and the lender. The Federal Government has served as such secondary guarantor, but his resulted in a simultaneous call on the federal government's resources from all market participants during a crisis, a very costly phenomenon, creating undesirable market dependencies.

The third type of costs that affect the value of housing wealth are the agency costs created by mortgages and mortgage derivatives. As we have pointed out in the analysis of the *Home* firm, housing wealth is an equity position in a leveraged firm, for which leverage is encouraged by the tax laws for the borrower and by federal government implicit or explicit guarantees for the lender. Since equity can be viewed as a special case of a call option, this means that volatility of

real estate prices becomes valuable to the borrower, while the lender is protected by the government from at least some consequences of such higher volatility. Thus higher leverage becomes more desirable not only because of taxes, but also because of this option-like position of the borrower. Volatility-inducing transactions, such as 100-percent financing, or home flipping, become desirable not just for their speculative perpetrators, but for all leveraged long positions in real estate. In other words, in a real estate market so constructed, all risk is great. Additionally, holders of long positions in real estate, in the unlikely case of a sharp downturn, can walk away from their positions and leave them to the lenders. The lenders then call on federal government protection. In fact, all market players can in some way call on the federal government in the case of crisis. Even the borrowers in default, who walk away from their positions and damage their credit as a result, can lobby their case to the federal government, and can reasonably expect some form of remedy.

It should be noted that this risky high leverage structure with embedded call options has been brought upon this market by public policy goals and federal government intervention. This is not the only such position in the current economic structure brought into the game by government intervention. Limitations on executive pay have resulted in extensive use of call options as a form of executive compensation, or even compensation for high-value non-executive employees. But a European call option, under reasonable assumptions, is equivalent to borrowing the exercise price at the risk-free rate, buying the underlying, and purchasing a European put with the same exercise price. Would we offer this form of highly leveraged option-laden compensation to a key employee if it were presented this way?

> "The CEO of firm X will be compensated by letting him borrow several hundred million dollars from firm X at the risk free rate, and use the funds to purchase shares of firm X, with the firm also offering the CEO the right to resell the shares back to the firm at no loss, should the value of the shares decline below the exercise price."

Yet this is exactly the structure proposed with call options as executive compensation. One has to only wonder if this is an "unintended" consequence of government intervention given that put-call parity is taught in very low-level finance classes, or if it was well-known to its designers all along.

But there are other agency costs in the mortgage markets. Mortgage originators and mortgage-derivatives creators are often compensated with volume-based commissions. This creates incentives for high level of sales. This is precisely the background for what is often perceived as "predatory lending." Mortgage originators have only remotely possible punishments for selling too much, but at the same time substantial instantaneous reward. Incentives for originators of mortgage derivatives are similar. Sales of safer tranches can be enhanced by moving more risk to riskier tranches. Those riskier tranches can then be sold in any manner possible. Already in the 1990s, this author witnessed a lecture of an investment professional, who proclaimed that risky tranches were sold to what some salesman called *the Slow Deer*. The name referred to unsuspecting deer crossing highways in upper New York, the deer that came in two categories: those aware of the danger that escaped cars traveling down the highway, and the *slow* ones that spent too much time glaring at the lights of upcoming cars. Clearly, this

perception of incentives in mortgage derivatives distribution by its participant is a sign of a serious agency problem. Ironically, it appears that the Slow Deer Theory did not pan out, as many failing mortgage derivatives originators found themselves holding substantial portfolios of so-called toxic, kitchen sink, last tranche CDO, as the Slow Deer to sell them to did not materialize. It seems that these toxic tranches of CDO should have been used as compensation for the sales force in the first place. In fact, that compensation design may have been optimal all along.

To put it more simply (this point has been observed already very clearly by Ingram, 2008): compensation schemes of the mortgage industry have built in incentives that reward risk taking without properly adjusting for the cost of the risk. This author has the following proposition concerning this situation: *This is actuaries' fault.* Actuaries are too timid and not willing to speak out about the cost of risk. This allows charlatans without any mathematical education to misrepresent themselves as risk specialists, or even disregard risk altogether. The incentive to boast have been built into the business culture, while incentives for caution have been removed, not just because non-actuarial agents employed in the financial industry wanted it this way, but because actuaries did not attack them for this disregard. Consider an economic agent facing a need to pay a bill. Short-term financial incentives point towards delaying the payment. Reputational and professional incentives point towards paying it immediately when due. These reputational incentives can be reinforced by culture and professional standards, or can be destroyed by them, as "old-fashioned." Similarly, a financial entity (an individual, a firm or a government) undertaking a risk can work to calculate and recalculate its price, and pay that price immediately, or can postpone that payment and seek ways to find someone else to cover the cost. An actuary following the second path would be in violation of professional actuarial standards. But when someone else, whose actions affect the society, such an entity considered widely "too big to fail," or even the federal government, follows such path, why does that someone not suffer the wrath of actuarial condemnation and disdain? Not merely critique, condemnation. Instead, in our current business culture, condemnation has been reserved solely for the victims of political correctness.

Actuarial professionals often complain that the risk management skills of actuaries are disregarded in firms outside of the insurance industry. In this case, it seems, the actuarial profession concurred with that disregard by not condemning compensation structures and risk management practices of major banks, mortgage originators, large portions of the investment industry, as well as Fannie Mae and Freddie Mac. The issue is simple: If one assumes risk, one must calculate its price and create appropriate reserves, appropriately in advance. This principle applies to all economic agents, not just insurance firms. Actuaries can do this. If someone else does this work, they are unqualified and should be condemned as practicing risk without actuarial supervision. This is not a choice for actuaries. This is our professional responsibility.

Reverse Mortgages

The problem of retirement of baby boomers, the nearly 60-million strong generation born following World War II in the United States, remains an economic puzzle. The secular bull market in equities that began in 1982, has suffered spectacular damage in the downturns of 2000-2002 and 2008. Funding retirement with stock portfolios will become far more difficult now. Funding with bonds, given historically low interest rates, has also become less likely. The third asset class that baby boomers have appeared to rely on is real estate. And that asset class has also delivered a painful blow to those retirement hopes in the secular downturn of 2007-2008. Reverse mortgages have been proposed as yet another form of retirement income that can help solve the baby boomers retirement puzzle. But the downturn in real estate combined with historically low interest rates mean that the level of income available to potential retirees using reverse mortgages has declined substantially. Ironically, or maybe consistently with the way free markets work, the asset that has stubbornly increased in value throughout all the crises experienced by baby boomers is the one asset that is most valuable to them: reliable retirement income. The only area where there has been no crash yet of assets tradable for reliable income is human capital. In fact, baby boomers have saved very little, have purchased almost no guaranteed income products, other than relying on Social Security guarantees, and have shown very few signs of planning for their unavoidable retirement. Baby boomers have decided to support themselves through combination of all sources of retirement income, which will, with certainty, include continued employment. To put it simply: by failing to plan, baby boomers have planned to work in their retirement years.

The more retirement becomes preeminent in baby boomers life, the more likely they will reach for reverse mortgages as one more line of support. Unlike outright sales of financial assets, or real estate, reverse mortgages spread the sale process over time, offering some diversification of risk. But, we should ask ourselves if this method of financing the retirement is subject to tax, bankruptcy or agency costs. Tax treatment of reverse mortgages is, of course, subject to political risk, but is generally favorable. Bankruptcy cost to homeowners is generally low, as they receive income for life. But the providers of reverse mortgages face mortality improvement risk, just as any providers of annuities, magnified by simultaneous real estate market risk. Recent works of MacMinn et al. (2005, 2006) also point out that longevity improvement is not just a risk in itself, but is subject to fluctuations among birth cohorts, creating additional risk to financial institutions short life annuities, such as traditional annuity providers, pension providers and providers of reverse mortgages.

But because baby boomers rely on human capital for retirement (and they no longer have any choice about that, the die is cast), they will have to pay a lot of attention to their health. This will create great financial pressures on Medicare and all other forms of health programs by the federal government. Furthermore, domination of marketing over business substance combined with baby boomers relying on their health can create a secondary crisis down the road for the providers of reverse mortgages: baby boomers rely on their health for retirement, but by doing so increase mortality improvement risk. Also, it is possible that active lifestyle, especially including work, in retirement, will additionally extend baby boomers' future lifetimes. The funds paid out in reverse mortgages are most likely to be used in a manner that will help expand the lifespan of recipients of income. This is a good thing, but it creates subtle agency costs for the reverse mortgage providers. Of course, this calls for reserving for mortality improvement, and for sound actuarial management.

Credit Default Swaps

The greatest and most significant area of practicing risk without actuarial supervision has been the credit default swaps (CDS) industry. A credit default swap is a private transaction in which one party, which should be called the insured, but it is not, makes a payment, which should be called a premium, or a consideration, but it is not, to another party, which should be called an insurer, but it is not, in return for receiving a payment, which should be called a benefit, but it is not, in the unlikely event of a default of a certain fixed-income security. CDS were designed to shift the risk of default to a third-party, and were therefore less punitive in terms of regulatory capital.

Credit default swaps were created in 1997. They became exempt from regulation under the Commodity Futures Modernization Act of 2000. The Act was rushed through Congress as a companion bill to the omnibus spending bill. It bypassed the appropriate policy committees in both the House and the Senate so that there were neither hearings nor opportunities for recorded committee votes. It clearly bypassed any actuarial supervision. President Clinton signed the bill into Public Law (106-554) on December 21, 2000.

As a result, financial institutions subject to risk-based capital requirements were able to lessen that burden, and transfer the risk onto other institutions that were not subject to such requirements, in a transaction that was not regulated. This author does not believe that regulation is a panacea for excessive speculation; in fact, this author would venture the hypothesis that speculation is a panacea for excessive regulation. But, we must note that in private markets, entities subject to excessive credit risk are subject to either a collateral requirement, or a guarantee of a third-party with an exceedingly clean financial bill of health, or both. And excessive credit risk it was, because multiple CDS contracts could theoretically (and practically) be created on one underlying security, activity unthinkable under actuarial supervision.

This author teaches a graduate reserving class, in which reserves for various lines of insurance business are discussed. The class begins with a question for the students: How can one become a millionaire quickly? The answer is very simple: Sell hurricane insurance in Florida. If there is no hurricane, you are a millionaire. If there is a hurricane, you need to travel quickly to a country with no extradition treaty with the United States. The story is meant to be an absurd joke, an impossibility, because one cannot sell hurricane insurance in Florida without being a proper insurance company, and without actuarial supervision. Yet thanks to financial "innovation" this is no longer a joke, it is merely a retelling of the credit default swaps story. Activities like this do exist in bookmaking. But bookmakers who fail to properly manage their book of risk do not expect federal government rescue. At least not yet.

This author must therefore repeat the call to the actuarial profession: We must not allow practice of risk without actuarial supervision.

Conclusions

As a result of the credit crisis in the United States and worldwide, financial institutions that were not creative enough to create housing wealth for their customers and not predatory enough to create profits for themselves, have turned for help to the federal government of the United States. The trouble with this situation is not that the federal government will help them. The trouble is that as a result of that help they will not have to become creative and predatory. Their failed leaders will keep their leadership positions, and may even assume positions in new regulatory bodies for the industry. Worse yet, they may end up teaching future generations of managers of financial institutions. They will leverage their lack of skills to the new level, and reaffirm the belief of so many current students of finance that high earnings for oneself can be created by rearranging cash flows and polishing one's marketing skills. In their minds, the core business will take care of itself, and the customers and investors should fend for themselves. Most contemporary finance educators are not too enamored with free markets, but tolerate them for their efficiency. Because as we all now learn from school, free markets are unstable, mean, greedy and crazy. Their only saving grace is their efficiency: in a free market, a light bulb that burns out will change itself. Actually, the markets are not that efficient. We all know that the light bulb that is expected to change itself will never be changed. In fact, that was the fate of a burned out light bulb under the Soviet command economy: It was never changed until a direct order arrived, and even then, a shortage of light bulbs often prevented successful changing. In a free market economy, a burned out light bulb is changed by people whose mission is to provide the light for their customers, and earn profits in the process. If that light bulb cannot be changed profitably, free markets will not change it. If the light provides positive externalities, the government may be justified in subsidizing the changing process. But if the subsidy ends up turning out the lights in other areas, more careful calculus of externalities is needed.

The mortgage industry, as any other industry, does not create profits by "shuffling papers" (albeit in the electronic form). In fact, "shuffling papers" is likely to subtract value, because of the omnipresent Modigliani-Miller Troika: tax costs, bankruptcy costs or agency costs. The industry cannot be seeking profits by pursuing origination commissions, servicing fees or selling to unsuspecting *Slow Deer*. The industry can only be creating profits by increasing housing wealth of their customers. We need to rethink and restructure the industry, its compensation policies, and its products, so that they first and foremost serve the customers. Not at somebody else's expense, but through true creativity. And we need to restructure incentives to channel individual pursuits toward that mission. And toward profitability of the industry, because without profits there will be no food for the cubs. False profitability the industry has shown in the past relied on false accounting for the cost of risk, i.e., practicing risk without actuarial supervision. Any efforts to pursue this kind of business strategies, even with blessing of government regulators, must meet with strong and hostile actuarial opposition.

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