

# **Mortgage Loan Revenue Source-Risk Management: Lessons from Corporate Finance Applied to the Mortgage Loan Market**

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In 1952, Nobel Laureate Harry Markowitz,....demonstrated mathematically why putting all your eggs in one basket is an unacceptably risky strategy and why diversification is the nearest an investor or business manager can ever come to a free lunch. That revelation touched off the intellectual movement that revolutionized Wall Street, corporate finance, and business decisions around the world; its effects are still being felt today.

Bernstein (1996)

## **INTRODUCTION**

As this paper is being written, the United States is experiencing the worst economic downturn in over a quarter century and one of the most severe financial crises since the Great Depression. Economic historians will doubtless study the origins of the current recession for the next century or more, but it seems clear that a major contributing factor has been the extension of mortgage credit to a subsection of the U.S. population that was financially ill-equipped to sustain the debt loads to which those mortgages subjected them. “Sub-prime”<sup>1</sup> and “Alt-A”<sup>2</sup> mortgages by definition were granted to borrowers who did not meet traditional mortgage lending underwriting criteria, and the substantive expansion between 2004 and 2008 of the proportion of the nation's mortgage lending that fell into those categories contributed to an overall deterioration in the quality of mortgage loan portfolios held, directly or indirectly, by financial institutions and investors throughout the world. The result was not unpredictable, and many in the financial economic community of scholars warned of the risks that were being woven into the fabric of the world's financial system. [6]

This paper looks at the fundamental risk assessment and management process employed by the mortgage lending industry and compares the tools utilized by the industry to those employed in the world of corporate financial management to assess and manage the risks of debt as a component of a firm's capital structure. In most cases, the tools employed parallel each other. But in one significant area the corporate financial world incorporates a measure of cash flow “source risk” that appears to be largely ignored in the mortgage lending world. The article concludes by observing that it may be beneficial to develop tools within the mortgage lending industry that address cash flow source risk.

## **BACKGROUND AND SIGNIFICANCE OF THE ISSUE**

The proximate causes of the mortgage lending strategies that led to the financial meltdown of 2008-9 were many and certainly include the expansionist Federal Reserve monetary policy of the early 2000's, political opportunism on the part of key members of Congress who received substantial political contributions from Government Sponsored Entities (GSEs) such as Fannie Mae and Freddie Mac, lobbying and legal pressuring of banks by “activist” organizations wielding the big stick of Community Reinvestment Act sanctions, overt policies promulgated by the Department of Housing and Urban Development during both the Clinton and the second Bush administrations, and the stated goal of both administrations to increase the proportion of the nation's population that are home owners.<sup>3</sup> But all of these proximate causes themselves result from a presumption that home ownership is, under all

circumstances, a positive good that *per se* confers benefits on both the homeowner and on society in general. In fact, however, some individuals are financially ill equipped to bear the fixed financial obligations associated with a mortgage loan, in some cases due to personal financial habits, in others due to the temporary nature of their employment, and in others due to the risks inherent in their employment income stream. It is that third circumstance that is addressed in this paper, and that the current system of mortgage underwriting tends to overlook.

So ubiquitous has been the assumption that home ownership invariably confers benefits on owners and on society in general that it is difficult to find any examples in either the popular literature or academic studies of admonitions to the contrary. It is somewhat mystifying why certain principles of corporate financial management, reflective of fundamental concepts well known to financial economists and expressed in mathematical relationships and measurements of risk well understood and tested in the research literature, should have been almost universally ignored in the drumbeat of enthusiasm for ever-wider home ownership in our society. But it seems clear that what is considered fundamental and unsurprising in the world of corporate finance has somehow never made the trip across the conceptual street to influence fundamental thinking about personal finance.

That the consequences of an unthinking pursuit of ever-increasing home ownership levels have been negative for both the U.S. economy and polity is now self evident, and it is equally apparent the many individuals who reflexively either promoted or themselves acted upon the presumption should not have done so. Mortgage lenders as well as personal financial advisors are of course well acquainted with concepts of risk and the circumstances that can lead to loan default or personal financial difficulty. But the measures of risk employed by the former, and the observations concerning potential life circumstances that argue against higher levels of personal debt for the latter, appear to be missing some critical elements included in the measures of risk employed in the corporate financial world.

## **“LOAN LEVEL” MORTGAGE LENDING RISK ASSESSMENT TOOLS**

### **The Nature of Risk**

Fundamentally, financial risks may be defined as variances in expected cash flows. An expected cash flow stream may be considered to be totally “riskless” if there are no conceivable circumstances wherein the “realized” stream of cash payments will vary from projections or expectations. Consider, for instance, that if God had inscribed an eleventh Commandment on the tablets that Moses brought down from the mountain, and it stated “Thou Shalt Receive 10 Credits Annually for the Remainder of Your Life,” and assuming that the Deity is both omnipotent and trustworthy, then Moses could be said to have owned a “risk free” annuity, as there were no circumstances that would alter the payment. Somewhat less risk free, but possibly close, is the promise of, say, the Swiss government, the U.S. government, or the British Crown to make certain payments on financial securities they issue (for a term in the case of U.S. government bonds, in perpetuity in the case of Swiss or British Consuls).

Other cash streams have greater potential variances from expectations, in response to a variety of “independent variables” beyond the control of the owner of the cash stream or, perhaps, of the entity that promises payment. The City of Pompeii may well have issued municipal bonds, and the Roman citizens who purchased them may well have thought the expected payments secure. But when Vesuvius erupted and buried the city in 79 C.E., the cash flows dependent on the city’s continued existence ended. Another way of expressing the difference between expected cash flows and realized cash flows is that some portion of realized cash flows results from “surprises,” events that could not have been anticipated. Surprises can be both pleasant and unfortunate, resulting in either higher or lower cash flows than could or would have been anticipated. It is the obvious purpose of mortgage risk assessment tools to identify circumstances wherein such “surprises,” when they occur, do not result in loan default – just as it is the purpose of corporate risk management tools to identify circumstances wherein “surprises” reducing corporate cash flow do not result in bond default or insolvency.

### **Coverage Ratios:**

There are two fundamental mechanisms utilized by both the corporate financial world and the mortgage lending industry to measure and assess the ability of a particular borrower (corporate or mortgagee) to sustain a particular level of debt. “Coverage Ratios” measure the extent to which cash

inflows available to the borrower exceed the amount of cash necessary to service the debt obligations being entered into. In the mortgage world, tools such as the “Total Debt Service Ratio” (TDS – The proportion of borrower gross annual income that is already committed to housing and all other debts and obligations, such as car loans and credit card payments) and the “Gross Debt Service Ratio” (GDS – The proportion of a borrower's annual gross income required to cover payments associated with housing, including mortgage principal, interest, property taxes, and sometimes including secondary financing costs, heating, condominium fees or pad rent) measure the borrower's ability to sustain a particular debt load. Common coverage ratio requirements utilized by the mortgage industry are a TDS of no greater than 40% and a GDS of no greater than 32%, and those standards can be found enshrined in multiple institutions’ underwriting policies as well as in popular publications advising potential homeowners of their borrowing capacity.

Coverage ratios in the world of corporate finance address the ability of a firm to utilize cash flows to service long term debt obligations and include measures such as the “Times Interest Earned” (TIE) ratio and the “Fixed Charges Coverage Ratio” (FCCR). The TIE measures the relationship between EBIDT (Earnings Before Interest, Depreciation and Taxes) and interest obligations, and the FCCR adds lease and certain other fixed financial charges to both the numerator and denominator of the ratio for a broader measure of coverage.

**Leverage Ratios:** The second fundamental tool utilized by both the mortgage lending and corporate financial world can be broadly termed “Leverage Ratios,” though they go by different designations in the two industries. Leverage ratios measure the fundamental relationship between debt and equity capital as components of an organization's (or individual borrower's) “capital structure” (or asset base). In the mortgage world, these tools include the “Loan to Value” ratio (LTV) and the “Combined Loan to Value” ratio (CLTV – the relationship between the borrower's total mortgage debt outstanding and requested and the assessed value of the underlying real estate asset being utilized as collateral) and the “Loan to Household Asset” ratio (LHA – the relationship between the loan mortgage total being requested and the value of the total household assets of the borrower that may serve as collateral in the case of default). Compromises in the standards appropriate for CLTV ratios have played a major role in the recent implosion of the mortgage loan market in the U.S. Historically, CLTV ratios of 75% or 80% have been common throughout the industry. Over the past 10 years, largely as a result of political pressure from two successive administrations and actions of government mortgage GSE's and the Department of Housing and Urban Development, “Sub-Prime” and “Alt-A” mortgages have been commonly made available to borrowers with CLTV ratios of 90%, 95%, and in many cases even 100%.

In the corporate financial world, the Debt Ratio (DR – the proportion of a firm's assets purchased with debt) and Debt-to-Equity ratio (D/E – The proportion of a firm's long-term capital that is financed with debt, measured as a ratio of total equity to total long-term debt) are utilized to measure the level of financial leverage, and thus financial risk, borne by shareholders; they are comparable in concept to both the CLTV and LHA ratios used in the mortgage lending world. Short term leverage ratios such as the Current Ratio and Quick Ratio measure similar relationships between short term lending activity and the underlying collateral on which the loan rests.

**The Missing Element:** While the tools utilized by the two communities are conceptually similar, there is a fundamental difference in the manner in which their outputs are interpreted. In the mortgage world all income is to a large extent considered equal, particularly if it results from a salaried or waged employment position. Beyond a certain period of longevity (how long has a person been employed by a particular company with a history of “job hopping” being an underwriting negative), no meaningful distinction is made between a salary received from a civil-service-protected position as a city or state government employee, for instance, and one received as an employee of a highly risky start-up in the biofuels industry. In other words, other than subjectively in a “community banking” context, the risk assessment tools utilized in the mortgage world do not tend to look beyond the individual's cash income stream to the question of whether the *source* of that stream is itself subject to variances based on general economic or political conditions.

This is a radical departure from the approach utilized in the world of corporate finance, where both coverage and leverage assessment tools are routinely interpreted in a “cross sectional” analysis subjecting the measures to substantively different standards depending on the volatility inherent in the underlying cash flows derived from economic activity within a particular industry. Consider, for instance, the differential debt loads appropriate for a retailer and a leasing-service company. Retailing is a highly volatile industry, with very large short-term swings in revenue streams depending on general economic conditions. Lease service companies, on the other hand, have extremely stable cash flows derived from well diversified, term-overlapping portfolios of leases. Lease service companies can and do routinely sustain debt ratios of over 95%, whereas retailers more often are in the 35% to 50% range. Even within retailing, a grocery chain can sustain higher debt loads than, say, a fine jewelry store; and a high-end grocery chain lower levels of debt than a store with an inventory geared toward food staples.

The mortgage industry virtually ignores these differential risks associated with the *source* of a borrower's cash stream. To be fair, local community banks are much more attuned to a subjective assessment of a borrower's source of income, and a physician with a solid contract at the local hospital will usually encounter a subtly different set of loan standards than a construction worker employed by a transient firm on a local building project. The difference, however, derives more from subjective decisions made by individual loan officers based on certain “common sense” considerations than any formal recognition of the differential variances associated with the employment income stream, any formal differences written into loan standards, or (as is the case with corporate debt risk analysis) any data set documenting source-income variances for different professions or industries providing employment. Likewise, community banks still utilize some level of “character lending,” regardless of formal banking regulations. Nevertheless, it remains true that even in the community banking world, and especially in the increasingly distant, formalized, and formula-driven lending environment of the heavily-regulated “big banking” world (where the actual underwriting decision on a mortgage loan is made by underwriters in a central location, distant from the borrower, and based on formulas set by the secondary MBS or GSE mortgage purchasing entity), income is pretty much income and little or no distinction is made based on the underlying risk of the employing entity.

#### **MORTGAGE PORTFOLIO-LEVEL RISK AND DIVERSIFICATION CRITERIA**

Just as there are parallels between the “loan level” risk assessment tools utilized by the mortgage lending and corporate financial worlds, so there are also parallels between the portfolio construction metrics utilized by the mortgage lending world and those utilized by investors in corporate financial securities. Investment portfolios are constructed in such a manner as to match uncorrelated historical price movements of firms as they respond to independent variables, resulting in a portfolio of securities that eliminates elements of price variation that results from non-systemic (“diversifiable”) risk. Because we have available broad, deep, and extremely efficient financial markets with which to work, this diversification process can and does become highly mathematically sophisticated, with low transaction costs, high information availability, and the ability to easily and seamlessly diversify investment portfolios across wide geographies, industrial sectors, national economies, time periods, global weather patterns, political systems, and just about any other independent variable imaginable.

The mortgage markets are fundamentally less fortunate. Real estate markets by their very nature are far less efficient than those for financial securities, with information often obscure, units of sale non-fungible in nature, transactional time seemingly glacial, and regulatory and legal inconsistencies across political jurisdictions. As a result mortgage lending has sought to diversify mortgage lending portfolios utilizing a much narrower array of independent variables than are commonly and easily available to the corporate investment world. The use of Mortgage-Backed Securities (MBS) over the past two decades has both advanced and impeded this process. On the one hand, MBS and the securitization of mortgage loans has enabled diversification to take place on a geographical scale that was inconceivable just 20 years ago (allowing investment capital easily to be applied both in Pompeii and Naples, e.g., and thus avoiding putting all one's capital “eggs” in one community's economic “basket.”). On the other hand, the manner in which MBS aggregate very large numbers of mortgages, often “stripping”<sup>4</sup> them to disassociate cash

flow streams within the mortgages themselves, has made the process of assessing the risks of individual loan contracts far less transparent than it has been in the past with a “community lending” approach.

Mortgage lending today adheres to diversification principles through the construction of mortgage loan portfolios and international mortgage securitization, both of which processes build diversified portfolios of loans based on a number of non-correlated statistical relationships, geographical diversification being just one of many. Principles of financial prudence learned primarily in the corporate financial world were applied to the lessons of the 1930’s, and over the decades following World War II sophisticated measures of loan portfolio diversification were developed and incorporated into both private market risk assessment mechanisms and Federal and state banking regulations.

In other words, by seeking broader markets and larger geographical “play pens,” lenders seek to minimize systemic risk, which cannot be avoided through diversification, and convert it to non-systemic risk, which can. Corporate finance, however, employs several practices that have as yet not been applied to the mortgage banking industry in terms of identifying and pricing risks associated with certain types of borrowers. Although the Comptroller General’s underwriting guidelines for the development of loan portfolios calls for such broader measures of diversification, [5] in practice most banks have limited their portfolio diversification criteria to just a few standard variables.<sup>5</sup> Corporate finance utilizes measures of relative systemic risk based on the relationship between price movements of underlying securities and broad market indices, resulting in a measure of relative systemic risk referred to as “beta.” Estimates of a firm’s beta measure not just the risk of the firm relative to the larger market, but the cyclical vs. countercyclical nature of that risk and, most importantly, the relative contribution of the firm’s securities to the overall risk of a larger diversified portfolio of securities.

## **CONCLUSION**

This paper suggests that an extension of the concept of beta (just the concept – the author is well aware that the metric is not directly applicable to individual employment cash flow streams) as it applies to the riskiness of the cash streams represented by the income projections for individual borrowers might be developed and utilized for mortgage and consumer lending, both as a contribution to the individual risk profiles associated with individual borrowers and, perhaps more importantly, as a further measure of the systemic risk diversification of a portfolio of mortgage and consumer loans.

In other words, attention should be paid to the underlying riskiness (potential variance) in the source of income for individuals at both the individual loan level (coverage and leverage ratio requirements should vary depending on the source of the income, with different standard applying to salary and wage income derived from stable employers in stable industries), *and* when mortgage loan portfolios are constructed an additional diversification element should address eliminating non-systemic risk associated with the sources of income included in the diversified portfolio. A mortgage loan portfolio, for instance, that is well diversified in terms of geography, design type, and construction materials utilized (all common diversification variables) is still subject to considerable diversifiable risk if all of the sources of income for all of the underlying borrowers are all highly economically cyclical and all derived from the auto industry.

## **SUMMARY**

The central observation and recommended of this paper is that the risk assessment tools commonly utilized by the mortgage loan industry are roughly analogous to those utilized by the corporate financial world, but tend to ignore an important source of risk. Cash flows used as inputs to measures of leverage and coverage tend to treat all employment income as equal, regardless of the underlying riskiness of the employer. Likewise, mortgage loan portfolios (which are subject to the same diversification strategies as those that apply to any investment portfolio) do not include employment income source risk as a diversification criterion. Failing to do so, they leave themselves open to a level of non-systemic risk that could be eliminated.

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## ENDNOTES

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- 1 A classification of borrowers with a tarnished or limited [credit history](#). Lenders will use a credit scoring system to determine which loans a borrower may qualify for. Subprime loans carry more credit

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risk, and as such, will carry higher interest rates as well. In 2008 approximately 25% of mortgage originations were classified as subprime.

- 2 A classification of mortgages where the risk profile falls between prime and subprime. The borrowers behind these mortgages will typically have clean credit histories, but the mortgage itself will generally have some issues that increase its risk profile. These issues include higher loan-to-value and debt-to-income ratios or inadequate documentation of the borrower's income.
- 3 Some may wonder that “deregulation” is not included in this list, but while deregulation is a favorite of the political and media class there is no good economic rationale for pointing to it as a cause either of nontraditional lending or the financial crisis itself. Likewise, the use of derivative credit default Swaps and mortgage-backed securities, while frequently pointed at by media and political critics, may have contributed to the unwinding of the mortgage market after the fact, but were not contributing causes to the proliferation of nontraditional lending practices themselves.
- 4 “Stripping” securities involves the disaggregation of payment streams and re-selling, swapping, or securitizing the separate payment streams into derivative contracts or securities. Principal and interest payments on a single contract for instance, may be “stripped” and bundled separately. The result is often to lose a clear relationship between the ownership of the stripped income stream and the any claim on the underlying asset serving as collateral.
- 5 As the Comptroller General’s guidelines observe, use of more sophisticated variable criteria require a substantive investment in the development of an extensive database. While such databases are plentiful in corporate finance, they are virtually nonexistent in the mortgage lending industry.