

The Functional Perspective of Financial Innovation and Real Estate

by

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Abstract: Two broad schools of thought dominate theories regarding financial innovation. One seeks to explain the process of security design in terms of relatively static organizations creating and promoting their wares and services competitively, generally in response to shifts in technology, taxes or regulation. The other approach stems from an understanding of the basic universal functions the financial system is called upon to deliver. I argue that the latter perspective is a more robust and adaptable framework for explaining the process of innovation. Furthermore, this functional perspective explains why cyclical shifts in certain sectors such as real estate stimulate the need for new and innovative financial products.

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Introduction

The study of financial innovation is hardly a new endeavor. Although much of the current literature is rooted in the development of security design during the 1980's and 1990's when seemingly countless new and arcane offerings were floated in the market, financial historians have been marking (and at times lamenting) the periodic surge in innovative products and services for decades. For instance, Graham and Dodd in their 1934 classic *Security Analysis* provide an appendix that lists no fewer than 258 different securities, many of which could easily be recognized in today's markets. The authors remark that any attempt to list every available security of the time would "extend the size of this volume beyond the reasonable limits."¹

But why does this myriad of products exist, and why do certain periods of history seem to be more conducive to innovation than others? These are fundamental questions that market observers have grappled with extensively. Consequently, there exists a number of competing theories and models used to explain the inherent functions and structure of an efficient economic system and the process of financial innovation. One broad school of thought emphasizes the network and activities of discrete *institutional* organizations (i.e. banks, insurance companies, exchange markets, etc.) as the central impetus behind the development of new products. This institutional perspective seeks to explain the process of innovation as a function of relatively static organizations creating and promoting their wares and services competitively, generally in response to shifts in technology, taxes or regulation. Most importantly with this viewpoint, product design is largely framed by managerial objectives of organizational survival and profitability, rather than some form of external motivation. But I argue that explanations of this nature are somewhat superficial, and is biased toward recent history since important steps in the

¹ B. Graham and D. Dodd, *Security Analysis*, Whittlesley House, New York, 1934, 1st ed.

evolution of security design can be traced back to times when many of the tax and regulatory issues of today were non-existent.

Robert Merton (1995) offers an alternative model to the institutional approach. Merton sees an ideal financial system as providing a finite set of important *functions*, such as the ability to aggregate and transfer economic resources and the ability to handle asymmetric information and agency conflicts. He feels these functions – each of which must be addressed in some fashion for the system to operate properly – have been relatively constant throughout history and across geographic boundaries. Similar to the previous perspective, institutional players act as financial intermediaries in providing these functions, and the technological, regulatory and tax framework is a costly “friction” to their activities. But Merton argues that the success – or even the very existence – of a particular institution is neither assured (nor likely) as certain functions become more crucial than others in the evolution of the financial system.

Ultimately, this thesis argues that Merton’s *functional* perspective is a more robust model with which to explain (and even predict) financial innovation than the counter example. Although institutional forces have been and will likely continue to be influential in shaping the economic system, the functional perspective provides a more “reliable and enduring frame of reference” upon which to study the evolution of security design.²

Merton’s argument begins with a relatively stable and finite set of easily recognizable functions that any efficient financial system should perform, with history providing a wealth of examples and trends to support his claim. Many scholars applying the functional perspective to advances in financial product design cite the advent of

² R. Merton, “A functional perspective of financial intermediation,” *Financial Management*, Summer 1995, p. 24.

securitization as one of the most illustrious examples of Merton's theory. Although home and commercial real estate-backed securities are often central to these academics' discussion of securitization, little has been written with respect to the fundamental role of the real property markets in the evolution of security design, particularly when viewed in relation to the gradual progression of secured financing toward greater market efficiency.

Tufano enhances Merton's ideas by proposing that "exogenous shocks and the life cycles of households, companies, industries and nations affect the mix of functions the financial system is called upon to deliver."³ Tufano sees changing factors such as taxes and regulatory hurdles as mere "institutional imperfections" that make operation of the financial system a costly endeavor. Furthermore, the cost/benefit structure of existing financial products and services is periodically upset by fundamental macroeconomic shifts, which opens the way for more innovation. Trends in real property clearly represent one of the most important cyclical macro-forces at work any financial system. Consequently, I will briefly examine the impact of secular trends in real estate (particularly cyclical downturns) as a motivating force behind financial innovation. This thesis will also examine two seemingly disparate capital-intensive sectors – the U.S. railroad industry and commercial real estate market – in relation to Tufano's ideas and Merton's concept of the "spiral of innovation," or the process by which one innovation lowers the cost of developing the next innovative product.

Do Institutions Matter?

The *functional* perspective of an efficient financial system as advanced by Robert Merton differs fundamentally from an *institutional* perspective. The functional frame of

³ P. Tufano, "Securities innovations: A historical and functional perspective," *Journal of Applied Corporate Finance*, Winter 1995, p. 91.

reference maintains that financial intermediaries serve to fulfill a finite but evolving set of economic functions often via innovative products and processes, whereas the latter perspective holds that innovation is the result of a relatively static institutional structure (i.e. banks, insurance companies, fund managers, etc.) working to perform their respective intermediary role more efficiently in response to changing market conditions, such as taxes and regulation.

Ross (1989) makes a compelling case in defense of the importance of institutions by emphasizing the “contractual framework” binding financial market participants in determining the “opacity” of a particular institution. He broadly defines this contractual framework as a “complex set of implicit and explicit contractual relations” that determine the duties and restrictions between market participants.⁴ These constraints prevent products in the market from strictly reflecting individual retail preference. Therefore, innovation is an institutional response to the challenges imposed by these constraints and varying degrees of opacity. As a new product is accepted by the market and becomes standardized and more reflective of retail preference, the costs associated with marketing that product decrease, and consequently, less-opaque higher volume market participants eventually rise as the lowest cost providers of this service.

Ross views the financial system in terms of institutional players with varying degrees of opacity, bound by contractual obligations. An institution’s opacity is largely determined by the extent its activities and products reflect the preferences and control of retail participants. The contractual framework constraining market participants prevents products and services from fully reflecting the retail preferences of individuals. Certain players in the system are virtually transparent (for instance, mutual funds) generally

⁴ S. Ross, “Presidential address: Institutional markets, financial marketing and financial innovation,” *Journal of Finance*, 1989, Volume 44, Issue 3, p.541.

acting as pass-through entities for their basic, well-defined fee-based services which are usually standard and commoditized. Little (if any) agency conflict exists with transparent institutions since control largely remains with the retail participant, both in terms of initial product choice and on-going monitoring/maintenance. Consequently, although transparency results in greater efficiency, it is generally not conducive to innovation.

Opaque institutions display the opposite of these qualities, according to Ross. Institutions with a high degree of opacity (i.e. insurance companies) are “clouded and veiled from the view of [other] participants.”⁵ Their wares and services are often non-standardized, highly-negotiated instruments subject to strict regulatory and tax constraints. For instance, insurance policies are generally tailored to the needs and risk of the policy holder, and the buyer has virtually no say (or even knowledge) of how premiums are re-invested. Although this informational disparity and resulting agency conflict is an obstacle to efficiency, it marks fertile ground for innovative financial products.

Ross views innovation as a process by which institutions overcome challenges arising from varying degrees of opacity. As the cost to market a particular product drops due to acceptance and standardization, the product migrates from the more to less opaque participant, and consequently, from less to greater retail market control. Most importantly for our discussion, Ross asserts that the proper role of an institution in the financial marketplace is a function of its level of opacity (which is largely determined by the extent to which its products and services reflect retail preference, which in turn is determined by the firm’s position in the contractual framework.) For instance, the contractual obligations that essentially set the level of opacity of investment banks make that institutional class the most appropriate entity for developing and marketing new

⁵ S. Ross, p.542.

corporate investment products, which are eventually standardized and work their way to retail market efficiency.

These ideas raise a number of unanswered questions, however. Ross sees opacity stemming from agency relationships between institutions, not the inherent sectors or markets in which they operate. One can argue that many institutions would be no more or less opaque (and reflective of retail preference) regardless of the level of regulation or the way they contractually structure their activities. Opacity, viewed in terms of informational disparities and agency issues, may arise from the very nature of the sector in which the institution operates, such as housing finance or international trade. Furthermore, Ross' argument implies uniform opacity (i.e. that virtually all the activities of a particular institutional class are under the same umbrella of opacity.) This runs contrary to intuition however; opacity is certainly different depending upon one's viewpoint, either geographically or in terms of the sequential steps in which a particular product or service is provided. Institutions are often involved in a wide-range of activities with varying degrees of retail choice and control. Informational differences and agency conflicts are heavily influenced by the participant's geographic or sectoral point of view. Furthermore, it is difficult to determine at what point in the procedural life of a product or service that it stops reflecting the preferences of individuals and starts mirroring conditions and standards of the market. Ross identifies a particular class of institution (investment banks) as the most-logical sponsor of innovative financial products, but fails to identify why a certain period in history or sector (notably real estate) seem to be more conducive to innovation than others. Ultimately Ross' argument provides a cogent framework for conceptualizing the interaction between institutional and retail forces, but does little to address our question of what role real estate plays in fostering financial innovation, or even why the financial system exists at all.

Admittedly, it is difficult to counter Ross' notion that institutional forces have had a tremendous impact on the global financial system. He feels that financial markets are largely "institutional markets," whereby institutions are not the *sole* players, but are certainly the most *dominant*, and therefore the primary source of innovation. Ultimately, few (if any) scholarly reviews of the financial system omit an important role for institutions.

But Merton's viewpoint provides a more comprehensive and fundamental model of the system's structure and processes, beginning with his initial suggestions that 1) financial functions are generally more constant than institutions (i.e. the basic roles of financial intermediaries change less over time and geographic boundaries than the institutions themselves) and 2) the institutional structure is largely shaped by competitive forces to perform each participant's respective function(s) more efficiently, and does not ensure either the permanence nor success of any participant (i.e. the dominance of one particular type of institution is generally dependent upon its ability to fulfill a particular function efficiently and profitably relative to its peers.) Merton argues that even though institutional forces throughout history are considerable, a fundamental understanding of any financial system must begin with the function(s) a given product or institution serves, particularly in its ability to "facilitate the allocation and deployment of economic resources, both spatially and temporally, in an uncertain environment."⁶

Merton's Six Functions

Merton identifies six core functions performed by a financial system. These functions are:

1) a method for *clearing and settling* payment,

⁶ R. Merton, p. 23.

- 2) a means by which interests are *pooled* for large-scale investment,
- 3) a way to *transfer economic resources* through time and across geographic regions and industries,
- 4) a means of *managing risk*,
- 5) a provider of *price information* to help coordinate decentralized decision-making in various sectors of the economy,
- 6) a process of managing *asymmetric information* and *agency issues* between capital providers and those in need of capital.

Merton argues that these basic functions have largely remained constant in all economies, irrespective of time or geographic boundary. Although these functions are relatively stable, the means and methods by which they are handled and the entities best suited to serve these functions evolve in response to technological advances, regulatory and tax changes, and other shifting conditions – all of which change the priority of demands placed upon the system by society. In response to evolving macroeconomic factors and consumption patterns, certain functions may play a greater role than others during a given period in history, location or sector.

The demands and qualities of real estate investment address a number of Merton's basic functions, particularly with respect to the pooling of interests, the transfer of economic resources, and risk management. Furthermore, although the introduction of various retail mortgage products, residential and commercial mortgage-backed securities, collateralized mortgage obligations, home equity loans, and the myriad of other forms of first and second lien real property debt and real estate-backed preferred and common equity are routinely cited by scholars using the functional perspective to broadly analyze financial market evolution, little has been said with respect to the fundamental role of real estate in spurring financial innovation.

The Pooling of Interests

Pooling is the means by which the economic interests of various parties are combined to fund a specific indivisible project or efficient-scale enterprise. Without pooling, a firm could undertake a capital decision no greater than what could be funded via its existing internal resources, thereby severely constraining business scale and efficiency. Furthermore, diversification among various capital projects would be difficult without tremendous internal sources of capital, or could only be accomplished via an array of smaller, potentially less-efficient or unprofitable projects. Pooling permits the partial purchase or sale of an asset, thereby freeing resources to meet other cash requirements. Without pooling, capital decisions are generally an “all-or-nothing” proposition.

With respect to real estate, the inability to pool resources would render homeownership virtually impossible for all but the wealthiest of individuals, as was the case before the advent of building and loan institutions, and then the Federally-chartered home credit agencies, which eventually lead to the modern mortgage securitization market. The aggregation of financial resources to help facilitate homeownership is pooling at its most basic. This is accomplished via multiple bilateral contracts between households (both depositors and borrowers) and a financial intermediary. Furthermore, the social benefits of pooling with respect to real estate in the form of reduced borrowing costs and greater liquidity are well documented.⁷ This is particularly true in the United States, which arguably has the most advanced and efficient mortgage market in the world, and consequently one of the highest rates of private homeownership as well.

⁷ See Sirmans and Benjamin (1990), Hendershott and Shilling (1989) and Jameson, Dewan and Sirmans (1990).

Merton cites the creation of a national mortgage market as *the* prime example of the social benefits of financial innovation with respect to pooling.⁸

Similarly, Sirri and Tufano mention the advent of mortgage backed securities (MBS) as one of the most fundamental examples of multilateral pooling, particularly due to the homogeneity and relatively low individual servicing and monitoring needs of the collateral.⁹ Indeed, much of the real estate market (both commercial and residential) is readily defined by a relatively finite set of statistical measures, such as vacancy levels, lease terms and rates, location and basic physical characteristics. Consequently, disparate investors who may have minimal detailed knowledge of a particular market or borrower can adequately assess the risk of the overall investment vehicle with confidence. (Note: although these qualities are inherent to real estate, the descriptive data was not always available [nor trusted] by potential investors as we will see in the next chapter.) Naturally, some on-going servicing and monitoring still exists by the very nature of mortgage securitization. Consequently, agency conflicts are a possibility since the servicer, who may have limited financial interest in the venture, generally seeks to strictly limit its direct costs in servicing the pool. Fortunately, performing mortgage collateral generally requires little in the way of on-going servicing and maintenance, thereby minimizing the agency conflict. Furthermore, third-party guarantees (either from the government or private insurers) further minimizes investors' concerns regarding on-going servicing.

Advances in mortgage securitization, particularly in the form of over-collateralization and credit enhancement (i.e. subordination and third-party guarantees) are often as a result of innovative solutions to agency and monitoring issues.

⁸ R. Merton, "Financial innovation and economic performance," *The Journal of Applied Corporate Finance*, Volume 4, Issue 4, p. 14.

⁹ E. Sirri and P. Tufano, et. al. *The global financial system: A functional perspective*, Harvard Business School Press, Cambridge, MA, 1995, p.116.

Furthermore, these financially-engineered solutions have migrated to other cutting-edge sectors of security design as well. Sirri and Tufano site the need for on-going monitoring and lack of homogeneity as the primary limiting factors in the securitization of commercial and industrial loans.¹⁰ Indeed, when their piece was published in 1995, the credit derivatives market was still relatively young. But since then, the growth of collateralized loan and debt obligations (CLOs/CDOs) has been remarkable, due in no small part to the gradual standardization of commercial loan documents, the adoption of over-collateralization, creating various priority-pay classes of securities, and the use of compensatory structures and incentives for investment managers that minimize agency conflicts – all structuring tools first perfected in the commercial and residential securitization markets. While not nearly as consistent as the home loan market, commercial loan terms have become more standard due to the maturation of the syndicated loan market and lender consolidation. The subordination and pay-down structure of CLO/CDO tranches is a practice that was lifted directly from the collateralized mortgage obligation (CMO) market. Furthermore, just as it has become commonplace for servicers to hold an interest in the most junior classes of mortgage securitizations, thereby aligning their interests with that of the more senior investors (who presumably have less capacity and desire to monitor the collateral) so do CDO/CLO managers routinely hold unsecuritized portions of the underlying collateral. Incentives for investment managers to actively monitor CLO/CDO collateral, such as tying their compensation to recovery rates, are comparable to compensatory agreements for special servicers in the mortgage market.

Pooling has become such a pervasive force in modern finance that the economic system could hardly operate without it. With its heavy capital requirements, relatively

¹⁰ E. Sirri and P. Tufano, p.117.

homogenous character and steady cash flows, no market is more dependent on pooling (and possibly influential to its existence) than real estate.

The Transfer of Economic Resources and Asymmetric Information

Another of Merton's basic functions of a financial system is its ability to facilitate the transfer of economic resources across time, geographic boundaries and industries. This function raises many key issues with respect to real property, particularly since real estate is generally long-lasting asset, the qualities of which vary by individual and industrial preference, and can rarely be accomplished with just local resources.

Although the homogeneity and predictability of cash flow associated real estate lend themselves perfectly to interregional investment (ultimately through securitization) these qualities were not always apparent to investors. The early mortgage market (and for that matter, virtually all early attempts at inter-spatial, -temporal or -industrial transfer of economic resources) was severely limited by the disparity of available information between lenders and the counterparty, be it the borrower, local agent, solicitor or mortgage broker.

Baskin traces many of the products used to overcome agency issues (brought on by asymmetric information) to developments in interregional residential and commercial mortgage finance. Per Baskin, many of the advances in railroad-related security interest and liens were initially established in U.S. real estate finance, and earlier still in real property law in Great Britain.

Tradition as well as restrictions in certain regions against out-of-state lending made long-distance mortgage investment virtually non-existent prior to 1900. There were a few short-lived attempts to facilitate interregional lending, notably the emergence of "national building associations" in the mid-1800's. These lenders paid third-party solicitors to

establish lending branches, often hundreds of miles away, to originate and monitor home loans to the outside investors' specifications. This was comparable to the emergence of "lending agents" around the same time. These agents (often bankers, lawyers or builders who knew the local market) would sell their expertise and knowledge of the area to outside lenders wishing to invest. Agency problems notwithstanding (i.e. compensation to agents or solicitors was often dependent upon the amount of loans originated) these functions never gained widespread acceptance, and when land prices collapsed toward the end of the 19th century, so did the fragile infrastructure for long-distance mortgage lending. Of the 240 national building associations founded in the 1800's, only six remained by the early 1900's, all of which restricted their activities to their local markets.¹¹

Interregional lending was revived in large part to the formation of the Federal Housing Authority (FHA) in 1934, and later the Federal National Mortgage Association (FNMA, or "Fannie Mae") in 1938. To help solve the housing shortage as a result of the Depression, Fannie Mae was mandated to provide liquidity to the mortgage market by purchasing FHA and Veterans Administration (VA) loans from lenders. Eventually a Fannie Mae spin-off, the Government National Mortgage Association (GNMA, or "Ginnie Mae") issued the first mortgage-backed pass-through securities in 1970. FNMA, which largely financed its activities with debentures to that point, did not follow suit until 1981. Ultimately, Crane (1995) cites the development of the U.S. mortgage securitization market as one of the single most important developments in the transfer of economic resources spatially.

Baskin (1988) argues that asymmetric information has had greater impact on financial innovation and capital structure decisions than any other historical market factor.

¹¹ D. Crane, et. al. *The global financial system: A functional perspective*, Harvard Business School Press, Cambridge, MA, 1995, p.137.

Modern corporate finance theory tells us that capital structure decisions should balance the tax benefits of leverage versus bankruptcy costs.¹² However, Baskin shows that the use of leverage (and corresponding market in new and innovative debt structures) was widespread prior to the advent of a corporate tax code in the United States in 1909 and 1947 in Great Britain.

Baskin concludes that corporate tax rates have had little affect on the evolution of debt products during much of the 20th century, and that the disparity of information between investors and those in need of capital (particularly railroad entrepreneurs) had far greater impact on the evolution of corporate debt products than the tax code. With their predictable cash flow and progress toward standardization, debt instruments (more so than equity issues) were pivotal in the evolution of capital market innovation in most modern economies. Investors hungry to put their dollars to work but severely lacking in local expertise to make informed investment decisions abroad, and burned by rampant fraudulent equity offerings (such as the collapse of the South Sea Company in 1720) ultimately sought to reduce perceived risk via mortgage bonds and direct loans secured by a first lien on the venture's assets. Structures and language that were initially perfected in U.S. real estate loan documents (the roots of which are in English real property law) were modified and adopted to railroad mortgages to help stimulate interregional investment.

Franks and Sussman (1999) describe how different insolvency “regimes” evolved in Great Britain and the United States during this period, which ultimately had a tremendous impact on the particular strength and scope of first priority liens within each of those countries. They argue that these fundamentally different insolvency “regimes” greatly

¹² See F. Modigliani and M. Miller, “Corporate income taxes and the cost of capital: A correction,” *American Economic Review*, Volume 53, June 1963, p.433-42.

affected the process of financial innovation within those two countries. In particular, the English standard served to limit the social and economic benefits of innovation since the strict bankruptcy powers granted to the senior secured creditor made that class virtually the only position in the capital structure acceptable to potential outside investors. The development of innovative debt instruments in the United States spurred by informational asymmetries was effectively squelched in Great Britain because of the strict insolvency conditions in that country. In its defense, the English contracting standard resulted in little ambiguity among investors of that region, and consequently had the socially beneficial effect of judicial and legislative efficiency. Furthermore (as we will see later in this paper) the evolution of bankruptcy receivership in the U.S. with respect to defunct railroads in the late-1800's illustrates the potential consequences of judicial (re)interpretation of financial contracts for the benefit of unfettered securities innovation. In particular, U.S. bankruptcy courts have been influenced by political and/or regulatory concerns (either real or imaginary) in the defunct enterprise, and subsequently have not always acted in the best interest of creditors.

Risk Management

Individuals and firms depend immensely on the financial system to manage various forms of risk often via innovative financial products. Progress in securities design has allowed investors to more precisely isolate the risk and return components of a financial transaction. An innovative financial product helps to “complete” the market by connecting a particular investment and return outcome with a specific set of contingencies. Market participants are therefore left with the logical choice of accepting only those risks they are most capable and willing to bear, and allocating the rest to another party who presumably is more appropriate to bear those isolated risks.

The ability of a properly functioning financial system to allow for the management of risk has real economic benefits. Mason (1995) uses simple neoclassical economic theory to illustrate this point. He states that individuals, who derive utility from the consumption of goods and services after an initial capital investment to produce those goods and services, are *the* fundamental real economic unit. Individuals are locked in a cycle of economic investment and consumption, and presumably would prefer to maximize their utility through greater lifetime consumption. However, the investment and consumption cycle is veiled in uncertainty (i.e. there is no guaranteed outcome to the capital allocation decision.) Individuals therefore prefer to maximize overall consumption while minimizing the risk associated with investment.

Mason points out that individuals are the ultimate owners of all economic resources, and therefore are the ultimate bearers of all risk. When an individual manages his/her risk profile, it is assumed some personal risk is acceptable. But depending upon the qualities and characteristics of the individual, not *every* form of risk is appropriate for *every* individual. A financial system must facilitate the allocation of risk among participants per their individual capacity to bear certain risks and not others. Furthermore, securities and markets must be “complete” in order to operate properly. That is, there must be a product available for every contingent possibility of risk for the financial system to run efficiently. Where situations arise in which risk is allocated arbitrarily, innovative products help to complete the market by refining and reallocating that risk to the most willing and able market participant.

Managing the risk/return profile of real estate investment has been fertile ground for innovative financial products. In plotting the historical evolution of securities design, Finnerty (1992) shows that the process of reallocating the various risk components of real estate (particularly with respect to credit risk and other perils associated with the

concentration of capital, and various cash flow risks, such as interest rate, prepayment and extension risk) has been a motivating force in securities design for decades. In particular, commercial and residential mortgage-backed securities and collateralized mortgage obligations have played an integral role in how market participants conceptualize the bundling and distribution of risk. These market-driven, efficient means of allocating capital resources and distributing risk have arguably provided greater stability and managed growth to the real property markets, and therefore enhanced overall economic welfare at a fundamental level.

Advances in security design have allowed society to better manage the risks associated with real property investment – capital decisions we might not otherwise make in the absence of risk sharing and management. Ultimately, the myriad of innovative financial products related to real estate serve dual crucial roles: 1) they allow individuals to fashion preferred contingent patterns of consumption of a fundamental social product (i.e. space) and 2) they facilitate the allocation of the many risks associated with the production and maintenance of that product to those individuals most willing and able to bear the risk.

Merton’s “Spiral of Innovation”

As described earlier in this paper, the financial system consists of intermediaries and markets in competition to fulfill Merton’s six fundamental functions as efficiently and profitably as possible. However, there seems to exist a process by which the costs associated with innovation are reduced as products migrate from relatively opaque institutions (i.e. banks, insurance companies) to market-driven forces. Indeed, in his seminal paper on the functional perspective, Merton notes that Finnerty’s review (1988 and 1992) of financial engineering “suggests a pattern in which products offered initially

by intermediaries ultimately move to markets.”¹³ The recent and continued growth in efficient, low-cost capital markets products would suggest the role of institutions is diminishing, and studies exist supporting this claim.¹⁴ However, as Ross notes above, empirical evidence shows that markets largely remain “institutional markets” whereby relatively opaque intermediaries (or institutions) are not the sole participants in the market, but are certainly the most active. Furthermore, Merton also sees an integral on-going role for institutions in the evolution of securities design, particularly where the products are relatively new, low-volume and non-standardized.

The process by which new products are introduced, eventually accepted, standardized, and adopted by higher volume markets is well documented. However, Merton rejects the notion that the role of intermediaries in financial innovation is disappearing. Instead, he describes a dynamic, interactive process in which product design oscillates between institutional inception and market standardization in an on-going effort to provide the basic functions of the financial system more efficiently. During periods of strong innovation, a large number of new products are introduced by many relatively opaque institutions. These intermediary institutions full-well expect most of their successful products to eventually be copied and standardized, issued in greater numbers, and ultimately move to capital market efficiency. This is comparable to the way private equity funds expect (even hope for) successful ventures to eventually migrate toward lower-cost, more-plentiful sources of market-driven capital.

Ultimately, Merton recognizes that institutions and markets are closely intertwined in the process of “completing the market” and moving the financial system toward greater

¹³ R. Merton, p.26.

¹⁴ See M.C. Keely, “Deposit insurance, risk, and market power in banking,” *American Economic Review*, December 1990, p.1183-1200, and G. Gorton and G. Pennachi, “Money market funds and finance companies: Are they the banks of the future?” in M. Klausner and L. White, Eds., *Structural Change in Banking*, Irwin, Homewood, IL, 1992.

efficiency. Financial intermediaries serve an important role in recognizing that a particular function of the financial system is underserved, and subsequently “creating and testing new products as a part of the general financial innovation process” to capitalize upon these inefficiencies.¹⁵ By following the evolution of a given function rather than the time path of a particular product, Merton devises a “spiral of innovation” whereby the financial system is pushed toward greater efficiency via an array of products originally devised by relatively opaque institutions that address the functional needs of the system. As a new offering increasingly reflects the standards and conditions of trading markets, intermediaries are consequently free to devise new products and trading strategies in response to the changing demands society places upon the system, which in turn leads to more volume, increased trading profits, and greater incentive to create new products and markets, and so on. Ultimately, the markets represent the most immediate barometer of financial system stability and efficiency, but it is the intermediaries that are best-suited to respond to these signals via the creation of new financial products.

Under this model, the symbiotic relationship between financial institutions and markets is revealed by the particular function(s) a series of products serve rather than the time path of a particular product. Intermediaries must adapt to shifts in the functional requirements of the financial system by investing in the design and marketing of new products. Only those institutions that are rigidly attached to a particular product will suffer (and potentially demise) as a result of the migration of products toward market efficiency.

The Role of Systemic Shocks and Economic Volatility

¹⁵ R. Merton, p.26.

Tufano (1995) enhances Merton's "spiral of innovation" by suggesting that macroeconomic factors and exogenous shocks to the financial system help spur the process of innovation. These structural shifts do not alter the fundamental quality of Merton's six functions. As mentioned before, the basic functions a financial system must provide remain relatively constant in all economies throughout history. Instead, macroeconomic and industrial cycles help determine which functions are of greatest importance to a particular economy at a given moment in time, and upset the cost/benefit relationship of existing products and markets. This ultimately motivates intermediaries to create and market new products, and the spiral of innovation begins again. For instance, during periods of considerable instability (either in a particular sector or the overall economy), the risk management role of the financial system and its ability to handle asymmetric information and agency conflicts may be the most crucial functions it serves. During periods of relative calm, managing growth through the efficient pooling and transfer of economic resources may rise to the forefront.

In either case, each of Merton's six functions need to be addressed in some manner if an economy is to be properly served by its financial system. But Tufano points out that one or more functions may play a greater role during a given period depending upon macroeconomic factors, industrial cycles, or fundamental shifts in consumption patterns. Tax and regulatory changes (which upon first glance seem to be the motivating factor behind many periods of financial innovation) are often merely reflective of underlying cyclical changes in the economy or a particular sector. Tufano argues that taxes and regulatory constraints are usually developed in response to shifts in fundamental conditions, not the other way around. Taxes and regulation can play a major role in defining the cost/benefit relationship of a given financial product during periods of relative economic calm. But exogenous shocks and macroeconomic volatility

alter the demands individuals place on the financial system, which in turn upsets the cost/benefit relationship of many markets and products. This renders the existing institutional framework obsolete and clears the path for new products and services.

Parallels Between Defunct Railroads and the Savings and Loan Crisis

Tufano and Merton's models are readily applicable to the boom and bust cycle of the railroad industry in the United States. During the early stages of the industry, railroads were almost entirely financed via locally-raised equity subscriptions. Once internal and local equity sources of capital were exhausted, railroad entrepreneurs turned almost exclusively to first mortgage bonds to finance their operations rather than tap additional equity capital from distant sources. Per Baskin earlier in this paper, the decision to issue mortgage debt was almost certainly a function of the informational disparity between management and potential investors at the time since there was no discernable tax advantage associated with this choice. Early railroad mortgages in the United States were often used for westward expansion (where the prospects of success were nebulous at best) and secured by existing tracks and equipment in New England, New York and Pennsylvania. Railways and related equipment were considered excellent collateral since the continued use and resale value of the assets would likely be significant in the event of default.

Although a tremendous amount of U.S. railroad mortgage debt was issued in the 1800's, few of the actual bond structures could be considered "innovative." As mentioned earlier, the language perfecting first priority mortgage liens on railroad assets was initially drafted in standard real estate loan documents. If anything, advances in U.S. railroad bonds in the early to mid-1800's owe more to developments in railroad finance in Great Britain than to home-grown innovation. Public securities markets in England were first

started in order to trade government issues (particularly war debt). The first railroads in Great Britain were largely viewed as public works, and indeed, the Bank of England played a major in supporting early railway ventures in that country. Thus, railroad mortgage bonds in England were often viewed as quasi-municipal securities, and eventually traded along side straight government debt on the early bond exchanges.

This paradigm carried over to the debt markets in the United States. State and local governments were key subscribers of early railroad initiatives, and the Federal government provided much of the initial capital for the Union Pacific railroad. However, the scale of U.S. railroad debt dwarfed that of England. Great Britain enjoyed relative peace beginning with the downfall of Napoleon to the First World War, and consequently that country's war debt was reduced to nil by the early 1900's. The United States government was left with a \$2.0 billion deficit following the Civil War, although that sum was completely repaid within a few decades. The U.S. railroad industry, on the other hand, had issued \$4.8 billion in outstanding securities (mostly mortgage bonds) by 1878. By 1893, that figure had swelled to \$9.9 billion.¹⁶ Ultimately, bond structures initially perfected in real estate finance and the aura of legitimacy provided by government investment cleared the way for the widespread acceptance of railroad securities by the investing public in the United States.

Railroads did not mark fertile ground for what can be considered truly innovative financial contracts until the failure of much of the industry in the late 1800's. As Tufano predicts, it took a secular shift (or collapse) in market conditions to bring about this change. Railroads at the time faced exceptionally high fixed costs and immense competition due to low barriers to entry and subsequent overbuilding. Relatively opaque

¹⁶ J.B. Baskin, "The development of corporate financial markets in Britain and the United States, 1600-1914," *Business History Review*, Volume 62, p.208.

public and private entities (bankruptcy courts and investment bankers, respectively) devised creative responses to the ills plaguing the railroad sector via innovative security contracts and governance structures. In particular, the creation of receiver certificates and the establishment of the bankruptcy receivership process set the stage for a large-scale restructuring of the railroad industry, and ultimately, further innovation.

Receiver certificates are comparable to modern debtor-in-possession (DIP) financing. They represent a form of super-senior debt secured by the entire assets of the defunct company, including those assets already pledged as security to other debt holders. The company could use the capital infusion to continue operations during restructuring or liquidation. As is the case with DIP loans today, many of the largest and most-senior railroad creditors also purchased receiver certificates despite the unpaid balance on prior obligations because 1) the likelihood of repayment on the certificates (which carried an above market interest rate) was very high, and 2) those in a super-senior position of the capital structure were considered to be in a more advantageous position during restructuring. In fact, with respect to the second point, many of the investment bankers (particularly J.P. Morgan) who were called upon to create and market railroad receiver certificates eventually held significant balances of the certificates, and used this position to guide the restructuring in their favor.

The ideas of Franks and Sussman described earlier regarding the U.S. insolvency regime provide greater insight on the implications of receiver certificates. In their desire to rescue what they perceived to be a public good, bankruptcy courts dramatically redefined existing financial contracts by allowing the super-senior form of financing. Ultimately, it is unclear to what extent the courts were acting in the nation's best interest, or were simply manipulated by bankers who stood to gain from restructuring the industry.

Furthermore, courts and certificate holders used their position not only to redefine and/or nullify prior financial contracts, but also to coerce additional capital from creditors. In order to save the company, additional cash (above and beyond what was provided by the receiver certificates) was needed to fund on-going operations and restructure existing debt. The bankruptcy court (on the advice of the creditor committee, which was largely controlled by certificate holders) determined the “upset value” as well as the terms of exchange for new securities to recapitalize the defunct railroad. If a creditor did not wish to exchange its existing position into new securities, then the claimant received the upset value (usually just pennies on the dollar). If the creditor instead chose to comply with the recapitalization, the terms of the exchange usually required the creditor to provide an “assessment” (i.e. cash) in addition to handing over the non-performing securities. Depending upon the original type of security held, creditors who accepted the exchange offer usually received some form of longer-dated, lower-coupon debt as compensation, often with warrants or convertible to common stock.

Other structures used in exchanges were income bonds, an innovation of the time where interest was contingent upon the operating results of the company, and cumulative preferred stock, which was in use before the late 1800’s but gained greater acceptance following the restructuring of the railroads. Put and call structures, springing liens, prepayment penalties, and subordination were also not uncommon. Although these structural twists were not necessarily innovative, the various combinations and frequency of use in exchange offers were unprecedented prior to this period. Ultimately, upset values were often set so low as to make compliance with the exchange offer the only reasonable choice for a claimant. All of these events – spurred by a collapse in the industry and encouraged by the existing insolvency regime – marked an evolutionary

leap for financial innovation, but at what cost? This period marked a radical reinterpretation of the strength of existing financial contracts and cast doubt on the independence of bankruptcy courts, all for the sake of unimpeded securities innovation and an industry with a questionable future.

Turning our attention to a more recent example, Tufano and Merton's ideas can be applied to the savings and loan crisis of the late 1980's. Once again, this period of financial innovation was sparked by an extraordinary collapse in a particular sector (this time, real estate) and required considerable intervention by outside regulators and intermediaries to creatively handle the crisis. Although the product used to handle this crisis (commercial mortgage-backed securities, or CMBS) existed prior to this period, the large scale use of that product was unprecedented. But key differences exist between this example and the previous case with the railroad sector. The government organization (in conjunction with the structuring and distribution expertise of investment banks) that intervened in the thrift bailout was not beholden to relatively opaque and self-serving credit committees and bankruptcy courts, unlike the previous example. Instead, the savings and loan bailout was ultimately a function of relatively transparent market-driven forces and signaled the maturation of the commercial mortgage securitization market – an evolutionary leap along Merton's spiral of innovation.

During the 1980's, tax shelter syndicates and thrifts were the dominant suppliers of capital to the commercial real estate industry. Syndicates of investors attracted by the tax benefits of real estate provided a tremendous amount of capital to commercial development projects during this period, often irrespective of the cash-flow projections of the particular project. Savings and loans were aggressive commercial real estate lenders following deregulation of that industry in 1980 with the Depository Institutions

Deregulation and Monetary Control Act. That act allowed thrifts, among other things, to service commercial mortgages in addition to their traditional residential portfolios.

The Tax Reform Act of 1986 eliminated many of the tax benefits associated with real estate, and syndicate financing subsequently withdrew as a major source of funds. Furthermore, chronic overbuilding eventually led to depressed real estate values, and thrifts, banks and insurance companies all suffered considerable losses in their commercial mortgage portfolios. This led to a dramatic pull-back in real estate lending which created a liquidity crisis in the sector, exacerbating the situation only further. By the early 1990's, Congress had stepped-in with the creation of the Resolution Trust Company (RTC) to facilitate the bailout of the ailing savings and loan industry. RTC's mandate was to liquidate assets (largely non-performing real estate loans) acquired from insolvent thrifts as quickly and efficiently as possible. To do this, RTC turned to the then-unproven CMBS market.

Although CMBS existed before these events (Finnerty traces commercial mortgage-backed bonds back to early 1984) the heavy volume of loans securitized by the RTC signaled the arrival of this asset class as an accepted capital market product.¹⁷ Many CMBS market conventions and structural standards such as subordination, overcollateralization, cash reserve accounts and the role of special and master servicers were established during the RTC years. Furthermore, many insurance companies, pension funds and commercial banks witnessed the success of RTC's foray into CMBS, and quickly followed suit as a means of restructuring their balance sheets. In all, RTC was extremely efficient in its mission, and by 1996 had divested itself completely. Some

¹⁷ J.D. Finnerty, "An overview of corporate securities innovation," *Journal of Applied Corporate Finance*, Volume 4, Issue 4, p.29.

argue that the only way for the RTC to have been more successful would have been to outright demolish many seized properties in the most-severely overbuilt markets.

This example evokes similarities with the previous case of the railroad industry, but with crucial differences. Once again, excess capacity led to a cyclical downturn in a particular sector resulting in a period of unprecedented financial innovation, as Tufano predicts. With the collapse in real estate values, the specific functions the financial system is called upon to deliver did not necessarily change, but rather were reprioritized to reflect the special needs of the time. For instance, the risk management role of the financial system is clearly a function that was underserved during the 1980's when capital flowed steadily to projects with no substantive economic basis from lenders incapable (or unwilling) to accurately measure and bear such risks.

Instead of relatively opaque institutions (bankruptcy courts and investment bankers whose motives were questionable in the case of the railroad industry) forming a highly-subjective solution to the problem, the RTC turned to a relatively new capital market product. Not only did this development mark the maturation of the asset class, but one can argue that the CMBS market could only have experienced that type of rapid growth via some measure of forced supply motivated by regulatory intervention. In contrast to the aura of legitimacy enjoyed by a particular *industry* (i.e. the railroads) which contributed to a false sense of security for their investors, the government endorsed a particular *market* via the RTC, the result of which was a period of considerable innovation and market growth. Ultimately, these events played an integral role in forming the modern definition of risk sharing and management by reallocating real property risk to those most willing and capable of bearing it.

The evolutionary future of the CMBS market is debatable, particularly with respect to the role of intermediaries. Merton's spiral of innovation tells us that institutions should

have an on-going role in the commercial mortgage securitization process if they can adapt to shifting market conditions with new and innovative products. However, the strength and immediacy of market forces on this asset class have made excess trading profits and market incompleteness arguably nil. Non-recourse commercial mortgages (the mainstay of many real estate lenders) represent one issue associated with the savings and loan crisis that was not entirely resolved during the RTC years. These products pose an ethical dilemma by which lenders are encouraged to swell loan portfolios, often irrespective of market conditions, whereby they ostensibly become “too big to fail.” This strategy shifts property risk from lenders and depositors to the federal government, and ultimately U.S. taxpayers (who absorbed most of the losses during the collapse of the late 1980’s). Bank and thrift capital reserve requirements attempt to mitigate this issue, but perhaps this quandary is better addressed via security design in the form of mortgage products that required some measure of culpability by the borrower. This may signal the next cyclical wave of innovation and activity by intermediaries. On the other hand, Tufano might suggest their best hope is to wait for another secular collapse before committing considerable resources to this market again.

Closing Remarks

Although there exists a number of competing viewpoints regarding the evolution of securities design, most of the theories stem from discussions of either the existing institutional framework or the particular functions new products and markets serve. Nevertheless, the debate as to which school of thought most accurately and convincingly explains the process of financial innovation is unlikely to subside anytime soon. These are fundamental questions that affect the way market participants view their inherent

purpose and goals. In many respects, this discussion represents the financial system at its most introspective.

I have attempted to show that Merton's functional perspective provides a more robust and adaptable framework with which to explain security design and the financial system in general. Ross makes a compelling argument in favor of the importance of institutions, and Merton certainly sees a crucial on-going role for organizations such as banks, insurance companies, and regulatory bodies in the process of innovation. But any attempt to adequately explain the structure and purpose of the financial system in terms of relatively static organizations acting in their own self-interest to circumvent or manipulate constraints imposed by the regulatory and contractual framework is superficial at best.

Ultimately, the institutional perspective is temporally biased and fails to explain why a sector such as real estate lends itself so readily to new and innovative products. Some of the greatest periods of innovation are clearly motivated by macroeconomic change or industrial cycles. Regardless of whether they are cognizant of it, institutions have made the strongest case for their continued survival and profitability by accurately recognizing these fundamental shifts and responding with new products and services that address certain basic economic functions the financial system is called upon to deliver.

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