IMPACT AND ROLE OF TECHNOLOGY IN MODERN FINANCIAL INNOVATION AND INVENTION

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Abstract

A financial innovation, like many other modern innovations and inventions, is a boon when properly used and is a bad thing when abused. The key here, of course, is being able to locate which uses are abusive and which are benign. However, it is very difficult to identify in advance which innovations are abusive and which are not. Instead the debate should be on how an innovation is being used rather than any particular innovation. "Innovate" is defined in Webster's Collegiate Dictionary as "to introduce as or as if new," with the root of the word deriving from the Latin word "novus" or new. Broadly speaking, financial innovation is an act of creating and then popularizing new financial instruments as well as financial technologies, markets and institutions. Generally, a link is established as to how financial innovations are optimal responses to various basic problems or opportunities. Further, the different functions performed by the financial innovations are listed down, like completion of inherently incomplete markets, minimization of transaction cost and complying by tax regulations.
Key Words: *financial innovation, abuse, boon, transaction cost.*

Introduction

History shows that financial innovation has been a critical and persistent part of the economic landscape over the past few centuries. In the years since Miller's 1986 piece, financial markets have continued to produce a multitude of new products, including many new forms of derivatives, alternative risk transfer products, exchange traded funds, and variants of tax-deductible equity. A longer view suggests that financial innovation—like innovation elsewhere in business—is an ongoing process whereby private parties experiment to try to differentiate their products and services, responding to both sudden and gradual changes in the economy.

Surely, innovation ebbs and flows with some periods exhibiting bursts of activity and others witnessing a slackening or even backlash. The first section defines financial innovation and discusses the difficulty of creating taxonomy of financial innovations. The second section discusses the explanations advanced for financial innovation. The third section discusses the identity of innovators. The fourth section discusses the implications of financial innovation on private and social wealth.

What Is Financial Innovation?

Most of the theoretical and empirical work in financial economics considers a highly stylized world in which there are few types of securities (perhaps debt and equity) and a handful of financial institutions (banks or exchanges). But in reality there is vast range of different financial products many different types of financial institutions and a variety of processes that these institutions employ to do business. Here, the review makes an attempt to catalog some of this variety and the reasons for their existence along with private and social implications of this activity. "Innovate" is defined in Webster's Collegiate Dictionary as "to introduce as or as if new," with the root of the word deriving from the Latin word "novus" or new. Innovation includes the acts of invention (the ongoing research and development function) and adoption of new products, services or ideas. Invention is probably an overly generous term, in that most innovations are evolutionary adaptations of prior products. The innovations are sometimes divided into product or process innovation, with product innovations exemplified as new derivative contracts, new corporate securities or new pooled funds etc. and process improvements shown as new means of distributing securities or pricing transactions. But in practice this differentiation is also not clear as both product and process innovations are often linked. The processes by which one creates a new index linked to college costs or invests to produce returns that replicate this index are hard to separate from a new indexed investment product that tries to help parents save to pay for their children's education. Innovation includes the acts of invention (the ongoing research and development function) and diffusion or adoption of new products, services, or ideas. Invention is probably an overly generous term, in that most innovations are evolutionary adaptations of prior products. One sub-branch of the literature on financial innovation has created catalogs or taxonomies of innovations. Given the breadth of possible innovations, this work tends to specialize in particular areas, such as securities innovations. For example, Finnerty (1988, 1992, 2001) has created a list of over 60 securities innovations, organized by broad type of instrument (Debt , preferred stock , convertible securities and common equities) and by function served (reallocating risk, increasing liquidity , reducing agency costs, reducing transaction costs ,taxes or circumventing regulatory constraints.).A small literature on the history of financial innovation demonstrates that the creation of new financial products and processes has been an ongoing part of economies for at least the past four centuries, if not longer. While many of these old innovations sound quite new even today, some have become extinct.

A small literature on the history of financial innovations demonstrates that the creation of new financial products and processes has been ongoing part of economies for at least the past four centuries, if not longer.7 while many of these old innovations sound quite new even today, some have become extinct. A list of 1,836 unique "security codes" was provided, used from the early 1980s through early 2001, each claiming to be a different type of security. Some of the securities

listed were nearly identical products. Some of the securities listed were nearly-identical products offered by banks trying to differentiate their stuff from those of their competitors. Others represented evolutionary improvements on earlier products. Perhaps a few were truly novel. Nevertheless, the length of the list represents a "normal" pattern of financial innovation, where a security is created, but then modified (and improved) slightly by each successive bank that offers it to its clients. Even this list –if scrutinized to eliminate false innovations –would severely underestimate the amount of financial innovations, as it only includes corporate securities. It excludes the tremendous innovations in exchange traded derivatives, over the counter derivatives contracts (such as credit derivatives, equity swaps, weather derivatives, and exotic over the counter options), new insurance contracts (like alternative risk transfer contracts or contingent equity contracts) and new investment management products such as folio FN or exchange traded funds.

Why Do Financial Innovations Arise? What Functions To They Serve?

This section discusses the requirements which make financial innovations to arise and what are the functions performed by it. If the world were free of all "imperfections" – such as taxes, regulations, information asymmetries, trisection costs and moral hazard and if markets were complete in the sense that existing securities spanned all states of nature, we could arrive at an M&M-like corollary regarding financial innovation. Financial innovations would simply be neutral mutation rather than being beneficial to either private parties or society. Against this backdrop, a sizeable body of literature attempts to understand how various "imperfections" or change in imperfections stimulates financial innovations.

Generally, some authors have established how financial innovations are optimal responses to various basic problems or opportunities, such as incomplete markets that prevent risk shifting etc. Some of these analyses are "institution-free" in that they do not explicitly consider the role of innovators in the process, while other institutionally-grounded explanations study the parts played by financial institutions using innovation to compete. What functions do innovations help us perform? Merton's (1992) functional decomposition identifies six functions delivered by financial systems: (1) moving funds across time and space; (2) the pooling of funds; (3) managing risks (4) extracting information to support decision making (5) addressing moral hazard and information problems; and (6) facilitating the sale and purchase of goods and services through payment system. Different writers use slightly different lists of functions, but there is much overlap in these descriptions. The BIS (1986) has a slightly different scheme to identify the functions performed by innovation, focusing on the transfer of risks (both price and credit), the enhancement of liquidity, and the generation of funds to support enterprises (through credit and equity). Broadly speaking, innovations are described to perform the following functions:

1) Completion of Inherently Incomplete Markets: in an incomplete market, not all states of nature can be spanned and as a result, parties are not able to move funds freely across time and space, not to mange risk. Duffie and Rahi (1995), in their introduction to a special issue of the Journal of Economic Theory on financial market innovation and security design, studied market incompleteness and innovation. The study attempts to establish conditions under which innovation would occur in equilibrium.

Allen and Gale (1988) consider a particular form of market incompleteness-in the form of short sales restrictions –as motivation for innovation for parties seeking to share risk. They show it may be optimal for firms to offer multiple classes of claims generating a value from different investor preferences and needs. Cloaked in less academic language, the idea that innovation typically addresses the unmet preferences or needs of particular clienteles is reasonably well discussed in business practice.

2) Innovation Exists To Minimize The Transaction Cost, Marketing And Research Costs. Many of the process innovations in payment system technologies are aimed at lowering transaction costs. ATMs, smart cards, ACH technologies, e-401k programs and many other businesses are legitimate financial innovations that seek to dramatically lower the sheer costs of processing transactions. By some estimates, these innovations have the potential to lower the cost of transactions by a factor of 100.By one estimate, for example, a teller-assisted transaction costs over $1.00 and the same transaction executed over the internet would cost about $ 0.01. New businesses like Instinet, Enron-Online, Open-IPO, or a host of B2Bexchages are innovations aimed at lowering the transaction costs faced by buyers and sellers. These transaction costs are search costs or marketing costs which can include a variety of components—the sheer costs of identifying buyers and seller, information costs, and transaction costs of order processing. Soubra (1991) examine how financial intermediaries attempt to maximize their revenue net of marketing costs, which leads them to design multiple products that appeal to wider set of investors.

3) Innovations Persist To Address To Inherent Agency Concerns And Information:

Most of the security design literature explores how contracts can be written to better align the interest of different parties or to force the revelation of private information by managers. Persistent conflicts of interest between outside capital providers and self interested managers, and asymmetric information between informed insiders and uninformed outsiders, leads to equilibrium in which firms issue a multiplicity of securities. Most of this work deals with innovation in a fairly limited sense, explaining the existence of a few contracts like debt or equity, not scores of different types of corporate securities.

Ross (1989) invokes agency issues to explain some financial innovations. He notes that agency considerations make borrowing costly or limited, as a result, individuals' contract with difficult financial institutions. When any change arises like change in taxes or regulation, financial intermediaries may find it efficient to sell off low grade assets. As the outside investors cannot easily assess the value of these assets, the institutions turn to investment banks to place these securities with their network of clients. These investment banks innovate, creating new pools of these low-grade assets. Agency considerations Agency considerations interact with marketing costs to produce innovation.

Throughout history, information asymmetries have prompted a number of innovations. In much of the nineteenth and early twentieth century, firms disclosed very little credible financial information. Over time, market forces and governmental actions materially increased the quantity and quality and –thus lowered the cost –of information about the firms. End of nineteenth century showed innovations taking advantage of the presence of cheaper and more

reliable information .Finally, income bonds got popularity almost in the beginning of the 20th century and were completely linked to the availability of the accounting information. These unsecured obligations required issuers to pay interest only if the firm earned positive accounting profits in the current period. This history of 19th and early 20th century shows how innovations were a response to information asymmetries. Certain innovations forced the disclosure of information and others exploited the low cost information generated through other processes.

4) In Response To Taxes And Regulation: Innovation responds to regulatory constraints, which in turn are adjusted in reaction to these innovations. Bank capital requirements are a good example of regulations that impose costs on the affected parties, who then use innovations to optimize in light of these constraints. Capital notes and certain preferred stocks that qualified as "capital" to bank regulators are examples of regulatory induced innovations. Likewise, the early Euro bond market was motivated by regulatory concerns. The list of tax and regulatory induced products would include zero-coupon bonds, Euro dollar Eurobonds, various equity linked structures used to monetize asset holdings without triggering immediate capital gains taxes and trust preferred structures. A number of legal scholars have written extensively on relation between laws and innovation, and have created a flourishing literature on this subject. Their literature discusses how tax laws have encouraged and discouraged innovations, analyzed the failures of the U.S. tax code for dealing with functionally-similar securities, suggested how to change the tax code to eliminate innovation, and given their opinions of the social welfare costs of tax-induced innovation.

5) Increasing Globalization And Risk Motivates Innovation: Most essays on financial innovation identify globalization and increasing volatility as drivers of innovation. With greater globalization firms, investors and governments are exposed to new risks such as exchange rate risks or political risks and innovations help them to manage these risks. In addition, globalization enables capital raisers to tap larger ad more diverse populations of potential investor's .A variety of innovations are attributed to attempt to meet the needs of specific investor clienteles. For Example, one popular finance book describes a variety of innovative structures designed to appeal to particular Japanese insurance company investors, a form of cross-national regulatory arbitrage. A List of variety of innovations spawned by increasing volatility is available that is foreign exchange futures, swaps and options and forwards and commodity swaps, futures and options.
Below are some examples of innovations in different contexts:

Examples of Spanning The Market

i. Some of the financial instruments became prominent after the macroeconomic conditions forced investors to be more aware of the need to hedge certain types of risk.
ii. The development of interest rate swaps in the early 1980s after interest rates skyrocketed.
iii. The development of the credit default swaps in the early 2000s after the recession beginning in 2001 led to the highest corporate bond default rate in 2002since the Great Depression.

Examples of Mathematical Innovations

i. The market in options exploded after the development of the Black-Scholes model in 1973.

ii. The development of the CDO was heavily influenced by the population of the copula technique (Li 2000).

The Role of Technology In Financial Innovation

Some types of financial innovations are driven by improvements in computer and telecommunication technology. For example, Paul Volker suggested that for most people the creation of the ATM was greater financial innovation than asset backed securitization. Other types of financial innovations affecting the payments system include credit and debit cards and online payment systems like Pay pal. Various forms of innovations such as new risk management systems and measures such as Value at Risk Based measures or financial engines providing online retirement planning services and new valuation techniques, were clearly facilitated by both intellectual and information technology innovations.

These types of innovations are notable because they reduce the transaction costs. These types of innovations may also have on monetary policy by reducing on monetary policy by reducing real household balances. Especially with the increased popularity of online banking, households are able to keep greater percentage of their wealth in non-cash instruments.

The Impact of Financial Innovation On Society

While most authors acknowledge that innovation has both positive and negative impacts on society, their conclusion regarding the net impact of financial innovation reflects a diversity of opinions. Financial innovations like so many modern innovations, is a good thing when it is used properly and a bad thing when abused. The Key of course is being able to know what abuse looks like when we see it. Consider “securitization” for example .Securitization is the process by which financial assets such as mortgages or car loans are bundled together and used as collateral to back the security issued to the investors, sometimes called “asset backed securities” or ABSs. There seems little doubt that the ability to securitize loans makes it easier for banks to sell off loans , so that they can raise financing to make new loans , generally good thing.

But then, what about CDOs (collateral debt obligations) which are basically securitized ABSs (i.e. bundles of ABSs used as collateral for new securities called CDOs)

A consensus is beginning to form around the idea that this innovation was probably not a good thing because each layer of securitization adds substantial complexity and makes it difficult to adjust the terms of the underlying loans when and if some of those loans get in trouble .In retro respect, this seems obvious, but apparently it was not so obvious at the time when securities were invented. And may be it is rarely obvious that when a new security is first invented that it might cause trouble down the road

As some researchers like Leo Tillman and Nicholas Dunbar have already argued in this debate, it is difficult to identify in advance which innovations are abusive. Instead, we should argue that the debate should not be about particular innovations, but about how they are used. Three simple tests have been suggested that can be applied at the security is being created or an innovation is

being used to determine whether it is positive contribution to the economy as a whole or an abusive instrument likely to cause trouble:

i. Is the innovation being used to arbitrage around regulations?
ii. Does the innovation add significantly to the complexity of the unwinding or adjusting the claims on the underlying assets?
iii. Is the innovation being used to hide or disguise the amount of actual or effective debt of the issuer, such as by getting the debt off the books, or taking advantage of accounting rules which might not classify the new instrument as debt obligation?

If the answer is yes to any of these questions, then the innovation is probably being abused, likely to lead to problems, and should be prohibited or at least closely monitored be regulators. If the innovation is being used to get around regulations, then if the answer is yes to any of these questions, then the innovation is probably being abused, likely to lead to problems, and should be prohibited or at least closely monitored by regulators. If the innovation is being used to get around regulations, then regulators should take a serious look at whether the regulations should be changed or the arbitrage outlawed.

Most financial innovation exploits inefficiencies created by regulation and governance mechanisms — for example accounting rules, credit ratings, securities listing rules and politically-motivated fiscal distortions. What does this tell us? Rather than assuming inefficiency is bad, and innovation is good, we need to address the causes of inefficiency It could also be argued that so long as regulation and governance mechanisms can make the distinction between good and bad, financial innovation should be permitted to flourish as a free market mechanism. However, that places an unrealistic burden on the shoulders of supervisors and investors. A close examination of financial innovations introduced in recent decades reveals that not all of them were universally toxic or universally beneficial. Since innovative financial products can and have served important and productive roles when properly used, it is important to discuss

i. How to spot potentially viable financial innovations
ii. What type of setting encourages companies and investors to use financial products responsibly?

Conclusion

In trying to understand whether a new financial product or service –or an innovative use of existing financial technology –is more likely to help than to harm, we need to think on the following two complimentary criteria of sustainability. a) Financial innovation should have the potential to help create lasting economic value for those who use it: financial institutions, non-finance companies and investors. Productive uses of securitization, certain new debt and capital instruments, innovative asset management products, advisory services and computer system designed to address clients needs have the potential to help financial firms and clients deliver lasting economic performance. b) Financial innovation should be conducive to sustaining and enhancing economic dynamism. Economic dynamism –the whole country's capability and proclivity to innovate in ways that prove lasting and viable –is one of the essential drivers of growth, employment and prosperity. Financial institutions and capital markets have an important role to play in this regard. Thus, if a new product or institution help channel fairly-priced funds to the business sector and entrepreneurs, this has potential to enhance economic dynamism. On

the other hand, if a new financial product is directed at helping overleveraged consumers and companies live beyond their means, this is likely to result in misallocation of resources and impair economic dynamism in the long run.

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