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Financial Risk as a Good

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Abstract

This paper aims to present an alternative paradigm of financial risk to mitigate future financial crises. We argue that risk is not simply a feature of a financial product but a good in and of itself. Examining financial risk, we argue that it is most accurately typed as a common pool (particularly systemic risk) and so another approach to financial risk pricing is needed. We outline the basics of an ex-ante quasi-insurance fund to price financial risk. For more effective governance, risk-loving agents need to contribute to an ex-ante quasi-insurance fund. Insurance recipients would be risk-averse agents, who do not contribute, as they are forced to participate in systemic risk-taking against their preferences. Our approach to financial risk combines a microprudential regulatory framework with macroprudential supervision.

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1. Introduction

Analyses of the recent financial crisis have creatively attempted to isolate key factors that caused it, to distinguish between unique factors in this financial crisis as compared to past crises, and to propose policy that may mitigate future financial crises [1, 2, 3]. Each effort has sought out those factors which caused the recent crisis to reach such heightened systemic effects which damaged national, regional, and global financial systems. Integrating ideas from banking and investment finance with environmental and public economics literatures, we propose a new perspective on the recent crisis and effective financial system governance. We examine financial risk not merely as a parameter of financial products, but as a good in and of itself.

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1.1. Constructing a stylized view of risk

To develop our alternative paradigm of risk as a good, we discuss essential stylized facts from risk theory, including insurance against risk, and sketch the fundamentals of a goods typology from the public choice and environmental economics literatures. We note that risk may be ubiquitous, but always comes packaged with another good. That is to say, consumption of pure risk as a separable good is not possible. As with many goods, a consumer's perception of, and taste for, risk may shift through experience. Implicit or explicit insurance from government sources may further alter consumers' perception of risk, thereby pushing them toward more risk-accepting consumption patterns [4, 5].

These stylized facts enable us to argue that financial risk may be categorized as a private good in smaller product forms, but when reaching a certain size threshold risk is no longer a private good. At increasing thresholds it becomes a common pool and, as aggregated financial risk approaches global systemic size, a public good [or "bad"]. This "transmutation" of risk into another type of good [6] may cause profound changes in the systemic level of risk, which we argue has manifested in the most recent financial crises. Since risk is simply risk, additional goods must be added to the original unit(s) of risk to cause this transformation to occur.

1.2. Viewing risk as a good

By viewing risk as a good we could better price risk and develop ex ante insurance schemes which may provide more effective risk governance. To that end, our insurance propositions address systemic-level factors on systemically important financial institutions (SIFIs) as well as organizational design of financial institutions' remuneration policies. To motivate our argument, we examine decisions facing individual traders, and sketch out an insurance scheme that may be transferred into remuneration designs [7, 8]. We define risk as the estimated exposure to a situation of uncertain outcome [9: page 22]. We believe estimation is in the eye of the beholder, and varies based on the risk-consumer's preferences and experiences. Financial risk consists of potential volatility or changes in returns which differ from actors' expectation and estimation of these values. It can have both positive and negative sense depending on risk-consumers' preferences. The loss aversion phenomenon [10, 11] means that estimation of losses has a greater impact on humans' behavior than a similar level of gains. However, risk-loving agents may take on additional risk in some cases.

There are four advantages to using the approach of an individual trader: (1) it simplifies to examine an individual, then scale up to the organizational level of a SIFI; (2) institutions fundamentally manifest agency through the actions of people, so we are able to encompass individual motivations; (3) because agency is executed through the actions of individuals in an institution, the problems we highlight must be understood and, ultimately, addressed at an individual level as well as at an institutional level; and (4) we employ an individual remuneration "insurance" contract developed in Penikas [8] as our vehicle to develop a similar risk insurance that we argue exists at an institutional level. We freely admit there are complications, and oversimplifications, inherent in our approach, but believe parsimony and clarity outweigh these complications.

There is an important simplification in this approach. We are focusing on agent effects—how and why a risk-consumer acquires risk—but we ignore the network effects of risk consumption, where many agents' risk consumption causes a network effect of systemic risk. While accepting network effects occur, our intention is to focus on agents in this paper to develop this risk paradigm for further expansion in future papers.

2. Stylized characteristics of risk as a good

In everyday life people face risks, whether that risk is as simple as crossing the road or as complex as hedging a portfolio. If risk, broadly defined, is considered as a good, then it can be said that we all consume it. But the question arises as to what kind of good risk is.

2.1. Consumer preferences determine the good nature of risk

We can map risk consumers' preferences onto a continuum, wherein the poles represent risk-averse and risk-loving consumers. Risk-averse consumers consider risk as a "bad" because consuming this "good" results in loss of income or an impairment, while risk-loving consumers view risk as a complementary good embedded in the choice of a risk-taking position. The midpoint maps consumers who hold neutral feelings toward risk.

If assumption of a risk-encumbered position affected only the individual with no possibility of a broader social impact, then benefits obtained and costs borne in assuming that position would accrue to the individual. We argue that this is not always the case, that there is a non-private goods nature in some cases of risk consumption. To see why, let us start with Samuelson's [12] seminal private-public goods dichotomy. As Samuelson suggested, public goods governance is based on the concept of externality. If a good produces a positive externality, its owner is rewarded. If the externality is negative, proper governance would mandate a payment by the good's producer or consumer.

Take the example of an individual trader who obtains a loss or profit due to world markets' performance. In case of a recession, the trader would face a loss. In case of a boom, it would be positive for the trader. Though the relationship of risk outcome (loss or profit) is clear in this simple case, the trader's view of risk as a good is derivative with reference to that outcome. So whether risk is considered a good or a bad, which must be consumed with the investment position, depends on individual preferences. Risk is generally a good for an archetypal risk-lover. Similarly, in spite of profit being a positive outcome, the risk embedded in the trading position is categorically a bad for someone mapping to the risk-averse side.

Consider a situation where a risk-averse consumer faces an imminent risk, but as a result his well-being is improved. In the case where the consumption of a good involves an embedded risk posing damage to health, it is likely the consumer would not consume that good. But when such a risk is not certain, but only probabilistic, the consumer would weigh that probability and make a decision as to whether to consume the underlying good or not.

Consider in this regard the situation of an individual's market risk. Let us suppose that the consumer, a stock trader who had traded only blue chip stocks, decided to buy second- or third-tier stocks. These shares have less liquidity, and so purchase of them is linked to their inherently higher risk while the expected profit that can be gained from them is also higher. If the trader obtained this income, it may incent him in the future to renew this risk and it is possible that a risk-averse consumer's attitude to risk will change in such a situation.

On the contrary, if a risk-loving trader expects that a systemic risk, such as a collapse of world stock markets, will occur, it may motivate that trader to give up his love of risk. But this result obtains when there is little uncertainty toward a bleak future. When an individual trader considers such a risk probabilistically, we cannot say how that trader may act. And significant success in trading would likely push even a risk-averse trader toward more risky positions, even if the risk incurred carries with it some system-threatening probability.

- *Thus, we cannot definitely determine whether the risk is only a good or a bad, as this largely depends on the type of consumer—risk-averse, risk-loving, or risk-neutral individuals. Also, the outcome of the situation associated with a risk can affect future attitudes to that risk itself or to other risks.*

2.2. Risk is conditioned by temporal factors

Some risks are "acquired" rarely or only once, while other risks are "acquired" on an ongoing basis. The first type of risk is exhaustible in that it is temporally-bounded, but the second type of risk is inexhaustible. That is to say, the temporally dynamic nature makes this risk recurrent and so renewable. Under conditions of time, then, the risk in question can be a renewable good with respect to economic agent. We may apply this same logic to the stock market. While a stock is traded on the market with non-zero-priced quotes, then there is

an embedded, recurring market risk because our stylized trader must employ capital to purchase or sell short the stock.

Of course, trading of that stock may be halted, thereby terminating the risk linked to changes in that stock's price. But delisting, acquisition of all outstanding shares, or other forms of permanent halting of stock-trading are not common occurrences for listed shares. Instead each time the share is traded, risk embedded in the transaction reoccurs. Under these conditions, risk embedded in trading stock is a renewable good with respect to agent. We might note that growth of listed firms, further issuance of new shares, and increasing usage of equity based financing serves to increase the overall pool of financial risk, as more economic agents may become vulnerable to the changes to prices of the same equity and may become more vulnerable to market fluctuations as higher percentages of economies are represented on stock exchanges.

- *Thus, in various situations, risk is an exhaustible good with respect to the source, where the elimination of the source of the risk leads to disappearance of the risk itself, and is a renewable good with respect to agent, if the situation which produced the risk occurs again and again.*

2.3. Risk may be a private or a public good

Public choice and environmental economics literatures are replete with analyses of goods types. Scholars have long been challenged by questions of who supplies, regulates, owns, consumes, and benefits from specific goods [12, 13, 14, 15, 16]. To frame these questions, scholars developed theoretical scaffolding around property rights- visualized as a two-by-two matrix (see Table 1) - in which:

- The vertical axis maps the degree to which property rights and nature of a good enables exclusion of others from consumption once it is purchased, accessed or provided; and
- The horizontal axis maps the degree to which property rights and nature of a good may or may not limit consumption to a single consumer, meaning that once a good is consumed or accessed, others cannot consume or gain access to that same good.

The four resulting goods types are private goods (capacity to exclude, rivalrous consumption), club goods (excludable, non-rivalrous consumption), common-pool resources (non-excludable, rivalrous consumption), and public goods (non-excludable, non-rivalrous consumption). McNutt (1999) adds a very important point to our concept of risk as a good. He suggests that we may view all non-private goods as different kinds of public goods, in that their consumption is determined by boundary conditions. These boundary conditions may be geographic, or determined in some other way. Harkening back to seminal pieces in public choice economics [12, 17], he revives the idea of a goods continuum, suggesting club goods may be called "local public goods," common-pool resources termed as "public goods," and what public policy literature customarily terms public goods may be a non-observable archetype better described as "pure public goods." Utilizing this goods typology framework as a diagnostic tool, we argue that risk cannot be unequivocally characterized as only a private or only a public good. In fact, it could be mapped into any of the four quadrants depending on the circumstances.

Returning to our example of the individual trader, we considered risk as a private good taken on through individual market risk. If a trader opens a short position under the assumption of decline in a certain stock's price, she does this by obtainingshares lent through a broker-dealer. She sells, expecting to repurchase shares

Table 1. A law and economics typology of the four types of goods. Adopted from [16: 930, tables 1 and 2; 13].

Consumption	Rival	Non-Rival
Excludability	Private Goods	Club Goods: McNutt notes we may view this as a "local public good"
Non-Excludability	Common-Pool Resources: Creates a "Private Externality": McNutt notes we may view this as a "public good"	[Pure] Public Goods: Creates a "Public Externality": McNutt remarks on the debate over whether these are "pure public goods"

at a lower price and return to the broker the same number of shares that she had borrowed. In this case, the risk is an individual one, as it lies with our representative small trader.

But as a small trader scales-up, significant systemic risk may result. As an example, consider the case of the Hunt brothers (henceforth, the Brothers), who attempted to corner the silver market in the late 1970s [18, 19]. As their silver buying increased, the Brothers and their buying partners amassed "50 percent of the deliverable silver inventory at the Commodities Exchange of New York (Comex) and 70 percent of the Chicago Board of Trade's" [18: 185] and arranged warehousing to take physical delivery of the metal. The resulting spike in silver prices from their initial purchases in 1974 until 1980 caused havoc not only with industrial users of silver [20] but influenced other precious metals prices and nearly brought down the London Metals Exchange. To establish an "orderly withdrawal" of market demand, a $1 billion emergency loan to the Brothers was extended [21].

The Brothers' example is an extreme one, but shows two points: risk in the silver market "grew" from a private good to a club good (shared among industrial users) and then to the status of a common-pool resource (affecting other precious metals markets), and beyond to a public good (in this case, a public bad). That the silver market crisis became systemic indicates the public nature of the risk. Secondly, the Brothers' earlier success appears to have encouraged them to take on more risk as the 1970s progressed [19].

Natural hazards manifest risk that may be not only private or only public good in nature, but the same risk may belong to either first or second type of goods subject to initial conditions. For example, the risk of a cold snap may be a destructive situation for a town that has a problem with heating facilities. And the same cold snap to -50 degrees in the city with high-quality heating services may manifest as an individual risk only for a person who has a problem with her particular home system.

The understanding of the shift from financial risk's private nature to the public one is the foundational justification for developing comprehensive macroprudential governance rather than relying solely on microprudential regulation, as suggested by Houben (22: page 210): "Supervisory efforts are more likely to focus on generic risks and cut across different institutions, than to focus on a single risk at an individual institution."

- *When risk incurred by an individual is a private good, the consequences will only affect the consumer himself. Systemic risk affects a large number of consumers, and thus maps to one of the categories of public goods in McNutt's typology. We argue that the type of non-private good may be determined by the size of the social impact exerted by the risk in question. This requires us to revise approaches to risk-pricing.*

3. Risk Governance: Integrating Lessons from Natural Resources with an Insurance Mechanism

We have described risk as a good, explaining its ubiquity, its renewable nature with respect to *economic agent* yet exhaustible nature with respect to *source* of risk, and the fact that risk preferences vary just as with other goods. We explained in general terms that risk may be a non-private good, and have noted the criticality of initial conditions influencing how the risk manifests. Better regulation and governance ideas require us to understand what type of good financial risk becomes when the threat becomes systemic.

3.1. How the common pool nature of financial risk relates to natural resource management

If financial risk is considered to be a non-private good, the most likely quadrant it would map to would be common-pool resources: excluding someone from consumption of the good is very difficult. This exclusion is possible by an economic actor incurring high costs and possessing an advantage in market power or market access (often, but not always, jointly occurring). As argued above, when financial risk become systemic it is shared by all. But is risk's consumption rivalrous, in that it reduces the availability and/or the amount of the

good? As a common-pool resource, we might expect that the consumption of risk in financial markets by one consumer may act to limit possible consumption by others.

To see how this mechanism may work and to explore possible policy ramifications, let us examine the work of a representative broker and of a representative dealer in stocks. Both work with the same type of risk—individual market risk. A dealer trades in securities on his own behalf and for his own account. The standard view is that the dealer bears the market risk himself—that is to say, he has access to that risk—but we would also add that he may restrict, or "alienate," others from access to that market risk. The broker is a participant in the security market with the right to conduct transactions in securities on behalf of the client on the basis of compensation agreements with clients. A broker may enable his clients to take on market risk, but he cannot restrict their access to that market risk, because clients could simply transact through another broker.

Both financial risks, as we have presented them, and forests can be viewed as common-pool resources. Schlager and Ostrom [14] argue that access to natural resources such as forests may be restricted through law, custom, or size of the market actor. They argue that property rights associated with the timber rights are tiered: access is the lowest property rights bundle, in which a user may enter a common-pool resource but not harvest anything. This is the level at which a broker's client, through that broker, may access market risk. At the next higher tiering of property rights, the forest's management empowers the actor to regulate use of the resource and make improvements, but not exclude others from access, nor determine how access rights might be transferred. In our stock market example, this would describe a broker who may employ trading technology to access market risk, but still cannot restrict—that is, alienate—others. Alienation, the highest tiering of property rights, empowers the property-rights owner to sell or lease lower-tiered rights. This would represent the dealer's level. The dealer may withdraw from the market and thus not trade specific stocks, thereby removing financial risk, or refuse to trade with a counterparty, again removing financial risk from being accessed by others. The dealer can literally alienate others from access to market risk as a common-pool resource.

This tiering of property rights to market risk has profound consequences just as it does for natural resources. Examining the competitive nature of financial markets, financial risk and forests are similar to each other because the consumption by one actor could worsen the situation for others. Additional economic benefits accrue not only by moving up the hierarchy of property rights; when an actor grows to a certain threshold size, she gains market impact power (i.e., attains the level of a price influence or even a "price-maker," whereas other market actors remain as "price-takers"). A price-maker may alienate on a very large scale.

- *The financial risk we are describing may be defined as a common-pool resource. Consumption by one individual may worsen the positions of the rest; control by powerful actors certainly worsens the position of the rest.*

3.2. Governing consumption and creation of financial risk through an insurance mechanism

In situations where the risk is considered as a private good, the individual determines the amount of the good consumed. Aside from the risk-prone, economic agents will be likely to acquire risk as long as it is rational to do so—that is, until the expected return exceeds the expected result conditioned upon the consumer's risk tolerance. When market conditions cause a shift in the nature of risk as a good toward a common pool, there are several principles to consider when designing regulation.

In a centrally planned economy, the state regulates consumption of risk; ownership and disposition of a risk belongs to the state. Economic decisions pertaining to risk consumption are made by the state machinery, thus becoming a collective decision. The argument for better risk management is predicated on the deliberate process of decision-making, in which the required time, team commitment and expertise, discussion and agreement are all invested, lowering the possibility of the adoption of hasty, spontaneous, and resource-wasting decisions. Proponents of this model suggest a better decision can be reached through a committee rather than

through a single market actor, as the outcome affects the position of the country and the committee pools its combined wisdom and experience. But the downside is that the state provides a kind of public insurance, perhaps best described through Kornai's [23] work on soft budget constraint. The danger that the government will not cut off a struggling firm from the state's supply of capital arises, thereby socializing the risk of the firm by assuming it into the entire economic system. While it had been assumed that this problem does not arise in a market economy, this is no longer the case regarding systemic financial risks [1- 6].

The classic view of a market economy sees economic actors turning to insurance companies to shield themselves from risk, a method of dealing with risk described as diffusion by Knight [24, 25]. Shared between clients of the insurance company, risk is reduced for a single economic actor. But the insurance company does not eliminate the risk itself. The individual insurance client offsets his risk through purchasing insurance, but the consequences remain the same; in case of an outcome that triggers policy payout he is compensated. In terms of microeconomics, the optimal payment will be equivalent to the compensating variation because the individual will be paid the amount at which he estimated his loss (assuming he has correctly calculated his probable loss).

Just as with the state insurance system under central planning, the private insurance model also has some drawbacks. We may illustrate these through a simple insurance pricing model:

- Let's say a consumer has wealth equal to 10 units. He can invest in risky assets resulting in equal probability outcomes of gaining or losing 5 units of wealth.
- Define the risk-neutral consumer as one who is indifferent between retaining his initial position and investing.
- For a risk-averse consumer, his utility of wealth is u(10) when not taking risk. If he invests in risky assets, his expectation of the utility from a payoff is less than the utility of the expected value of wealth.
- Using a Neumann-Morgenstern utility function, the risk-averse consumer's condition can be written in the form of an inequality:

$$u(10) > 1/2*u(15) + 1/2*u(5)$$

If a the risk-averse consumer is compelled to invest in risky assets, he will seek an insurance policy that would pay out, in the case of loss, an amount equal to "a" (Figure 1). This amount, "a", is his compensation for assuming the risk, because without this risk, he could get this level of utility from the lower value of wealth.

For a risk-lover on the contrary, his utility of wealth when taking risk is less than the expected utility of wealth, which he can get as a result of a risk-encumbered decision. He appreciates the "income" as a result of taking a risk-encumbered investment more than the guaranteed level of utility without the risk. He would then be willing to place the value of "b" (Figure 1) into the general insurance fund, since this delivers the level of

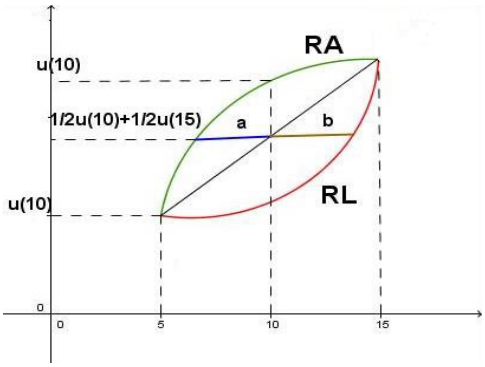

Fig. 1: Alignment of risk-lover's and risk-averter's utility when "gambling."
OX axis presents return on "gambling" outcome; OY axis is value of utility corresponding to the outcome.

utility when making the risk-encumbered decision more than 1/2 u (15) + 1/2 u (5). This utility is achieved by investing a value greater than 10, thus "b" is the maximum amount he is willing to invest. Our described transfer design is expected to augment social welfare using Condorcet criteria (but is not Pareto-optimal as the risk-lover would suffer a decline in his utility by contributing to a fund through a pay-in fee).

We can generally describe the challenge facing a risk insurer through this simple model: to sustain the value of risk-lovers' deposits at the level that is greater than the value that risk-averse consumers want to get:

- N(RL)* a ⩽ N(RA)* b,
- where N(RL) corresponds to the number of risk-lovers each contributing "a" on average; and N(RA) stands for the number of risk-averse agents receiving "b" on average.

❖ *There is a need to control both the consumption and the creation of a risk. Because it is impossible to give a clear assessment of what type of good financial risk may be, it is necessary to choose the appropriate method of regulating its consumption and production. We propose an ex ante insurance mechanism.*

4. Integrating microprudential regulation with macroprudential supervision

Financial risk insurance may be provided in developed economies whether the political system is centrally planned or capitalist. But the nature of that insurance is often murky—concrete answers of what, exactly, is insured through policies of too-big-to-fail or too-politically-important-to-fail are needed [26-28]. Congleton's description [4] of what happened through the Term Securities Lending Facility (TSLF) fits well with our model: if a government buys up risky assets of companies affected by the crisis with the taxpayer's money, it could be represented as a large-scale risk-loving agent. However, this governmental action created a perverse outcome in that the government acted as an ex-post provider of insurance by taking on some banks' assets, increasing banks' reserves and enhancing the quality of their remaining assets. The ad hoc nature of bail-out was not well-understood: "Regulatory agencies also mistook crisis insurance for ordinary insurance" [4: page 408-9]. Banks who became clients of the TSLF were able to transfer risk-laden positions and so were made whole. So, while this insurance program worked mechanistically (satisfying the inequality N(RL)* a ⩽ N(RA)* b), the ex-post nature of insurance created moral hazard. In effect, the banks' losses were socialized through purchase by the U.S. Treasury, becoming losses shared by all U.S. citizens. This led to extending insurance coverage to those more politically influential, to increasing moral hazard by those expecting to be bailed out, and to much greater costs.

Applying our general concept of risk to finance, we propose that effective financial governance policy must take into account three factors: (1) the utility function for risk-lovers is convex and that for risk-averse agents concave; (2) more risk-prone agents may seek levels of risk that create systemic effects, if those agents are of a sufficient size; and (3) as the scale of risk grows and risk is transmutated from a private good into a club good or common pool (Selmier, 2014), governance principles that encompass this transmutation are required. Given these three important reasons and these three factors, we argue that proper macroprudential governance and microprudential regulation must be developed in tandem.

In these efforts we can gain considerable leverage through environmental economics, and we are not the first to point this out. Stiglitz (2008: 17) states that: *"In environmental economics, there is a basic principle, called polluter pays principle. Wall Street has polluted our economy with toxic mortgages. It should pay for the cleanup."* Our paper extends the application of environmental economics mentioned by Stiglitz by proposing an insurance mechanism that accounts for risk-specific features which helps to deal with financial risk taking at *ex ante* stage.

We argued that financial risk may be better-considered as a common-pool in that consumption may be rivalrous while it remains difficult to exclude others from the "pool." This classification gives us considerable

leverage to suggest appropriate methods of monitoring its production and consumption. In a centrally-planned economy, the regulation of risk consumption belongs to the state machinery, but this state intervention engenders Kornai's issue of the soft budget constraint.

Lastly, because we define financial risk as a good whose property right characteristics vary based upon impact, it should be possible to price risk more accurately. When pricing, one must consider that systemic financial risk could be more precisely classified as a common pool, that risk itself is always a complementary good to economic activity, and that risk consumption depends on a consumer's preferences. We defined risk as the estimated exposure to a situation of uncertain outcome (modifying Holton, 2004) to encompass variation based on the risk-consumer's preferences and experiences. Revising risk pricing models is required as present models capture only part of individual consumer risk (even dealing with the portfolio-wide aggregated risks) and do not account for shifting preferences and the changing nature of systemic risk as a good.

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