RISK AS A GOOD

Henry Penikas*
National Research University
Higher School of Economics
Moscow, Russia

W. Travis Selmier II
Department of Political Science,
Indiana University, USA

Kseniya Vasilyeva
National Research University
Higher School of Economics
Moscow, Russia

Paper #2 in the series:"Addressing the Complexities of Property Rights in Financial Markets"

Henry Penikas acknowledges the support from the International Laboratory of the Decision Choice and Analysis of the National Research University Higher School of Economics.

Please check with authors before citing

Suggested citation: Penikas, Henry, W. Travis Selmier II, and Kseniya Vasilyeva. 2013. "Risk as a Good." Paper #2 in the series: "Addressing the Complexities of Property Rights in Financial Markets."Bloomington: Indiana University, The Vincent and Elinor Ostrom Workshop in Political Theory and Policy Analysis. http://www.indiana.edu/~workshop/publications/materials/W13-11_Selmier.pdf.

∗ Corresponding author.

Abstract

The recent financial crisis has once again shown us that our knowledge of the financial sphere is insufficient to manage, let alone control, these types of crises. The concept of risk is a crucial pillar in that sphere, and this paper aims to present an alternative paradigm of risk to mitigate future financial crises. Our key point is that risk is not simply a feature of a financial product, it is a good itself. We discuss stylized facts to examine the complexity of risk and how it may be typed as a good depending on the scale of its impact and initial conditions. Our principal conclusions are first, that risk is most accurately typed as a common-pool resource (particularly systemic risk) and so another approach to pricing risk is needed. Second, for more effective governance, risk-loving agents need to contribute to a quasi-insurance fund. We outline the basics of this insurance fund and sketch its mechanism. Insurance recipients are risk-averse agents who do not contribute as they are forced to participate in systemic risk-taking against their preferences.

Keywords: risk, goods, bads, common-pool resource, financial trader, SIFI, insurance

JEL Codes: D81; P14; P48

Introduction

Analyses of the recent financial crisis have creatively looked at many aspects in the financial domain to isolate the key factors that caused this crisis, to search for unique factors in this financial crisis as compared to past crises, and to propose policy that may mitigate future financial crises (Alessandri and Haldane, 2009; Reinhart and Rogoff, 2009; Woolley, 2010; also see Lo, 2012, for an excellent survey). Of special interest in all these analyses is what factor(s) may have caused the recent crisis to reach such a heightened, precipitous systemic effect that 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. We examine risk not merely as a parameter or a feature of financial products but as a good in itself.

To develop our alternative paradigm of risk as a good, we discuss critical 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, pure risk is unavailable as a unitized good. 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 toward more risk-accepting consumption patterns.

These stylized facts enable us to argue that financial risk, as a good, may be categorized as a private good in smaller product forms, but then reaches a size threshold at which risk is no longer a private good, but now a common-pool resource or a public good. This "transmutation" of risk into another type of good (Selmier, 2013) may cause profound changes in the systemic level of risk, which we argue has manifested in the most recent financial crises. Since "risk is risk," additional goods must be added to the original unit(s) of risk to cause this transformation to occur.

We suggest that risk insurance is 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 a too-big-to-fail or too-politically-important-to-fail are needed (Hughes and Mester, 1993; Mishkin, 2006; Brewer and Jagtiani, 2007). The coverage extended demands clear delineation.

Our argument concludes with proposals for risk governance, spanning from systemic-level factors on systemically important financial institutions (SIFIs) to 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 (Shapiro and Stiglitz, 1984; Penikas, 2012). We use the vehicle of an individual trader in this paper for four reasons: (1) it is a simple and valid assumption to examine an individual trader, then scale up to the organizational level of a SIFI; (2) organizations fundamentally manifest agency through the actions of people making decisions, so we examine 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 (2012) as our vehicle to develop a similar risk insurance that we are 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.

This paper proceeds in six sections. Section 1 provides stylized facts about risk itself and attitudes toward it from the points of view of risk-averse and risk-loving consumers. The second section presents the evidence that risk should be treated as a renewable good, although governance principles applicable to exhaustible resources might be of value when governing risk. Section 3 presents the limitations of viewing risk as a private good. It is argued that there is a threshold at which risk cannot be solely a private good, as risk's effects gradually expand to affect actors other than one individual risk-taker. Section 4 draws parallels between financial risk and forest exploitation as common-pool resource goods. The fifth section is devoted to risk governance issues. It justifies the key concept of the paper that a transfer needs to be organized to rebalance a free-of-charge utility increase for risk-lovers (from risk-taking) and the resultant costly utility decrease for risk-averse. The proposed quasi-insurance fund is a solution to the problem that enables raising social welfare by Condorcet criteria. Section 6 concludes that systemic financial risk is a common-pool resource good, implying the need for different ways of its governance. Three additional issues are discussed as future research topics: quasi-insurance fund application to bankers' remuneration, moral hazard problems that arise in this regard, and the possibility of a polycentric governance approach toward financial risk.

Risk Characteristics—Ubiquitous, Embedded as an Option, Varying with an Agent's Perception of Risk

In everyday life, people face risks, whether the risk is simply to cross the road or to make investments. 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 is risk?

Imagine a stylized continuum on which to map consumers' risk preferences. At opposite ends of the continuum, we find two types of consumers: the so-called risk-averse and risk-loving consumers. At the risk-averse end of the continuum, consumers fear risk and do their utmost to avoid it, while at the other end they literally seek out risk, searching for situations that carry higher risk. For risk-averse consumers, risk would be considered as a "bad" since its consumption is associated with potential loss of income or an impairment of the individual. At the other end of our continuum, risk-loving consumers value the revenue (which may simply be psychic benefits) that would be gained from the consumption of a risk, so in their view, risk is better seen as a complementary good embedded in the choice of a risk-taking position. In short, risk is a "commodity" improving these risk-loving consumers' well-being. This archetype encompasses consumers who appreciate the risk itself, for example, "extreme-addicted" people endeavoring to enter a situation that poses a risk to health or even life, who enjoy increasing their adrenaline—mountaineers, climbers, lovers of dangerous sports, etc. Parenthetically, we would note here that the risk in question may be embedded specifically with a unique good. In our "extreme" example, a rock climber may eschew the risk embedded in powerboat racing, while accepting the risk incurred when rock climbing.

At the midpoint of our continuum, we find a group of consumers who hold neutral feelings toward risk. This archetypal consumer is not interested in the uncertainty embedded in the decision to consume a particular good but is only interested in the result itself. Examining our continuum, we may ask: is a specific consumer's perception of risk actually a good or a bad? The answer to this question determines the decision to take on risk, and we find the answer depends on where that individual consumer maps onto the continuum.

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 the case, that there may be a non-private goods nature in some cases of risk consumption. For simplicity's sake here, let us

employ Samuelson's (1954) 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, 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 that must be consumed with the investment position, depends on individual preferences. Disregarding loss to be a negative externality, risk is a good for a risk-lover. Similarly, in spite of profit being a positive outcome, the risk embedded in the trading position is a bad for a risk-averse person.

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 a natural risk of damage to health, it is likely the consumer would never 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 the individual 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 the purchase of them is linked to a 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 faces a systemic risk, such as a collapse of world stock markets, it may encourage the person inclined to give up his love of a risk and make only carefully thought-out, less-risky decisions. But this is the result that is obtained when there is no uncertainty toward the future, where the outcome is clear. That is to say, the trader *knows* a collapse will occur. But when examining such a risk probabilistically, we cannot say how an individual trader may act. Significant success in trading would likely push even a risk-averse trader toward more risky positions, even if the risk incurred carried 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-lovers, 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.*

Risk—Exhaustible or Renewable Good?

If we consider risk in a particular situation, it would seem to be an exhaustible good at first glance, because if there is any method by which to eliminate this risk (e.g., the simple case of a busy road may be addressed by not crossing the road in the wrong place, but by the nearest pedestrian crossing), it will not occur anymore. But if we consider the same risk without the temporal bounds of a specific moment, then risk manifests again and again as units of time pass. That is to say, we may encounter the same risk when we find ourselves, again, in the same situation. We might delineate temporally bounded situational risk as one in which time is static, while the recurrent nature of the same risk may be considered temporally dynamic.

Under conditions of time, then, the risk in question can be a renewable good; over the passage of time, new situations associated with that risk appear (e.g., when commuting to work, you may cross a specific road a few times). 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 inherent, and recurrent, market risk because our stylized trader must employ capital to purchase or sell short the stock. Termination of trading of that stock terminates the risk linked to changes in that stock's price simultaneously. In this case, where the share is no longer traded, then the risk may be described as an exhaustible good.

But delisting, or permanent halting of stock-trading, is not the common state of a share on a stock market. Rather, the share is traded and, each time it is traded, risk embedded in the transaction reoccurs. Under these conditions, the embedded risk is a renewable good. We should note that the number of shares, and the number of traded firms, has generally increased over time as well. So we may argue that share issuance provides a vehicle that actually cultivates more 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 can be an exhaustible good, where the elimination of the source of the risk leads to disappearance of the risk itself, and can be a renewable good, if the source of the risk situation can produce it again and again.*

Risk—Just What "Type" of Good Is It: Private or Public?

The public choice and environmental economics literatures are replete with analyses of goods types as their scholars are challenged by questions of who supplies, regulates, owns, consumes, and benefits from specific products (McNutt, 1999; Ostrom and Ostrom, 1977; Schlager and Ostrom, 1992; Weimer and Vining, 2005). The generally accepted approach in these literatures is to employ a two-by-two matrix (see Figure 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.

(Figure 1 about here)

Broadly speaking, the four goods types thus produced 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). For our purposes, we adapt a general view of goods typology based on McNutt (1999: 930) and Ostrom and Ostrom (1977) to motivate our discussion of what type(s) of goods risk may be.

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 (Buchanan, 1965: Samuelson, 1954), 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 choice has called 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. Consider when a person buys a lottery ticket, where the outcome of his decision to take on risk affects only his own well-being. In this case, it is necessary to speak about the risk as a private good. But there are also similar situations where the risk applies to a group of people. For example, when the head of a bank makes a risky decision, the resulting consumption of risk is extended to employees of the bank, too. This decision will affect their salaries or even the fate of the bank, and not just the well-being of the head of the bank. This "acquisition of risk" may map into the club goods sector, if the bank is not a SIFI, as the risk is within the "walls of the club" of that bank (Selmier, 2013). But what if the bank were a SIFI? Then, in McNutt's terminology, the acquisition of risk may move out of the local public goods space into the common-pool resource quadrant (McNutt's "public goods" quadrant).

To understand why we make this argument, let us return to our example of the individual trader, where we considered risk as a private good taken on through individual market risk. Suppose there is an expectation of price decline of a certain stock in an equities market. A trader opens a short position by taking credit in the form of a certain number of shares from a broker in order to sell them at a higher price, then buying shares on the lower price and returning to the broker the same number of shares that he had borrowed. But, under the influence of market fluctuations, the value of a financial asset can change in an unfavorable direction for the trader, which may limit her ability to meet her obligations. In this case, the risk is an individual one, as it lies with our representative small trader.

Now scale-up our small trader to an enormous trader representative of significant systemic risk. As an example, we offer the case of the Hunt brothers (henceforth, the Brothers), who attempted to corner the silver market in the late 1970s (Abolafia and Kilduff, 1988; Eichenwald, 1989). In this case, the Brothers amassed significant cash and futures positions and arranged warehousing to take physical delivery of the metal.[1] The resulting spike in silver prices from their initial purchases in 1974 until 1980 caused havoc not only with industrial users of silver (*Economist*, 1980a) 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 established (*Economist*, 1980b).

[1] In conjunction with buying partners, they held accumulated claims on "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" (Abolafia and Kilduff, 1988: 185).

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 perhaps beyond. 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 (Abolafia and Kilduff, 1988).

Analogous to this panic in the silver market and its results, the collapse of world stock indices is a realization of the systemic risk, which is a public bad. Inability to meet its obligations of one of the participants of the market may lead to the inability of other parties to fulfill their obligations. Indices' drops cause a series of events, and this resultant risk affects many economic agents. Following a logic similar to the impact of the Brothers' silver speculation, if share prices changed on a global basis causing exchange rates to change, thereby affecting the size of exports, this would affect investment of capital into the real economy, and the net wealth that individuals hold. Such a risk may negatively affect the economy in general, and thus there could be many financial victims. Risk in this case has become a public good.

Naturally occurring risks[2] could be both private and public goods. We are referring here to natural hazard risks not caused by direct human intervention but that still exert economic impacts with measurable externalities. These natural hazards may include health risks or perhaps consequences of natural disasters, for instance. Natural hazards manifest risk that may be not *only* private or *only* public good, 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 (for a systematized example, see the Appendix).

Thus, it is important to stress that because the nature of risk as a good is complex, it is of vital necessity to revise approaches to risk pricing (particularly systemic risks), as conventional ones (e.g., Black-Scholes-Merton option pricing model or CAPM) are tailored for risk pricing as solely a private good. Though it falls out of the scope of the current paper, we may hint at a policy solution:

[2] Such risks are included as realization of operational risk for credit institutions under the Basel II framework.

1. Visualizing a price/quantity graph, derivation of the equilibrium price needs to be approached through a vertical aggregation (i.e., by price) for demand for risk *as a public good* rather than through horizontal aggregation (i.e., by quantity), as one might do for risk as a private good.
2. The envisaged probability distribution and scale of risk realization (including the option of breaching the threshold of risk shifting from private good toward a public good nature) needs to be considered.

- *It turns out that the risk cannot be defined as only a private or public good. When individual risk is a private good, the consequences will only affect the consumer himself. Systemic risk affects a large number of consumers, thus it appears as a public good in McNutt's typology. Therefore, 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 the approaches to risk-pricing.*

Similarities and Differences of Risk and Clean Air or Forests?

As we noted above, the fact that the recent financial crisis of 2009–11 affected financial markets at a systemic level is of critical importance, and a prime motivating factor in this paper. We have described risk as a good, explaining its ubiquity, its renewable nature, 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. To offer governance ideas and suggest policies that provide governance, we now describe what type of good risk becomes when the threat becomes systemic, and offer natural environment examples to motivate our discussion.

If risk is considered to be a non-private good, the most likely quadrant it could be attributed to would be common-pool resources: to exclude someone from the consumption of the good is not only very hard but, even if this exclusion is possible, the process would be associated with high costs (i.e., to reduce the risk to zero in any situation is almost impossible). There remains the question concerning the second part of the definition of this type of good: is its consumption rivalrous, in that it reduces the availability and/or the amount of the good?

Let us return to our example of the bank manager, who may accept a risk-laden position that may actually worsen the position of employees before the result is obtained. This representative may work at a bank that, as a "consumer of risk," might be risk-neutral at an institutional level whether senior managers act as risk-lovers while ordinary employees are risk-

averse agents. Or, the bank may be risk-loving due to the preferences of its senior management, without regard for the more junior employees. Now, if the outcome from taking the risk-laden position is positive, then we can say that acceptance of the risk turned out to be a good, not a bad. But it should be noted that the risk itself, apart from the result, may be rather bad for society as a whole, because it leads to a state of uncertainty. If the bank is a SIFI, bank management has introduced systemic risk through their risk preferences. Risk is not something to be categorically eschewed, however; as Adam Smith argued, even getting a normal rate of profit is necessarily accompanied by a risk. Thus, the risk is integral to the success of the company.

As a common-pool resource, we would expect that the consumption of risk in financial markets by one consumer may act to limit possible consumption by others. To see how this may occur, and the 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. The broker's activity does not worsen, but rather improves, the position of consumers who turn to him for his service. The dealer is a professional participant of a security market who 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 account of the customer on the basis of compensation agreements with clients. To be exact, that broker may enable his clients to take on market risk, but he cannot restrict their access to that market risk. Clients could simply transact through another broker. He does, however, take on settlement risk. Knight (1921) wrote that a client's request for service of the broker is an example of such a method of dealing with risk as a specialization. The client applies to the broker because the latter has to deal with such transactions all the time, and relying on a specialist like a broker reduces the risk of error associated with the process of the transaction, but not the risk associated with economic conditions.

Our point in using this example is to compare access to this market risk with access to natural resources like a forest. Both are common-pool resources, but access to those resources may be restricted through either law, or custom, or size of the market actor. Schlager and Ostrom (1992) apply this idea to forests, arguing that property rights associated with the timber

rights are tiered: access is the lowest 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 the 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 more similar to each other because the consumption by one actor can 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., becomes "a price-maker," whereas others remain as "price-takers"), which may alienate on a very large scale. Analogous to this case of financial risk, we consider the case of forest exploitation: if one company clear-cuts trees, then others do not obtain the lumber and cannot make their products. Anderson and Hill (1990), for example, showed that a "race for property rights" to land in the Western United States led to significant economic wastage and overexploitation.

- *The financial risk we are describing may be defined as a common-pool resource. It is not wise policy to exclude any individual from its consumption. Risk manifests as a common-pool resource, and economic benefit is optimized through competition. Consumption by one individual may worsen the positions of the rest; control by powerful actors certainly worsens the position of the rest.*

Risk Governance Principles: Goods' Typology Approach

Since risk can be seen as a good, it is necessary to establish the principles of its distribution among individual actors in an economy. Our view is consistent with received economics

wisdom—most consumers are risk-averse, and thus for most people, the risk is a bad. However, market conditions such as size of market actor, top-tier financial risk property rights, the asymmetric nature of bonus compensation in investment firms, and positive reinforcement through profitable trading may alter risk perception. Given our argument above regarding tiered rights of financial risk, it follows that it is necessary to understand who has the right to dispose of the good, and to increase or reduce its consumption.

In situations where the risk is considered as a private good, then it is obvious that the individual himself determines the amount of the good consumed, that is, how much he is willing and able to consume. Aside from the risk-prone, economic agents will be likely to use a risk as long as it is reasonable—that is, until the expected return exceeds the expected result should a negative outcome occur.

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 the risk. Here, the ownership and disposition of a risk belongs to the state. The decision could be made only by the state machinery, but it turns out that it is 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, staving off the possibility of the adoption of hasty, spontaneous, and wrong decisions. Proponents of this model suggest a better decision can and should be reached through a committee rather than through a specific market actor, as the outcome affects the position of the country. But the downside is that the state provides a kind of public insurance, perhaps best described through Kornai's (1986) work on soft budget constraint. The danger here is that the government will not cut off a struggling firm from the state's supply of capital, a problem that usually does not arise in a market economy.

In a market economy, economic actors turn to insurance companies to shield themselves from risk. As described by Knight (1921, 1924), this method of dealing with risk through the action of insurers is described as diffusion. Risk is shared between the other clients of the company, so the risk is reduced for a single person. In other words, the likelihood is low that a negative outcome will be suffered by all clients at the same time with the result that the company will have to pay out on all insurance held by those clients. But, of course, 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. If we talk in terms of microeconomics, it can be said that the 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, which we may illustrate through a simple insurance pricing model:

> Let's say an individual has wealth equal to 10 units. He can invest in risky assets, as a result with equal probability he can get or lose 5 units of wealth.
>
> For a risk-averse consumer, his utility of the expected value of wealth is u(10). 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, this condition can be written in the form of an inequality:

$$u(\frac{1}{2}15+\frac{1}{2}5) = u(10) > \frac{1}{2}u(15)+\frac{1}{2}u(5).$$

It can be concluded that if the individual 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 2). 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.

(Figure 2 about here)

For a risk-lover on the contrary, the expected value of wealth 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 2) into the general insurance fund, since this delivers the level of 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 insurers through our simple model: that is, to sustain the value of risk-lovers' deposits at the level that is greater than the value that risk-averse consumers want to get:

$$N(RL)^* a \leq N(RA)^* b,$$

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.

In addition to the consumption of a risk, it is necessary to regulate the establishment of a risk. For example, consider the issue of new securities. This process involves new agents entering the market in the process associated with the risk, which may adversely affect their well-being. For the issue of new shares, the company must meet certain criteria, which then creates a certain level of confidence (similar to the person who gets the credit).

- *Thus, 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 the risk belongs to, it is necessary to choose the appropriate method of regulating its consumption and production. Note that special attention may be addressed to possibilities of a polycentric[3] approach to risk governance in a future paper.*

Conclusion

In this paper, we have attempted to bring a new perspective to risk by examining it as a separate good. We have noted that, while ubiquitous, risk always comes as a package with other goods. One might say that risk is mysterious, in that it is renewable when viewed over time, the scale of its impact changes how we classify risk as a type of good, and initial conditions influence how the risk manifests. Without knowledge of a consumer's preferences, we cannot actually determinate if risk is a good or a bad.

Any successful 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 to a club good or common pool (Selmier, 2013), governance principles that encompass this transmutation are required.

[3] A polycentric forest management model that fits our suggested public goods governance approach is discussed in Nagendra and Ostrom (2012).

We argued that risk would be best-considered as a common-pool resource 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.

While market economies face issues as well, we proposed the creation of a special insurance fund to transfer cash flows from beneficiaries of risk-laden financial decisions (risk-lovers) to victims of such decisions (the risk-averse agents). This scheme enables a market economy to retain risk in the system while obtaining optimal consumption and allocation of that risk. Through this scheme, an increase in public wealth in Condorcet terms is achievable.

Finally, four discussion points need to be raised that are beyond the scope of this paper, but are worth pursuing in the future. These are: the applicability of our proposed transfer mechanism, a moral hazard problem in the mechanism, the possibility of structuring a polycentric governance system, and risk pricing:

- The applicability of the transfer mechanism from risk-lovers to the risk-averse is not limited to the systemic risk issue. Such a fund may be established for individual traders to incentivize optimal risk-taking. As an example, consider the practice of sign-in bonuses in investment houses when the person is remunerated for joining the organization. In order to avoid excessive risk-taking in which some trading professionals engage, an insurance pay-in fee (a priori incentive, i.e., a voluntary collateral) from the newcomer is not less efficient than deferring and limiting the variable remuneration part (a posteriori incentive). To employ another of our natural resource examples, the Kyoto Protocol prescribed the purchase of pollution quotas in advance of creating said pollution, that is, before the optimal amount of pollution is determined and not after the pollution, when nothing could be changed. While effective, such a transfer mechanism still has the following moral hazard issue that policymakers must face.
- If the described transfer mechanism is in place, then risk-loving agents would do their best not to reveal themselves as risk-lovers before and up to the decision-making moment at which pollution controls (or an insurance pay-in fee) is required. While

this problem must be addressed if this mechanism is made operational, we note that the challenge is similar to the much-discussed case of unobservable efforts that are demanded by the employer and masked by prospective employees. Hence, a solution to the problem might be a set of governance procedures motivating the agent to better reveal himself as a risk-lover even though he would be required to put up a pay-in fee.

- We suggest that another regulatory approach is to structure a polycentric governance system. Systemic dangers arise through concentration of market influence, as we have seen in the case of the Hunt brothers. So an increase in the number of "risk-owners" would serve to decrease the risk for one agent, and may encourage greater care when taking a risk-encumbered position. As an example, consider if shareholders were better-informed of a risk-encumbered decision. As "risk-owners," shareholders are quite focused on managements' methods of regulating risk production.
- Lastly, as we have shown, risk will become a common-pool resource or a public good (bad) when the associated exposure amount exceeds a certain threshold; revision of approaches to risk pricing are required as existing models are limited to capturing only individual risk (even dealing with the portfolio-wide aggregated risks).

Appendix 1: Stylized facts about risk broken down by its types.

	Natural risk	**Individual market risk**	**Systemic risk**
Type of good			
Risk-lover	Good	Good	Good
Risk-averse	Bad	Bad	Bad
Reproducibility	Renewable	Renewable	Renewable (but reproducibility takes more time than for previous two types of risks)
What can be the property	Either the consumption or the result	Either the consumption or the result	The result
The type of risk (private or public)	May be either private or public good	Private	Public

Bibliography

Abolafia, M. F., and M. Kilduff. 1988. “Enacting Market Crisis: The Social Construction of a Speculative Bubble.” *Administrative Science Quarterly* 33(2): 177–93.

Alessandri, P., and A. G. Haldane. 2009. “Banking on the State.” Bank of England working paper.

Anderson, T. L., and P. J. Hill. 1990. “The Race for Property Rights.” *Journal of Law and Economics* 33(1): 177–97.

Brewer, E., III, and J. Jagtiani. 2007. “How Much Would Banks Be Willing to Pay to Become ‘Too-Big-to-Fail’ and to Capture Other Benefits?” Federal Reserve Bank of Kansas City, RWP 07–05.

Buchanan, J. M. 1965. “An Economic Theory of Clubs.” *Economica* 32(125): 1–14.

Dietz, T., E. Ostrom, and P. C. Stern. 2003. “The Struggle to Govern the Commons.” *Science* 302(5652): 1907–12.

Economist. 1980a. “Over-Exposed.” January 26, 1980, pp. 70–71. Accessed March 8, 2013, on The Economist Historical Archive.

Economist. 1980b. “Kismet, Nelson.” May 10, 1980, p. 70. Accessed March 8, 2013, on The Economist Historical Archive.

Eichenwald, K. 1989. “2 Hunts Fined and Banned from Trades.” *New York Times*, December 21, 1989.

Goodhart, C. 2010. “How Should We Regulate the Financial Sector?” *The Future of Finance: The LSE Report.* London School of Economics and Political Science.

Gordon, S. 1974. “Frank Knight and the Tradition of Liberalism.” *Journal of Political Economy* 82(3): 571–77.

Helsley, R. W., and W. C. Strange. 1994. “Exclusion and the Private Enforcement of Property Rights.” *Journal of Public Economics* 53(2): 291–308.

Hughes, J. P., and L. J. Mester. 1993. “A Quality and Risk-Adjusted Cost Function for Banks: Evidence on the ‘Too-Big-To-Fail’ Doctrine.” *Journal of Productivity Analysis* 4:293–315.

Knight, F. H. 1921. *Risk, Uncertainty, and Profit*. Boston, MA: Hart, Schaffner & Marx; Houghton Mifflin. Available online from Library of Economics and Liberty, http://www.econlib.org/library/Knight/knRUP10.html (accessed July 19, 2012).

Knight, F. H. 1924. “Some Fallacies in the Interpretation of Social Cost.” *Quarterly Journal of Economics* 38: 582–602.

Kornai, J. 1986. “The Soft Budget Constraint.” *Kyklos* 39:3–30.

Lo, A. W. 2012. “Reading about the Financial Crisis: A Twenty-One-Book Review.” *Journal of Economic Literature* 50(1): 151–78.

McNutt, P. 1999. “Public Goods and Club Goods.” *Encyclopedia of Law and Economics* (online). http://encyclo.findlaw.com/0750book.pdf (accessed July 4, 2012).

Mishkin, F. S. 2006. “How Big a Problem is Too Big to Fail? A Review of Gary Stern and Ron Feldman’s *Too Big to Fail: The Hazards of Bank Bailouts*.” *Journal of Economic Literature* 44(4): 988–1004.

Nagendra, H., and E. Ostrom. 2012. “Polycentric Governance of Multifunctional Forested Landscapes.” *International Journal of the Commons* 6(2): 104–33.

Ostrom, E., and V. Ostrom. 1977. “Public Goods and Public Choices.” In *Alternatives for Delivering Public Services: Toward Improved Performance*, edited by E. S. Savas, 7–49. Boulder, CO: Westview Press.

Penikas, H. 2012. “An Optimal Incentive Contract Preventing Excessive Risk-Taking by a Bank Manager.” Higher School of Economics Research Paper No. WP BRP 03/FE/2012. Available at SSRN: http://dx.doi.org/10.2139/ssrn.2049870.

Reinhart, C. M., and K. Rogoff. 2009. *This Time is Different: Eight Centuries of Financial Folly.* Princeton, NJ: Princeton University Press.

Samuelson, P. A. 1954. “The Pure Theory of Public Expenditure.” *Review of Economics and Statistics* 36(4): 387–89.

Schlager, E., and E. Ostrom. 1992. “Property-Rights Regimes and Natural Resources: A Conceptual Analysis.” *Land Economics* 68(3): 249–62.

Selmier, W. T., II. 2013. “Why Club Goods Proliferated in Investment Finance.” Working Paper W13–10. Paper #1 in the series: “Addressing the Complexities of Property Rights in Financial Markets.” Bloomington: Indiana University, The Vincent and Elinor Ostrom Workshop in Political Theory and Policy Analysis. http://www.indiana.edu/~workshop/publications/materials/W13-10_Selmier.pdf.

Shapiro, C., and J. Stiglitz. 1984. “Equilibrium Unemployment as a Worker Discipline Device.” *American Economic Review* 74(3): 433–44.

Watkins, G. P. 1922. “Knight’s Risk, Uncertainty and Profit.” *Quarterly Journal of Economics* 36(4): 682–90.

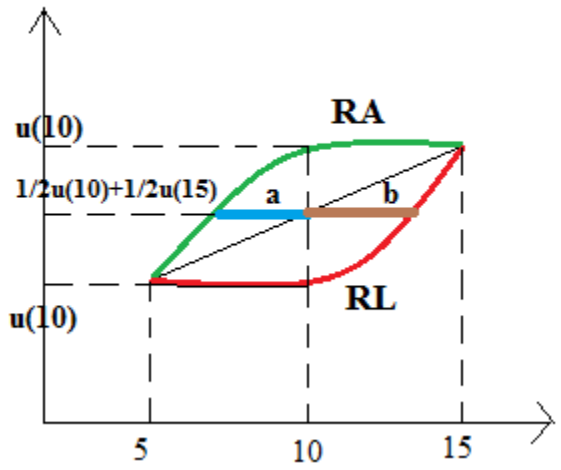
Weimer, D., and A. R. Vining. 2005. *Policy Analysis: Concepts and Practice.* 4th edition. Englewood Cliffs, NJ: Prentice Hall.

Woolley, P. 2010. “Why are Financial Markets So Inefficient and Exploitative—and a Suggested Remedy.” In *The Future of Finance: The LSE Report.* London: London School of Economics and Political Science. Available online at http://www.futureoffinance.org.uk/.

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"

Figure 1: A law and economics typology of the four types of goods.

Sources: Adopted from McNutt (1999: 930, tables 1 and 2); Ostrom and Ostrom (1977).



Caption: OX axis represents the money equivalent of "gambling" outcome; OY axis brings the value of utility corresponding to the outcome.

Figure 2: Alignment of risk-lover's and risk-avoider's utility when "gambling."