

Regulations in Organisms and Organizations

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Abstract

From the mainstream economic theory, unregulated free markets usually are optimal. Regulation is warranted only when market is imperfect. However, all organisms and organizations regulate their internal environments. Many also regulate their external environments. In general, “higher” organisms and organizations regulate their internal environment more precisely with higher resource expenditure than “lower” organisms and organizations. Organisms and organizations regulate their internal environments and external environments to gain competitive advantage. Rules of market competition are part of the regulatory systems. Hence regulation is a more fundamental concept than market competition.

Initial draft. Comments welcome.

1. Introduction

From the mainstream economic theory, unregulated free markets usually are optimal. Regulation is warranted only when market is imperfect. However, all organisms and organizations regulate their internal environments. In general, “higher” animals, such as human beings, regulate their internal environment more than “lower” animals, such as jellyfish. Most people think human beings are more perfect than jellyfish. Similarly, in social organizations, “higher” professions, such as physicians, are more regulated than “lower” professions, such as cashiers. While “higher” professions could be less “perfect” than “lower” professions, it is the “higher” professions that dominate resource distribution in social systems. In this paper, we will study the functions of regulation and its relation with market.

One important function of regulation is to maintain systems in desirable conditions. For example, the body temperature of warm blooded animals is tightly regulated at narrow range to keep body function at highly effective condition. This regulation is highly energy intensive. The body temperature of cold blooded animals is not continuously regulated with internal energy resources. This saves them energy expenditure but at the same time, their bodies are not always at most desirable conditions. Cold blooded animals often bask under the sun to increase their body temperature. When possible, many cold blooded animals keep their body temperature at similar levels to that of warm blooded animals (Gisolfi and Mora, 2000). This shows that both warm blooded and cold blooded animals prefer similar internal environments. Warm blooded animals regulate their internal environments more precisely with higher resource expenditure. Cold blooded animals regulate their internal environments less precisely with lower resource expenditure.

Similarly, regulatory measures are taken to keep social systems in stable and desirable conditions. When recessions occur, the market response of banks would be to increase interest rate to compensate the increase of default risk. Higher interest rate would push economy into deeper recession. Regulatory bodies, such as central banks, would lower interest rates to reverse the slow down of economic activities. However, there are costs associated with regulatory measures. After the burst of internet bubble in 2000, regulatory bodies lowered the interest rates in an effort to generate new bubbles to offset the bursting of old bubbles. Indeed, housing prices and commodity prices rose sharply. The high commodity prices eventually slowed down overall economic activities, which caused the reversal of housing prices, which in turn exposed the large scale liability of sub-prime and prime mortgages. The housing bubble and commodity bubble proved to be even bigger than the internet bubble before them. Their bursts brought the economy to its worst recession since the Great Depression.

All organisms and organizations regulate their internal environments. Many also regulate their external environments. For example, cold viruses make us sneeze so they can spread to other hosts. As the most dominant species on the earth, human beings' regulatory efforts are most visible. We cut through mountains to build roads; We clear fields to erect houses; We apply the chemicals to kill weeds in the lawns; We burn the forests to plant grains. Human agriculture activities probably have the greatest regulatory impacts on the landscapes. Forests are replaced by fast growing grasses, such as wheat, rice and corn, to satisfy high metabolic needs of human beings. We speculate that the spread of grasses in general has been regulated by mammals. Grasses first appeared on the earth about sixty million years ago, around the time when dinosaurs went extinct. The extinction of dinosaurs provided mammals with wide open ecological niches and mammals multiplied rapidly. Mammals, as warm blooded animals, have much higher metabolic rates than cold blood animals. Fast growing grasses can provide more energy than trees. Hence the spread of grasses will benefit mammals. Since mammals are more active than

reptiles, they disturb the landscape more, which makes the environment more hospitable to fast growing grasses than slow growing trees. In the past sixty million years, grasses have spread very fast and now covering approximately 20% of the earth's land surface (Kellogg, 2001). If our speculation is true, then mammals have played an active role in regulating the environment to benefit the spread of grasses, which in turn benefits the spread of mammals. But not all species benefit from the rise of mammals and human beings. The period of rising human domination is also one of the periods of the mass extinction in the evolutionary history.

In the human society, organizations often apply regulatory tools to improve their competitive edge. Large companies in an industry often propose regulations that are costly to implement to drive out smaller competitors. Technologically advanced states often develop and enforce tough patent laws to create monopolies while technologically less advanced states prefer freer flow of knowledge. Regulations are an important tool in market competition. One cannot really separate regulation from market competition.

The importance of regulation can be best understood by studying the effect when part of an organism escapes regulation and turns into a free market. This phenomenon is called cancer in medicine. "All cancer cells share one single, common feature: they have lost their ability to regulate DNA synthesis and cell division" (Clark, 2008, p. 163).

A cancerous tumor, for example, is born when one batch of cells no longer cooperates with others. By dividing endlessly, or by failing to die properly, these cells can destroy the necessary balance that makes a living individual person. Cancers break the rules that allow cells to cooperate with one another. Like bullies who break down highly cooperative societies, cancers behave in their own best interest until they kill their larger community, the human body. (Shubin, 2008, p. 119)

Cells need to break several regulatory barriers to become free. Cancer tissues have to induce blood vessels to grow new branches into them so they can obtain resources for further growth (Clark, 2008). By all accounts, cancer systems are highly innovative.

While regulations are indispensable to organisms and organizations, the effects of regulatory systems can be very subtle. For example, immune systems will attack and destroy foreign objects. But some viruses evolve to integrate into host cells tightly or resemble host's own tissues. When host's immune systems attack these viruses, either immune systems have to work less vigorously or immune systems will cause damage to the host's own tissues and organs (Clark, 2008).

Similarly, in human societies, activities that only benefit a small group of people are often more successful when they are integrated into activities that are essential to most people. The title of a book, *The Best Way to Rob a Bank Is to Own One* (Black, 2005), tells it all. An important development in the financial industry in the last several decades is the gradual reintegration of commercial banking and investment banking, which put the risky trading activities under the same protective umbrella that used to cover unsophisticated individual depositors only. It is this extension of regulatory privilege that enables the sophisticated financial institutions to engage in highly leveraged activities, which “guaranteed record profits in the early years. ... It also makes it inevitable that there's going to be a disaster down the road.”(Black, 2009)

In this paper, we have adopted an integrated approach to understand regulations in organisms and organizations. Insights from biology are often mentioned in economic literature. However, it is often thought that the ideas from biology cannot be literally applied to human societies because there are some fundamental differences between human beings and other biological organisms. One major argument is that human activities are purpose driven while biological evolution is

generated by random mutation. This argument confuses activities at different levels. Many animal behaviors are purpose driven and human biological evolutions are largely determined by genetic mutations as well (Jablonka and Lamb, 2006; Cochran and Harpending, 2008). Furthermore, more and more research in biology has provided strong evidence to support the old idea that biological evolution is not entirely random. In a recent review article on evolutionary theory, Rando and Verstrepen (2007) stated:

According to classical evolutionary theory, phenotypic variation originates from random mutations that are independent of selective pressure. However, recent findings suggest that organisms have evolved mechanisms to influence the timing and genomic location of heritable variability. ... Both, Darwin and Lamarck, two of the founders of evolutionary theory, predicted evolution itself may favor the development of self-guiding mechanisms, maximizing variability where and when it is most likely to yield positive changes while minimizing phenotypic variability when and where it is not needed. It is increasingly difficult to argue that their general idea of nonrandom evolution was entirely wrong.

Both biological activities and human activities are governed by the same economic principles. Regulatory patterns observed from other organisms will provide valuable lessons to human societies.

The rest of this paper is structured as follows. Section two discusses the relation between regulation and market. Section three concentrates on the regulation on financial institutions. Section four provides further analysis on policy issues.

2. Regulation and Market

From the mainstream economic theory, the purpose of regulation is to “make the market work”. Regulation only plays a secondary role with respect to market. We will examine the actual roles played by market and regulation in social and biological systems to determine their relative importance.

While all organisms and organizations regulate their activities, the levels of regulations differ. Small simple organisms or organizations generally regulate less than large complex organisms or organizations.

Many small organisms obtain oxygen by diffusion through their body surfaces, without having any special respiratory organs and without circulating blood. Larger and more complex animals often have specialized surfaces for gas exchange and also a blood system to transport oxygen more rapidly than diffusion alone can provide. (Schmidt-Nielsen, 1997, p. 16)

The above discussion shows that simple organisms can utilize a market for gas exchange while complex and large animals need more regulated systems. The theory of pure market exchange is an idealization of simple organisms and organizations. Large exchange places, such as New York Stock Exchange, are always governed by complex regulations.

When certain materials are abundant, organisms and organizations often adopt a simple diffusion approach, or market approach. For example, the absorption of oxygen in humans occurs inside lung through simple diffusion process. This method works because oxygen density from the atmosphere is higher than the oxygen density inside human body. When biological organisms need to move particles against the concentration gradient, active transport is required. An example of active transport is the sodium-potassium pump of the nerve cells. It transports the

potassium ion from the exterior to the interior of the cell and sodium ion the opposite direction against the concentration gradient. The purpose of this active transport is to maintain gradient differential along the membranes of the nerve cells so signal can transmit rapidly. Since active transport is a non spontaneous process, energy must be supplied from the external sources and active regulation is required.

There are parallels in human societies. When merchandises diffuse from high concentration places to low concentrations places, markets are often the best means. For example, many people will gather at grocery stores or supermarkets, where merchandises are of high concentration and bring them to individual homes, where merchandise concentration is low. When developing new products that are previously nonexistent and hence of low concentration, regulatory efforts are often adopted. Resources are allocated to scientific research and R&D efforts through regulatory guidelines and company policies instead of markets.

A system that is more resourceful or wealthy has a stronger incentive to regulate the entry of new members to share its wealth. If we stand at the US Mexico border crossing at San Diego, we will notice that there is no control at Mexico side at all. People and vehicles get into Mexico freely. The US side, however, carefully checks the identity of travelers to limit the entry only to selected people from Mexico so the natural and institutional resources are not diluted. All organisms have skins or membranes that are selectively permeable. Through membranes, organisms absorb and retain resources and discharge wastes. Membranes of organisms also prevent the entry of foreign entities from sharing their resources. In general, the more resourceful organizations or organisms are more exclusive and more tightly regulated than those that are less resourceful.

Wealthy countries not only regulate the flows at their borders more than poor countries, they also regulate their internal working environments more. High paying jobs often require lengthy and

costly training. But discount rates for individual persons are high (Ainslie, 1992). If left to individual decisions, a substantial portion of people will leave school early. To ensure a uniformly high standard working force, most wealthy countries regulate their education systems to require a minimum number of years of mandatory education. This mandatory educational system, while essential for a high standard of living in the wealthy countries, is a constant source of strain between children and their parents and between students and their educators. Many poor countries follow the example of wealthy countries to expand their education systems. Very often, the number of graduates greatly exceeds the number of job openings. This generates a potential source of instability and revolution.

Large firms and small firms often have different regulatory structures. Large firms have more strict policies in hiring employees than small firms. Once hired, new employees in large firms often go through lengthy and thorough training while new employees in small firms are required to work immediately. While large firms are more regulated internally, they often prefer a less regulated external environment so they can compete freely. Small firms often prefer a more regulated business environment. For example, small firms often lobby governments to hire local contractors in government projects to avoid competitions from large outside firms. The same argument applies to countries. Wealthy countries prefer free trade most of time because free trade increases the market size of their products. Poor countries often support infant industry policies so their new industries can be shielded from competition from more established competitors (Stiglitz, 2002). The infant industry policy has often been criticized because once government provides support to a new industry, it is difficult to decide when this industry should become independent. Since our theory is an integrated theory of organisms and organizations, it will be helpful to look at infant care practices. It is difficult for parents to decide when their infants should become independent. But parents would not expose infants to “market competition” immediately after they are born. The fact that we can not time the optimal moment to let infants

become independent does not mean infants should not be supported. For the same reason, the difficulties involved in supporting new industries does not discredit infant industry policy itself.

It is often argued that unregulated free market generally produces the optimal results. To understand this argument, we will consider optimality in lawn management. If lawns are left to free market competition, weeds, such as dandelions, quickly dominate the lawns. For dandelions, free market competition is optimal. But most people prefer to regulate lawns with weed killers to remove as much weeds as possible. This shows that the concept of optimality means different things to different parties. A result favored by one group of people is not necessarily favored by other groups of people.

In economic theories, it is often argued that the increase of efficiency will reduce the need of regulation. We will examine the regulation of digestive system to understand the relation between the efficiency of a system and its regulation. To increase the efficiency to break down the food molecules, our stomachs contain highly acidic juices, which are also very efficient in breaking down our own tissues. The cells of the inner surface of our stomach have to be replenished frequently to compensate erosion by acidic juices. The more powerful the digestive system becomes the stronger need to regulate it and the higher cost. In general, more efficient systems require more instead of less regulation. For example, Cars are more efficient in transporting people than bicycles and car traffics are more regulated than bicycle traffics; high voltage systems are more efficient in transmitting electricity than low voltage systems and the regulation on high voltage systems are tougher.

While many economists preach the theory of unregulated free market, the profession of economists itself, as well as other academic disciplines, is highly regulated by the tenure and promotion system. Only those contract lecturers who are not in the tenure system are subject to

the perils of free market. They get much lower pay than those inside the regulated tenure system and have to constantly worry about their jobs in the near future. This shows again that privileged groups are highly regulated and are maintained by regulation, while in a freely competing market, most earn very low income.

3. Regulation on Financial Institutions

In most business transactions, such as in retail, service and payment occur simultaneously. In the check out counter of a grocery store, customers pay cash and get groceries. In most of the cases, that is the beginning and the end of transactions. In other business transactions, especially in financial services, there is often a large time gap between payment and service. In insurance, one pays premium regularly but gets service only when incidents that insured for occur. In pension funds, one often starts paying at 20s and doesn't receive benefits until their 60s. Because of the large time gap in these types of services, uncertainty is high and the level of trust is low. To reduce uncertainty and build up trust, regulations by entities that are more stable and long lasting than individual businesses, such as governments, are required to protect individuals and companies involved in long term transactions. In a highly regulated financial system, trust in the financial system is high and people are willing to invest their money in such systems. With the increase of wealth under its management, the profit and profit potential increase as well. However, much of the short term profit potential cannot be realized in a highly regulated financial system. Therefore, there is a constant complaint among the practitioners that the financial system is over regulated. For many years, the US financial system was considered over regulated by many practitioners. At the same time, many foreign assets flow into US financial system because of the safety in a highly regulated system. The tremendous amount of wealth managed by the US financial system generates great political pressure to deregulate. When the financial systems finally deregulated, the trust that was accumulated over many years of the regulation was still

intact. But the types of transaction that are allowed in a deregulated environment greatly increased. This leads to much higher income for the practitioners in the financial industry and higher profits for financial institutions, which seems to confirm that a deregulated financial system is superior to a highly regulated one.

However, the time horizons for a healthy financial system and for a healthy income for individuals are very different. Financial contracts often last many years. For example, a mortgage contract may last forty years. Bonuses to individual employees, however, are distributed annually. When mortgages are securitized, the value of a forty's contract is reflected in a single transaction. Therefore, there is a great need to pop up the market value of the mortgage so the annual bonuses for the individuals involved will be maximized. Inevitably, these mortgages will be revalued sometime in the future, as we have witnessed in this financial crisis. While there are nominally "independent" third parties, such as financial regulators from governments and rating agencies, most participants in the game have highly uniform incentives. As a result, expert voices are highly uniform as well.

The differential of time horizons between individuals and institutions is also reflected inside each financial institution. Most of the trades sales people or traders proposed are rejected by risk managers. From the point of view of sales people and traders, the restrictions imposed by the risk managers greatly reduced the profit for the bank and for themselves. But from the bank point of view, allowing unsound trades to be executed will jeopardize long term prospect of the bank. There is a constant tension between the sales on one side and risk management on the other side. In a financial institution where credit and market risk regulations are rigorously enforced, the actual risk is small. To keep emphasizing risk increasingly looks like crying wolf when there is no wolf. In the end, the principle of risk management is traded for high short term profit.

4. Policy analysis

The current financial crisis is often described as the result of deregulation of financial system. The reality is more subtle. On the one hand, regulatory framework on the financial institutions has moved toward a market based measurement from an accounting based measurement. This allows financial institutions to operate at higher leverages, which enhances the profit levels of financial institutions. But it also subject financial institutions to more serious systematic risks over downturn (Chen, 2003). On the other hand, government guarantees to financial institutions have been extended from commercial activities to trading activities. The original intention of government guarantee was to protect the safety of deposits. But because of the extension of government guarantee, financial institutions enjoy large credit lines in speculative trading activities, which enable them to make large amount of profit with little effort and let the governments bail out them in case of losses. In effect, governments become the largest enablers and protectors of speculation. As a result, financial institutions are free to seek activities with the highest upside potentials, which are often the same activities with the highest downside potentials. Therefore, government support destabilize instead of stabilize the financial markets and the whole society.

In finance, diversification and liquidity are generally regarded as positive. However

Consider the chemical industry of forty years ago, back when such pollutants as PCBs were dumped into the air and water with little or no regulation. For years, the mantra of the industry was “the solution to pollution is dilution”. Mixing toxins with vast quantities of air and water was supposed to neutralize them. Many decades later, with our plagues of hermaphrodite frogs, poisoned ground water, and mysterious cancers, the mistake in

that logic is plain. Modern bankers, however, have carried this mistake into the world of finance. (Janszen, 2008, p. 43)

Modern bankers bundle illiquid mortgages into liquid mortgage backed securities and distribute these securities to diverse investors. With diversification and liquidity, risks are diluted. As a result, the society accumulate large amount of risk without feeling particularly alarmed. If government or government linked agencies stop guaranteeing mortgages, this will reduce the liquidity of mortgage backed securities. A major cause of this financial crisis is the widespread distribution of the toxic assets such as the securities backed by the low quality mortgages. If mortgages become less liquid, financial institutions will have to carry most of their mortgages to term. Since banks have to bear the risks themselves instead of transferring risks to less informed third parties, there will be less incentive to generate toxic assets in the first place. This is similar to chemical industry. If companies are required to carry pollutants generated by them, there is much less incentive to generate otherwise profitable products. Right now, it is up to individuals to become “financially literate”. However, “the shareholders themselves --- the millions of lumpen pseudo-investors who own mutual funds ... had neither the time, the money, nor the training to be real capitalists; they were merely chumps for Wall Street.” (Bonner and Wiggin, 2006, p. 214)

The regulation of financial institutions and the regulation of individual financial arrangements are intimately related. Many regulations, such as mandatory pension contribution, are passed to channel more and more assets through financial institutions. Many pension funds are managed by financial institutions as full service mutual funds, which charge very high annual fees. These regulations not only greatly increase the amount of wealth that is managed by financial institutions but also tie ordinary people’s life closer to financial institutions. Because of this, governments face great political pressure to save financial institutions when they are in trouble.

Reducing or abolishing mandatory pension contribution will increase the amount of wealth controlled by ordinary people and reduce the amount of wealth controlled by financial institutions. More importantly, decoupling the interests of ordinary people from that of the large financial institutions will simplify the policy making process. It is often argued that the discount rates of ordinary people are too high for themselves to manage their future. But the same argument was not extended to credit card debt. Because of high discount rate of individuals, consumers often accumulate large amount of credit card debt at high interest rate. There has been no similar regulation restricting the amount of credit card borrowing. In general, the interest rates on credit cards are much higher than the rate of investment return on pension funds. Why pension contribution becomes mandatory while credit card debt was not restricted? Mandatory pension contribution benefits financial industry. That is why it is regulated. High credit card debts also benefit financial industry. That is why credit card debts are not regulated.

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