

The Role of Regulation in Mitigating the Impact of International Capital Flows on the Environment: A Dynamic Modeling Perspective.

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Introduction

The large scale movement of capital in the form of financial flows and foreign direct investment is a relatively recent phenomenon despite the fact that international trade has been an important part of commerce throughout the industrial era. Such flows have constituted a major and perhaps defining part of the process of globalization over the past two decades. At the same time, the environmental problems created by industrialization have also grown to have global range, particularly as they are replicated around the world, largely as a result of international capital and technology flows. What were once local problems of resource depletion, air pollution, etc. have grown to include truly global problems such as biodiversity loss and global warming. The impact of international trade on the environment has received significant attention, but the impact of international financial flows has received less. This paper seeks to provide a framework for thinking about the relationship between international investment and the environment, and for identifying areas which may require new types of regulation. This framework is based on a dynamic modeling perspective, where the global economy is seen as a series of nested and interacting systems, governed by dynamic feedback loops.

The Role of Capital Flows in Globalization

The era of globalization has seen an increase in the level of international trade, yet its defining characteristic has been the increasingly transnational nature of investment and production. Global GDP is currently on the order of \$40 trillion annually, while international trade is about 10% of that. International investment is, in turn, about 10% of this, or about half a trillion dollars per year. This is a substantial number in its own right and is particularly significant because much of this investment is used to build industrial capacity which results directly in the use of resources and production of goods.

While international trade and investment are superficially similar, their dynamics are fundamentally different. In a world without international capital mobility, the assets produced within a given country must be employed within that country. They may be reallocated between industries, as domestic or international demand may require, but they are essentially captive within their country of origin. Trade between nations is, then, basically the exchange of goods. In Ricardo's famous example, wine from Portugal is exchanged for cloth from England. The realities of finance and exchange rates make this picture more complex (as we begin to see in the Heckscher-Ohlin model and its descendants), but the basic Ricardian picture has proven itself to be tremendously useful as a model for understanding international trade and the gains to be made from it.

Unfortunately, the Ricardian picture has proven so useful that many have been held captive by it when trying to comprehend the contemporary regime of globalism. One of the central assumptions of Ricardo's model – one which he makes quite explicitly – is that capital is fixed in its country of origin. Ricardo's analysis is fundamentally *international*, which is to say that he discusses trade between national markets.

But what, fundamentally, is a market? One way of thinking about a market is that it is a mechanism for allocating scarce means toward competing ends. In a modern industrial economy, capital is a critical, and oftentimes limiting, means. It is useful, therefore, to think of a market as an economic space across which capital can be reallocated. During the international era of the 19th and 20th centuries, this space was generally the nation state. In the rapidly emerging global era, this space is the entire planet.

The Role of Environmental Regulation in Markets

While spontaneously evolving market mechanisms do a miraculously efficient job of allocation under many circumstances, there are a host of well understood situations where the market fails to function properly. Classic examples include the provision of public goods, cases of missing markets, asymmetric information, externalized costs, and a host of other situations which occur commonly in economic activity.

Furthermore, markets only address the issue of allocation. This is to say that, given a certain initial distribution of resources among market participants, the market allows each participant to obtain a bundle of goods such that he or she could not be made better off by a trade without making others worse off. This process of allocation presupposes two critical factors: distribution and scale. The idea of distribution addresses the problem of who has what percentage of the total resources. The idea of scale addresses the total size of that resource pool. While market processes certainly end up affecting distribution and scale, they do not necessarily affect them in socially desirable ways (as they are generally assumed to do for allocation). Distribution and scale are the parameters with respect to which the efficiency of allocation is defined.

In the United States economy, as in other national economies, there are a host of regulations designed to protect the environment and other things that are of value to society, but are not directly valued by the market. This paper will focus on regulations related to environmental issues, but similar analysis could be applied to other areas. Some of these regulations seek to restore the functioning of the market by market means: internalizing costs, assigning property rights, requiring the disclosure of information, etc. Where this is not possible, regulations seek to protect the environment directly by prohibiting or requiring certain actions. The common element in each of these types of regulation is that the government acts to modify the market to better serve the public interest.

The environmental problems which have come to be associated with global financial flows generally also stem (by my definition) from limitations in the market. A working list of financial issues which have direct or established indirect negative effects on the environment might include: Financial instability, high indebtedness, high interest rates, investment uncertainty, fiscal austerity, competition for investment capital, and (more controversially) a skew of wealth distribution toward the elite. John D. Shilling provides a brief and cogent overview of the environmental impacts of financial markets in the document which began this seminar series¹.

¹ John D. Shilling, Financial Markets Do Impact the Environment: Overview for New America Foundation Project The Environment and International Finance, New America Foundation, 2002, Washington DC.

Given these problems, some set of regulations would seem to be warranted, yet the problem of how to do this – or even how to think about this, is quite complicated. International capital flows come in a bewildering variety of distinct yet interrelated forms. Major categories of mobile capital include: foreign direct investment, long and short term portfolio investment, foreign exchange market operations, various derivatives, bank lending (including both commercial and multilateral banks) along with the associated debt service, and development aid. Regulations also come in a wide variety of types, some better suited to a given problem than others. Some general categories of regulations include: Prohibitions and proscriptions (a.k.a. command and control techniques), taxes and incentives, the creation of property rights and associated markets, transparency requirements, assignment of responsibility and liability for use in tort systems, and the establishment of voluntary standards.

There are real connections between international capital flows and environmental problems. These flows take on a variety of disparate forms, and there are a great many different types of regulation to choose from. Given these factors, we need a consistent framework for thinking about capital flows, their impact on the environment, and the role of regulation in mitigating this impact.

A Framework for Thinking about Environmental Regulation

The field of dynamic modeling provides a useful set of concepts for thinking coherently about environmental regulation. Every model, be it formal or purely conceptual, must begin with a pre-analytic vision. What are the major parts of the system in question and where are its boundaries? In thinking about capital flows, I would like to begin with a very simple vision: a market, embedded in a society, embedded in a biosphere.

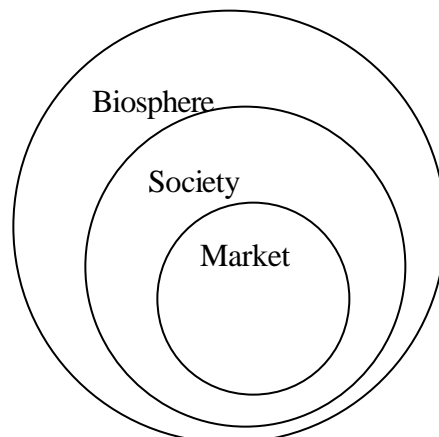


Figure 1. Biosphere, society and market as nested subsystems.

A fundamental concept here is that the market is largely (but not completely) self regulating. In a market economy, there is no need for society to fix prices on most goods. If the price goes too high, supply will increase, demand will decrease, inventories will build up and prices will come back down to a market clearing level. Prices are regulated, but only in the modeler's sense of the term. They are regulated by feedbacks inherent in the structure of the market.

The self-regulation of the price level is an example of a feedback loop. The feedback loop is a central idea in dynamic modeling. Generally speaking, feedback loops are used

to keep a dynamically generated parameter within given range. The range itself may change dynamically. In economic terms, this parameter might be anything that we generally think of as having an equilibrium value: the price of an asset, an interest rate, the savings rate, etc.

The idea of a feedback loop is also useful for thinking about market failures and regulation. A market failure is a case where the feedback that we would like to see regulating a process in the market has been broken, or never existed in the first place. Such an open loop can cause problems in the market (what are generally referred to as market distortions), when some of the costs of an action are borne by a party external to the action.

Also, when an open loop is left unchecked, the impacts from a failure of the market to regulate itself or to be regulated can intrude directly on the spheres in which the market is embedded – the social and environmental spheres. The pollution of a river, for example, leads not only to the economic costs associated with more expenditures for processing of drinking water for those who can afford it and higher health bills and lost income for people who can not, it also leads to direct social costs. The suffering associated with ill health and the feelings of embitterment and distrust which might be engendered by such pollution are disruptive to the social system in its own right. In the environmental system, the loss of spawning beds for fish may well reduce the value of the fish catch, but can also be seen a disruption of the complex ecosystem of which fish spawning is a part – a direct impact on the environmental sphere which might lead to unexpected consequences elsewhere. The imbalance created by a broken feedback loop may be felt in areas which are important to the quality of human life, to ecological resilience, or other non-market areas while having only minimal impact on the market itself.

One reason that it is worthwhile to separate the nested subsystems of market, society, and environment is that, speaking very generally, they tend to respond to stimuli on different timescales.

The market exhibits the fastest dynamics, generally responding to shocks in a period of days to months. A poor earnings report will change the price of a stock in minutes to hours. A frost in Florida will raise the cost of oranges in New York in days to weeks. Even in the case of the broad macroeconomic dynamics associated with the business cycle, we are talking about a period of a few years at most. These quick dynamics make the market tremendously flexible: change the rules, and the market will adapt with only a minimal lag.

The social system, in contrast, operates more slowly with a response time measured in years to decades. The Clean Water Act represents a formal regulation coming out of the political end of the social system. It has had a tremendous positive impact on the quality of American waterways, but it took decades of organizing, planning, and implementation to bring about. The duration of the election cycle (generally 4 to 6 years) is an important parameter in this process.

The social system also includes less formal means of regulation. An example of this kind of informal shift is the campaign during the 1970s and 80s to reduce littering in the

United States. Gradually, a norm developed that made littering a generally reprehensible behavior – and American parks, streets and roadsides are much cleaner for it.

The ecosystem, while it contains dynamics of many different durations, it is typified by very long dynamics, on the scale of decades to centuries. Once logged, a forest takes decades to regrow. In the case of an old growth forest, it takes centuries. It is taking centuries for anthropogenic carbon dioxide emissions to exhaust the atmosphere's ability to absorb them without drastic climate change. Evolution operates over a timeframe of hundreds of thousands to millions of years – an alarming thought when we consider the rate at which market and social processes have been driving species to extinction.

A second way of differentiating between the three nested systems is suggested by the ecologist's notion of trophic level in a food chain. A simple ecological system might contain grass, gazelles and, cheetahs. Grass can live without gazelles or cheetahs. Gazelles can not live without grass but can live without cheetahs. Cheetahs can not live without gazelles, and therefore can not live without the grass which supports the gazelles (and, incidentally, provides them with cover from which to hunt).

The nested ecological, social, and market systems depend on each other in a similar way. The biosphere can regulate itself reasonably well without human society or markets. Society can not exist without a functioning natural environment. In contrast, society does not (in principle) depend on the market. Granted, society has come to rely heavily on the market, but this is secondary. Gazelles have developed reproductive strategies that rely on the cheetah to maintain a healthy gene pool, yet this reliance is not of the same order as the gazelle's dependence on grass. Before the emergence of the division of labor and of markets, people presumably lived lives of reasonable social fulfillment as hunter-gatherers – albeit at a much lower level of material consumption.

The market, in turn, depends on a functioning social system (information flow, rule of law, enforceable contract, basic honesty, etc.), and also on a functioning natural system, which provides society with such basic things as stable and appropriate climate, air, and water and also with the materials and waste sinks on which the market process feeds.

The power of natural dynamics underscores the fundamental role that the environment plays in all human activity. Just because the environment is slow to react is not to say that its dynamics are not a force to be reckoned with. Natural processes tend to be as inexorable as they are slow. If society fails to regulate the market, nature will eventually regulate it for us – but this is not a desirable outcome. If society did not act to deal with ozone depletion from CFCs, the biosphere would have reacted by letting skin cancer and related problems eliminate vulnerable species (including a good many humans). A new equilibrium would have been reached eventually. As effective as this kind of regulation may be, in its own way, it is often not the sort of regulation we would want.

As James Lovelock (the originator of the “Gaia Hypothesis”) and others have pointed out, the biosphere will – in the long run – look after itself. A million years from now, there will almost certainly be living species on the earth. Whether there will also be advanced industrial societies based on markets is quite another matter. The reason that regulation must be done at the societal level (rather than leaving it to nature to adapt) is that nature

cares not at all for society or the economy. We must conduct regulation in the middle, social, system because it is the highest level that is concerned with our survival.

Now that we have analyzed the system into three parts, and have looked briefly at how they depend on one another, we can look again at the role of regulation. Regulation, as the term is normally used in a policy context, refers to cases where the formal, political portion of the social system takes action to close or otherwise modify a market feedback loop in order to try to keep some aspect of market activity within a politically agreed upon range. This goal may be purely allocative – promoting an endogenous market end like stability or efficiency. It may be distributive – promoting a basically social end by preserving a resource for use by all, regardless of their ability to pay. The goal may also relate to scale – insuring that an economic process does not overwhelm the critical yet slow moving social and environmental processes on which it depends.

The Regulatory Challenges Posed by Globalization

I have taken an extended detour to build up this simple, three tiered model because it can be used to illustrate the challenges posed to the usual regulatory processes by the globalization of capital flows. So long as there is a one to one to one relationship between environment, society, and market, there is a reasonable chance that society might be able (and inclined) to regulate the market to serve politically agreed upon ends. At the beginning of the 21st century, we find this relationship breaking down in two important ways.

The first change, which is not directly related to capital flows, is that environmental problems are becoming increasingly global. Climate change is the clearest case here. The carbon dioxide emitted by one nation does not stay within the borders of that nation, but is equally problematic for all nations. A somewhat analogous problem occurs when the same set of economic and technological methods spread throughout the world. Seemingly independent systems in diverse nations become locked into the same methods, which create the same local problems in each system. An example of this might be the loss of soil microbes and related erosion associated with the green revolution.

In terms of our nested systems model, these global problems lead to an expansion of the effective size of the biosphere, so that multiple societies and markets are forced to share a common concern for the same environment, rather than simply worrying about their own environment and their own welfare. The result is a tragedy of the commons situation where it is not rational for one nation to act unless all other nations are also forced to act.

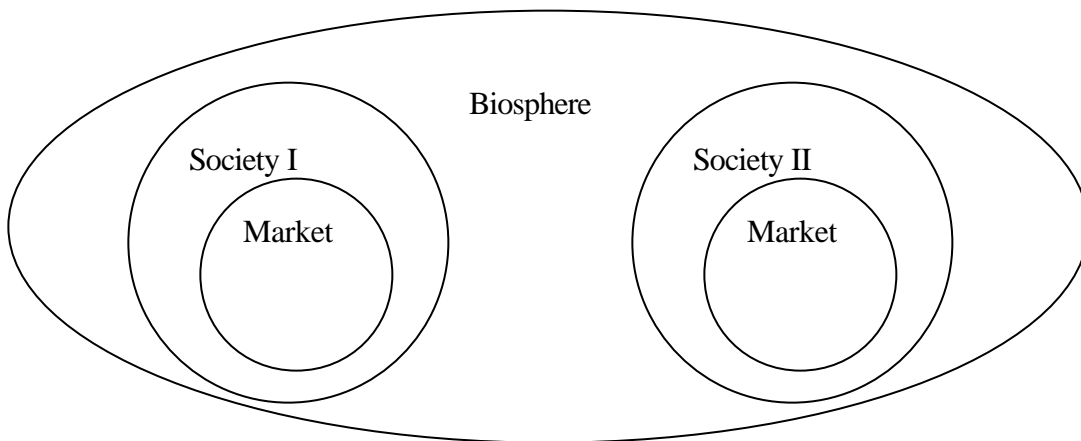


Figure 2. National markets and global environmental problems.

The second way in which the three tiered model is breaking down in the current era is the direct result of mobile capital. As discussed above, the removal of barriers to international investment is resulting in the effective pooling of the productive capacities of the many nations of the world. A much touted effect of this pooling is that it allows capital to move to the location where it can find the greatest return. This implies that, all else being equal, mobile capital should increase global output. This seems to be a valid observation, at least so long as the social and environmental systems retain their current level of functioning, but this added output comes at a substantial cost in terms of governance.

If we return to the idea of a market being a mechanism for allocating scarce means toward competing ends, we see that the pooling of capital is truly the combining of many national markets into a single global market. Our once-nested system diagram now looks like this:

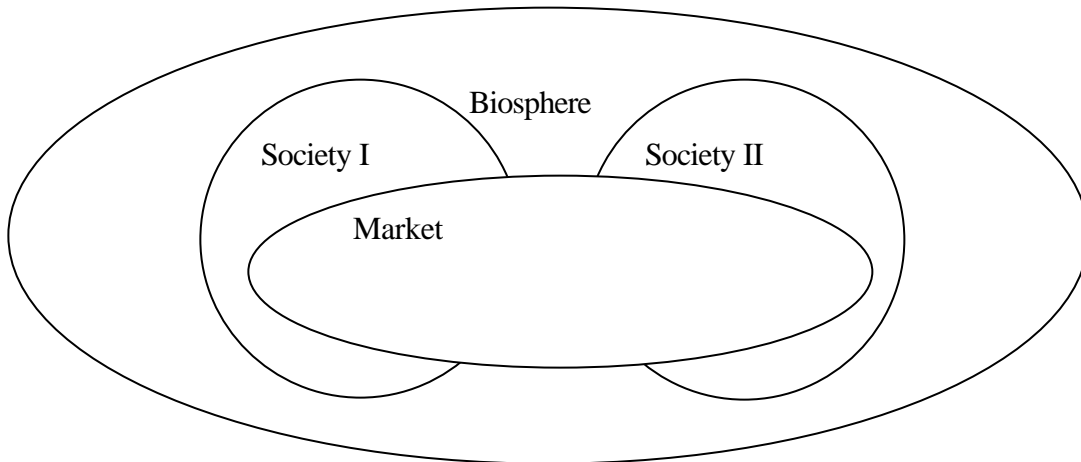


Figure 3. National political systems with global environmental problems and global markets.

When capital becomes freely mobile, trade between nations becomes functionally equivalent to trade between regions within a single nation.

The obvious difference between the globalized system and the national system is that the market is no longer encapsulated within a society. As discussed earlier, there are many

things which markets do not do well and it is the proper roll of societal, and often explicitly political, regulation to compensate for these weaknesses. Such compensation is much more difficult, and in some cases impossible, without a political system which encompasses the entire market.

A quick look at the responsibilities of the Federal government in the United States gives a sense of the scope of the possible regulatory needs. The United States is, after all, a federation of largely independent states, with Federal action being circumscribed by the principle of subsidiarity. This principle states that the federal government should only regulate those things which the states can not adequately handle by themselves. While there is legitimate debate about the proper size of the US federal government, only the most extreme anti-federalist would advocate the complete elimination of the Federal Courts, the Justice Department, the Environmental Protection Agency, the Securities and Exchange Commission, and all of the dozens of other branches, departments and agencies of the federal government.

There are many reasons why we might want to avoid a world government with the same kind of size and scope as the US federal government. One of the foremost of these is that the social systems of the various nations of the world are quite different from one another and forging their political union would be terribly difficult. The US Civil War comes to mind as an example of the kind of difficulty involved with the formation of a strong political union from traditionally independent states. Other serious problems include reduced cultural diversity, susceptibility to the abuse of power, and extreme unwieldiness. Perhaps most importantly, given the current national character of governance, I think we can agree that a world government, in any strong sense, is just not going to happen any time in the foreseeable future.

This presents a real challenge, because there are problems which need to be addressed soon. Some problems, by their nature, must be handled by global political action in the form of international treaties and the coordinating functions of the United Nations. For the bulk of possible regulatory needs, however, it seems that we need to look for alternatives.

Environmental Problems and Regulatory Approaches

Now that we have established a conceptual model for thinking about regulation, the environment, and financial flows, we can begin to put it to use by examining some of the environmental problems which have come to be associated with mobile capital.

Problem: Financial Instability

The financial instability associated with currency crises in developing nations is generally agreed to be a problem – but, on its face, it does not seem to be an environmental problem. However, the fallout from a financial crisis can have severe environmental impacts. This fallout usually includes high interest rates, investment uncertainty, and the immediate need for foreign exchange. All of these factors contribute to an investment environment which has a very short horizon. Because the dynamics of the natural system are generally slower than those of the market, such shortened horizons systematically bias the capital market away from environmentally friendly investments which will take longer to mature.

Currency crises have numerous fundamental causes. The nature and relative importance of these causes is currently the subject of lively debate in the economics literature. One major class of causes is rooted in domestic macroeconomic mishandling. The current crisis in Argentina seems to have this sort of character, though some would disagree with this analysis.

A second type of cause, however, is herding behavior among speculative investors. Many countries affected by the Asian financial crisis had fundamentally sound macroeconomic policy. Yet short term portfolio investors, who had been rushing to invest in the region, pulled their capital out – driven by the self-fulfilling fear that others would do the same. In terms of our model, the dynamics of the short term international capital market are so fast that investors are forced to make decisions based on speculation about the behavior of others rather than economic fundamentals.

The challenge here is similar to that of trying to calm a nervous crowd. I was once at a protest, standing at the back of a group of several thousand people. About fifty police in riot gear were attempting to disperse the crowd. At one point, the police formed into a phalanx and charged the crowd. In this situation, only the first few rows needed to be concerned about injury from the relatively small number of police officers. The rest of the crowd had to worry about the stampeding of the people in front of them. From my position at the back of the crowd, if there was going to be a stampede, I faced real danger if I was slow to run. My reaction had to be very quick, because the situation was unfolding so fast that waiting to see how it would unfold could potentially be a fatal mistake.

Fortunately, there were organizers in the crowd with megaphones who called on everyone to sit down. This form of crowd regulation had two effects, both pertinent here. First, it made it easier for everyone to see what was happening at the front. People were able to base their actions on more complete information about the level of risk they faced. Second, and probably more important, people had more time to think about their actions. I now knew that it would take the person in front of me a second or more to stand up before they could start running. This allowed me to hold my ground for just a bit longer and to reevaluate the fundamental risk generated by the clash at the front. The result was a brief clash at the front, followed by restored calmness and order.

This is roughly analogous to the investor panic associated with financial crises. The initial cause may be relatively small – crisis in a neighboring country, for instance – but the result is devastating. The crowd analogy suggests that regulations which increase information about fundamental risks and slow the dynamics of investor flight might have significant stabilizing effects.

The implementation of a so called Tobin Tax represents a global government approach to slowing these dynamics by placing a drag on short turnover investments, which are also referred to as “hot money”. The Tobin Tax is named for James Tobin, the Nobel laureate economist who first suggested it. This proposal would levy a tax of between 0.1% and 0.25% on international currency transactions – 90% of which are speculative in nature. This small percentage tax would make currency speculation unprofitable without producing a significant drag on the currency exchanges needed to conduct international commerce. Even if it did create some drag, this would have the affect of providing

balanced protection to domestic markets, which would have the effect of developing domestic demand and might not be a bad thing in many cases. It would also raise significant revenue (estimated at \$100 to \$300 billion per year) which could be spent on issues of global priority.

A very real problem with implementing such a tax is that it would seem to require the establishment of a global body with taxing authority, and a related institution to decide how the resulting revenues would be spent. These are the basic qualities of a global government, and make this proposal a non-starter in the eyes of many economists and political scientists. Others have suggested that such a tax could be implemented on a national level if nations could harmonize their proposed regulations in advance and implement them simultaneously. While this is an interesting proposal, it seems that a noncompliant country would gain sufficient advantage to make this kind of universal coordination unlikely to occur.

A second approach, which may be easier for nations to implement unilaterally, is the reinstatement of a mild capital control, namely a minimum residence time requirement for investments. A minimum residence time requirement of one year would assure investors that all investors would not pull out of an economy at the same time – thereby causing the investment of anyone who hesitated to be plunged into near worthlessness. A minimum residence time would allow investors to make their decisions based more on fundamentals, rather than on the fear of a stampede. While implementing this approach might reduce the attractiveness of a country relative to an identical country without such a requirement, all else being equal, it should be pointed out that all else is seldom equal. If, for instance, such a policy were part of the standard IMF prescription for good financial governance – taking the place of total capital account liberalization – such a policy might come to be seen as an indicator of sound management and a stable investment environment.

This kind of approach has been pursued in Chile and Malaysia with mixed results, though they seem to have done as well or better than their neighbors in recent financial crises. A major problem with this approach, as with any regulation, has been that people find creative means to circumvent it. This presents a challenge for regulators, but not an unprecedented or impossible one. This would seem to be a case where the development of model regulations and strong technical leadership on the part of the IMF could be helpful, though current IMF policies do not seem to be moving in this direction.

The institution of a procedure for sovereign bankruptcy is a third approach which has actually gained some traction with the IMF policy process. Currently, when a sovereign nation accumulates more debt than it can conceivably repay, it is not at all clear what should happen. Which creditors should be repaid what fraction of their investment? Clear procedures for bankruptcy would remove some of the uncertainty from the process of national default. In the protest example, sitting had two effects: it increased the time required before someone could start running (the principle harnessed by short term capital controls) and also made it easier for everyone to see what was happening at the front of the crowd. By creating a more predictable environment, sovereign bankruptcy procedures would reduce the likelihood of financial stampedes not by slowing the movement of investors, but by providing risk-averse investors with more certainty about risks they were facing.

Problem: Liquidation of natural capital misaccounted as income

The liquidation of natural capital is another class of environmental problem which stems from the dynamics of international finance. The problem is not natural capital liquidation per se, but the fact that such liquidation tends to be accounted as income. I use the word “income” here in the Hicksian sense: the rate at which assets can be consumed while preserving the ability to consume at the same rate in the future. Converting natural capital to built capital can be a perfectly sensible and sustainable activity. Think of cutting a path through a forest and using the proceeds from the timber to build a road. While the environment may not benefit from this, society may well benefit enough to justify the project. The problem occurs when the proceeds from natural capital liquidation are counted as earned income and consumed rather than reinvested in built capital or, worse yet, are repatriated to an international investor.

This has been a particular problem in investments of two general types: megaprojects supported by lending from international investment banks and multilateral development banks, and the projects of extractive industries such as mining and forestry. In both cases, the problem is that the internal rate of return for the project is generally calculated based only on the financial capital invested. The natural capital consumed by the project (e.g. the forests inundated by a dam reservoir) is not counted as part of the investment. This leads to an artificially high rate of return – making projects appear bankable when they are actually not. Furthermore, the capital component of the revenues from the extracted resource is rarely invested in the country whose resource is extracted.

Doing such calculations properly is difficult both because intangible benefits need to be considered and also because the natural dynamics are slow and complex. However, valuing natural capital at zero when examining an investment ensures a systematic bias against the environment. There has been discussion of changing the World Bank’s due diligence procedures to include such calculations. This seems particularly important where part of the return on a project is expected to come in the form of increased tax revenues stemming from long term economic growth spurred by the project.

This is an area where improved accounting standards can make a huge difference. The most logical locus of this work is probably the multilateral lending institutions, which frequently base project evaluations on predictions of long range economic performance. Once the standards exist it would, in many cases, be logical for commercial lenders as well as government borrowers and regulators to adopt them as well.

Problem: Undermining ability of nations to make and enforce environmental regulations

The ability of nations to make and enforce their own environmental regulations is also undermined by the unregulated globalization of capital. One source of this problem is not lack of regulation, but the nature of existing regulation as promulgated by the World Trade Organization (WTO). WTO regulations seek to maximize the benefits of Ricardian comparative advantage in international trade by reducing barriers to trade between nations. Environmental requirements pertaining to the production of imported goods are recognized as one such barrier – and are therefore generally prohibited. This phenomenon is exemplified by the 1998 WTO ruling that the United States could not require imported shrimp to be caught with methods that were safe for sea turtles.

At first glance, this problem has nothing to do with international investment – it is a problem related to international trade. In a purely Ricardian world, without mobile capital, this would be true. In such a world, this would still be an environmental problem, but at least it would be contained to the nation deciding to lower its standards. A nation could choose to specialize in a product by lowering its standards in that one area, while other nations maintained their standards and specialized in something else. The lowering of standards would change the relative advantage situation between the countries and lead to a different mix of traded goods. However, because international trade without mobile capital is governed by the principle of comparative advantage, a lowering of standards in one country may or may not cause a loss of welfare in that country, but can only cause a gain in welfare in its trading partners.

With globalized capital markets, however, it becomes possible for the relevant productive capacity of the country with higher standards to simply move to the country with the more lightly regulated environment. This means that global competition for investment creates an incentive for nations to lower their standards in order to attract this investment. While this “race to the bottom” has not developed with the speed or intensity that some had feared, it remains a concern. Much of the initially expected damage was offset by the transfer of cleaner and more efficient technology as industries moved from the developed world to the developing world. It is not at all clear, however, that this trend will continue indefinitely. One might argue that the cleaner technologies which were transferred were largely developed in order to meet the higher standards of the developed world. The existence of large havens of weak environmental regulation could reduce the pressure to develop cleaner technologies and lead to concentrations of environmentally (and socially) harmful activity. Even a slight bias in investment patterns could, over time, result in significantly different patterns of industrialization and environmental degradation.

Problem: Lack of Development of Domestic Demand

Export led development policies have, in some cases, led to increased GDP in developing countries over the past couple of decades. This strategy, however, seems only to have worked for nations which adopted these policies early on (before other developing nations adopted them) and maintained tight and competent control over their national investment markets. On the other hand, even successful export led development policies did not lead to robust internal credit markets and strong domestic demand in most of the countries that pursued them. This issue has been explored in depth by the New America Foundation’s Sherle Schwenninger².

One of the several unpleasant side effects of an economy founded on foreign investment and designed to supply foreign demand is that it leaves the domestic political system in a position where it is difficult to muster the political power and will to impose environmental or other regulations in the public interest. From the demand side, domestic consumer preferences don’t particularly matter since output is made for export. From the supply side, producers have increased power because they are free to move their operation elsewhere. Again, problems result when the social system no longer encapsulates the market.

² Sherle Schwenninger, *A Financial Architecture for Sustainable Development*, New America Foundation, 2001, Washington, DC.

An important part of the idea of development is developing one's domestic markets. This requires diversity of the industrial base, a distribution of wealth and income consistent with broad consumer demand, and a distribution of political control conducive to the development of regulation in the general public interest. Simply plugging an industrial sector or two into another country's economy short circuits this process – creating the greater economic activity recorded by GDP (and, often, the associated environmental problems), without nurturing the other aspects of development needed to achieve long term environmental sustainability.

A radical approach to this problem would be to reorganize international finance along the lines of the International Clearing Union suggested by John Maynard Keynes in the discussions leading up to the Bretton Woods conference. Keynes's ICU would have served many of the functions of the IMF (the design of which Keynes generally opposed), while largely preserving the encapsulation of markets within societies. This union would charge both creditor and debtor nations the same rate of interest on their current account balances – thereby strongly encouraging balanced payments and limiting capital mobility to what is required to balance the current account. Such a system could provide for stable currencies while at the same time encouraging the development of functional domestic economies.

In a somewhat less radical vein, Scherle Schwenninger has made a number of useful suggestions toward improving the international financial climate for what he calls “sustainable, middle-class-oriented development.” He divides his suggestions into two parts. The first set of suggestions revolves around the development and strengthening of regional currency unions and capital markets and the harmonization of regional governance. The second set of suggestions are concerned with making positive global efforts toward improved environmental stewardship.

In terms of our model, Schwenninger's regional suggestions work to concentrate market activity at the regional level, where society will be in a better position to react to problems with politically coherent responses. The appeal of this idea is that regional groups of governments tend to govern more culturally homogeneous cultures and to share other governance issues – including environmental problems. A contiguous block of countries is therefore in a better position to exercise societal control over the market they share. His global suggestions work to expand the social sphere to the global level in order to deal with aspects of the market which can not be effectively regulated at the national or regional level.

Problem: Climate Change

While anthropogenic climate change is not a direct result of the globalization of capital (except for the scale effects associated with increased world output), the regulation of international investment and development of carbon markets with the accompanying international capital flows supporting that trade may provide an significant part of the solution. Climate change due to industrial carbon dioxide emissions represents the purest case of a problem stemming from the abuse of a true global environmental commons.

Other environmental problems share this feature to some degree: biodiversity loss, depletion of fisheries, and acid rain come to mind, but each of these problems has

features that limit its scope. Biodiversity within a nation has value to the people of that nation and good national environmental stewardship can protect much of this diversity regardless of the actions of other countries. Fisheries involve only a single industrial sector and include territorial waters which can be somewhat more easily regulated. Acid rain is primarily a regional problem, involving neighboring countries which tend to be few enough in number, and homogeneous enough in culture, that bi- and multi-lateral agreements are more easily established.

Perhaps the closest analog for the challenge of dealing with climate change is the example of ozone depletion from CFCs. Happily, once this problem came to be well understood, the nations of the world were able to agree on an international treaty (the Montreal protocol) which established a schedule for the phase out of CFCs. The treaty seems to be working and the crisis of dramatically increased ultraviolet radiation seems to have been averted.

Unhappily, the analogy is not perfect. The CFC crisis involved a single industry and only a small class of products from that industry, for which tolerable substitutes could be found at reasonable cost. This made agreement on action reasonably painless. Carbon dioxide, in contrast, is produced (directly or indirectly) by almost every industry – from subsistence farming to aerospace manufacture. Substitute methods for producing energy do exist, but real limits of scale and cost insure that the transition to sustainable energy use will not be painless. This transition is bound to require real reductions in the consumption of certain types of goods, especially if the economies of poor nations are to grow to the point where a large portion of their citizens can rise out of poverty.

The regulation of international investment is likely to be part of any effective reaction to the problem of climate change. Regulations which encourage green investment in developing nations can have a significant impact. Early in the development process, infrastructure and industrial patterns tend to become locked in. For example, in the United States, even if hydrogen powered vehicles and hydrogen fuel could, in theory, be produced at a lower cost than their gasoline equivalents, a move to that technology would be extremely slow and costly because of the tremendous fixed investment the nation has made in petroleum refining capacity, gasoline filling stations, trained mechanics, etc. The investment hurdle would be smaller in a place that was starting from something closer to scratch.

One way to accomplish these goals would be to strengthen an existing institution of the global political system, the Global Environment Facility (GEF). The GEF is currently a relatively small (\$500 million a year) program jointly implemented by the World Bank, UNDP, and UNEP and located as an independent agency in the World Bank. A better funded and more independent GEF could work to target investment in the areas where it would make the most difference.

On a different front, a cap and trade system on global carbon dioxide emissions would provide a more strongly market based mechanism for achieving many of these goals. The initial distribution of emissions permits would certainly be contentious, but the resulting market would allow more flexible economies to receive payments from less flexible ones to pursue clean development strategies. A cap and trade system would be the product of global society setting up a global market to handle a global problem. Once

again, the three systems would be neatly nested – but on a vastly larger scale. Because of the global commons nature of the greenhouse warming problem, the principle of subsidiarity suggests that, in this case, such a global solution may be the only workable way to proceed.

Conclusion

International capital flows exist in such a wide variety of types and contexts, and tend to have such indirect impacts on the environment that it is difficult to think coherently about how capital flows and the environment relate. This complexity makes it particularly difficult to think about the role of regulation in mitigating the impact of the one on the other. This paper has proposed a simple, three tiered model which helps to organize these disparate phenomena, to highlight the places where capital flows are likely to cause trouble, and to make clearer the types of regulation which might help to rectify these problems.

The central idea of this framework is the conception of the world in terms of three nested subsystems: a market within a society within an environment. Markets are largely self-regulating, but fail to regulate themselves in many critical ways. These failures include the classic market failures studies in introductory economics as well as the markets inherent inability to optimize for factors valued by society, many of which can be classified under the headings of distribution and scale. The regulation of these factors is therefore the task of society. If society fails to impose regulations to protect the environment, nature will eventually respond to reestablish equilibrium, but it is unlikely that nature's long term response will be desirable for society. It is therefore the task of society to serve as a buffer between the market and the environment, regulating market activity to promote socially desirable outcomes – including environmental stability.

This framework highlights the novel nature of the problems created by the globalization of finance. Where once we had three neatly nested systems, globalized markets now combine with global environmental problems to break the encapsulation of the market within society and to break the one-to-one correspondence between society and environment. This creates a situation where the tools and incentives are no longer present for nation based societies to regulate the market in the public interest.

We then explored various avenues of regulation which work to restore this encapsulation in two basic ways: either they reduce the domain of capital flows to an extent where national or regional political systems can regulate them, or they expand certain institutions of political governance to the global level. The development of prudent market regulations which protect society and the environment from the limitations of the market will undoubtedly require both approaches. The proper mix of the two approaches can be guided by the federal system adopted by many nations for their internal governance. In this system the principle of subsidiarity guides which regulations should be promulgated at which levels.

While this nested subsystem model is vague in its prescriptions, it is highly general. Any overall attempt to regulate capital flows which does not, at least implicitly, recognize the nested nature of these systems and the importance of encapsulation for governance is likely doomed from the outset.

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