Economic Policy for Sustainable Development vs. Greedy Growth and Preservationism*

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Abstract

Sustainability science emerged from the felt need to employ appropriate science and technology in the pursuit of sustainable development. The existing sustainability science agenda emphasizes the importance of using a systems approach, stressing the many interactions between natural and human systems. Despite its inertia and avowed purpose of being practical and feasible, however, sustainability science has yet to embrace the policy sciences. In pursuit of this objective, we first trace the history of thought of sustainable development, including its definition and operationalization.

Sustainable development encompasses sustainable growth and dynamically efficient development patterns. Two promising approaches to sustainable growth are contrasted. *Negative sustainability* counsels policy makers to offset any decrease in natural capital with at least the same value of net investment in produced capital. This *sustainability criterion* cannot determine how and how much to conserve natural capital nor how much to build up human and productive capital. Indeed, there is ambiguity regarding what prices to use in summing the values of diverse capital assets. To fill the void, we offer *positive sustainability*, which maximizes intertemporal welfare while incorporating system linkages, dynamic efficiency, and intertemporal equity. This provides a solid and operational framework for sustainable growth. In addition, sustainable development must include the lessons from development theory, including how optimal patterns of production, consumption, and trade change with standards of living.

However, like Tolstoy's unhappy families, there are many pathways to unsustainable development. We describe two broad causes of unsustainable growth – rent-seeking and preservationism. We also illustrate patterns of unsustainable development by drawing on lessons from the Philippines. While specialization is the engine of growth, fragmentation is the anchor. In addition to natural fragmentation from natural trade barriers in an island archipelago, policy and governance, driven by rent-seeking, promote economic stagnation. Low economic growth in turn exacerbates population pressure and environmental degradation—the vicious circle of unsustainable development. We give particular attention to how a resource curse can exacerbate policy distortions and rent-seeking, and how the same phenomenon can be promulgated by foreign aid, foreign direct investments, remittances, and tourism.

For sustainable development not to be at odds with policy science, *positive sustainability* must be combined with projects and policies that promote dynamic comparative advantage and poverty reduction. We emphasize the facilitative role of government especially in transforming the vicious circle into a virtuous circle.

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INTRODUCTION: SUSTAINABILITY SCIENCE AND SUSTAINABLE DEVELOPMENT

Sustainability science emerged from the felt need to employ appropriate science and technology in the pursuit of sustainable development. The publication of *Our Common Future*[a] in 1987 by the World Commission on Environment and Development (WCED: the Brundtland Commission) placed research and development as an integral component of sustainable development strategies and has been espoused by a number of international scientific organizations that were formed in the 1980s (Clark and Dickson 2003).

Because of its importance to the roots of sustainability science, we first trace the history of thought of sustainable development, including its definition and operationalization. Two promising approaches to sustainable growth are compared. *Negative sustainability* enjoins policy makers to conserve natural capital in accordance with dynamic efficiency and to invest in productive capital such that genuine investment is positive or at least zero. This *sustainability criterion* is called *negative sustainability* because it only provides guidance on what not to do. There are no policy principles to prescribe how and how much to conserve natural capital, nor how much to build up human and productive capital. Indeed there is ambiguity about what prices to use in summing the values of diverse capital assets.

While most scholars have focused on what should be ruled out in the name of sustainable development (negative sustainability), we put forward the idea of *positive sustainability*, which maximizes intertemporal welfare while incorporating interlinkages within the total *environomy*, dynamic efficiency, and intertemporal equity. This gets us to a solid and operational framework for sustainable growth. In addition, sustainable development must include lessons from traditional development studies, including how patterns of production, consumption, and trade change with the welfare of an economy's citizens.

While specialization is the engine of growth, fragmentation is the anchor. In addition to natural fragmentation from natural trade barriers in an island archipelago, policy and governance, driven by rent-seeking, promote economic stagnation. Low economic growth in turn exacerbates population pressure and environmental degradation—the vicious circle of unsustainable development. We focus on how a resource curse can exacerbate policy distortions and rent-seeking and how the same phenomenon can be promulgated by foreign aid, foreign direct

[a] Also referred in this chapter as the Brundtland Report.

investments, remittances, and tourism. We further emphasize the facilitative role of the government and what it can do to transform the vicious circle into a virtuous circle.

SUSTAINABLE DEVELOPMENT: HISTORY OF THOUGHT

As early as 1980, international bodies such as the World Conservation Strategy (WCS) endeavored to integrate economic and environmental management. However, the WCS fell short of being operational—it was unable to articulate either how poor economic policies would degrade the environment or how conservation might affect economic policies (Pearce, Markandya, and Barbier, 1989) Heightened concern for the environment was manifested when the United Nations (UN) formed the Brundtland Commission [b] in 1983 to examine the interrelationship between human activity and the environment, and its implications for economic and environmental policy.

Before publication of the Bruntland report, Barbier (1987) represented sustainable development with a Venn diagram of three intersecting circles for biological, economic, and social systems (Figure 1). A unique set of human goals are assigned for each system. The overlapping area of the three circles corresponds to the overall objective of maximizing the goals across these systems through an adaptive process of trade-offs.

Fig. 1

The Brundtland Report (1987) successfully ensconced sustainability in the development arena and became the basis for an integrative approach to economic policy. The Commission defined sustainability as, *"... development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* This rather vague definition has been the source of considerable contention. Indeed, a host of definitions has sprung up over the years: Pearce, Markandya, and Barbier (1989) supply a gallery of definitions while Quiggin (1997) demonstrates several inconsistencies among alternative definitions. For sustainable development tourism alone, one can find over 300 definitions (Stabler and Goodall, 1996). Ahmed (2009) noted that over 500 definitions of sustainable development exist. An International Environment Forum of the United Nations (UN) stated that there are one thousand

[b] Named after the Head of the Commission, Norwegian Prime Minister Gro Harlem Brundtland.

definitions of sustainable development.[c] Pezzey (1989) attempted to extract one single definition that could command the widest possible academic consent. Nearly a decade after, he gave up on his quest, noting that:

> "So I see little point in expanding the collection of fifty sustainability definitions which I made in 1989, to the five thousand definitions that one could readily find today." (Pezzey, 1997, p. 488)

The burgeoning number of definitions is a consequence of an explosion of literature from economics, philosophy and other disciplines that followed immediately after the Brundtland Report, much of which was an attempt to specify what sustainable development meant for public policy.

Just as the definitions and implications of sustainable development were proliferating along multiple lines, Pearce, Markandya, and Barbier (1989) abandoned the Venn approach and turned the attention to articulating a vision of sustainable development that was consistent with both economics and the Report. In his background paper for the 1992 UN Conference on Environment and Development (UNCED),[d] however, Munasinghe (1992, revised 1994) resurrected the Venn approach but turned it into a triangle encompassing three major objectives – economic, social, and environmental.[e] The three vertices are further connected with double-sided arrows showing the interactions among domains, thus illustrating trade-offs and synergies. The picture[f] is now known as the sustainable development triangle with its key elements and links.

While politically popular, this portrayal was so grand that the scope includes income distribution, gender equity, culture, and a host of other political goals.[g] The Venn diagram has

[c] See International Environment Forum (2009).
[d] Held in Rio de Janeiro and commonly known as the Earth Summit, the conference resulted in: Agenda 21, the Rio Declaration on Environment and Development, the Statement of Forest Principles, the United Nations Framework Convention on Climate Change and the United Nations Convention on Biological Diversity.
[e] Munasinghe now advocates *Sustainomics*, "a transdisciplinary, integrative, comprehensive, balanced, heuristic and practical framework for making development more sustainable," see Munasinghe (1994), also, <http://www.mindlanka.org/sustainomic.htm>.
[f] Munasinghe's "Sustainable Development Triangle," *Encyclopedia of the Earth,* http://www.eoearth.org/article/Sustainable_development_triangle
[g] See e.g. Hardi and Zdan (1997).

now evolved into 178 images[h] reflecting both a diversity and inconsistency among concepts. Arguably, the Venn-diagram image is still the most popular. As in the original Barbier (1987) version, the three circles continue to represent three objectives: economic, environmental, and social. This version is non-operational, however, lacking separate but comprehensive performance indices of the three objectives.

Moreover, in order for a strategy to be in the central section where all three circles intersect, the authors articulate minimum satisfactory performance levels for each. Three objectives, three performance indicators, and three constraints! Given that the Venn approach and most of the other images cannot be operationalized, how did they become so popular? Perhaps the very infeasibility in implementation is exactly the concept's appeal. When nothing is well-defined, anything goes. Any organization with a political agenda can readily turn the rhetoric of sustainable development to its own ends and not be constrained by transparency or accountability.

In the field of economics, Pearce, Markandya, and Barbier (1989) proposed what later became known as *weak* and *strong* sustainability. *Strong sustainability* prohibits any level of depletion of natural capital such as trees, water, or fish. The *weak sustainability* rule requires the summed value of produced and natural capital to remain constant or increase over time. A subsequent debate emerged over whether *weak* or *strong* sustainability was the best single criterion of sustainable development. Arrow et al. (2004) and others (e.g. Asheim, 1999; and Pezzey, 1997) have advocated a broadened form of the weak criterion for sustainable development—the requirement that the wealth of a society, including human-capital, knowledge-capital, and natural-capital (as well as produced capital), does not decline over time. Others, including Barbier (2007), continue to contend that *strong sustainability*—non-depletion of essential stocks of renewable resources—may be appropriate, especially for forms of natural capital that are essential in the sense that produced capital or other resources are poor substitutes.[i]

Dasgupta and Mäler (1995, p. 2394) criticize *strong sustainability* on the grounds that it is a:

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[h] See Mann (2009) on Visualising Sustainability.
<http://computingforsustainability.wordpress.com/2009/03/15/visualising-sustainability/ >

[i] This formulation implicitly acknowledges that applying strong sustainability to non-renewable resources would reduce the value of those resources to zero and leave countries at the mercy of their initial capital (Dasgupta and Mäler , 1995).

> *"*…category mistake, the mistake being to confuse the determinants of well-being (for example, the means of production) with the constituents of well-being (for example, health, welfare and freedoms)…*"*

That is, by proposing *strong sustainability* as both a criterion and a constraint, the means are confounded with the ends, as opposed to deriving the rule from more fundamental objectives. As Dasgupta and Mäler (1995) conclude:

> *"*The point is not that sustainable development, even as it is defined by these authors, is an undesirable goal. It is that, thus defined, it has negligible information content. (We are not told, for example, what stock levels we ought to aim at). This is the price that has to be paid for talking in terms of grand strategies. The hard work comes when one is forced to do the ecology and the economics of the matter.*"*

Regarding another formulation, that sustainable development requires both welfare and natural capital to be non-declining, Dasgupta and Mäler (1995, p. 2394) ask: "Two constraints? … [the formulation] offers no direct ethical argument for imposing either of the side constraints."

At first blush, it would appear that even *weak sustainability* involves a category mistake in the sense that the *requirement* not to deplete the total capital stock is a means without a distinguishable *objective* or *criterion*. Other authors have shown, however, that the *weak sustainability rule* (wherein total value of capital cannot decline) can indeed be derived from the sustainability *criterion* – the mandate that the total welfare of all future generations not be diminished (Arrow et al., 2004). That is, the *weak sustainability* rule is a necessary and sufficient condition for achieving the sustainability criterion. However, this still leaves the problem that no fundamental ethical argument has been provided for the sustainability criterion in the first place. Moreover, the sustainability constraint can be extremely restrictive. Suppose that society has the choice between maintaining utility at subsistence levels forever or doubling utility and then decreasing it (due to a previous decline in total capital) by 10 percent. The dominant, but non-monotonic, path is ruled out by the sustainability criterion.

Nonetheless, the sustainability criterion and the (implied) *weak sustainability* rule have become firmly ensconced in the environmental economics literature. Genuine investment[j] is commonly applied to empirically determine whether specific countries satisfy the sustainability criterion or not (Arrow et al., 2004, Dasgupta 2007, Hamilton and Clemens, 1999). Genuine investment is the increase in the stock of capital assets – manufactured, human, and natural.[k] The sustainability criterion is met if genuine investment is non-negative. Augmenting the measures employed by Hamilton and Clemens (1999), Arrow et al. (2004) showed that most low-per-capita-income countries, especially in sub-Saharan Africa, are unsustainable even though net investment and increases in human capital (education expenditure) are positive. On the other hand, China's genuine investment is high, even amidst claims of heavy pollution and natural capital depletion, because of extremely high domestic net investment and human capital accumulation.

By alerting countries that the total value of their capital accumulation is negative, the statistic provides a useful signal to examine the components more closely and formulate possible strategies to combat unsustainability. The criterion by itself, however, does not provide clear guidance on how much genuine investment should be increased nor how much its components should be changed. For that reason, the sustainability criterion can be classified as *negative sustainability* – it only tells us what not to do.

Hamilton and Clemens (1999, p. 351) maintain that the criterion naturally leads to a management of a country's portfolio of natural, produced, and human capital.

> "More optimal natural resource extraction paths will, other things being equal, boost the value of genuine savings. The policy question for natural resource management is therefore: to what extent can stronger resource policies (royalty regimes, tenure) boost the genuine rate of saving."

As appealing as it sounds, the advice is misleading in two important ways. First, maximizing savings, genuine or otherwise, is inconsistent with maximizing welfare, which is given by green

[j] The term is synonymous with the "genuine savings" measure of Hamilton and Clemens (1999).
[k] There are some variations on this theme: Dasgupta (2007) added institutions (including cultural coordinates) as part of an economy's productive base on the assumption that better institutions allow the world's poor to consume and invest more.

net national product, GNNP = GS + C, where GS is genuine savings and C is aggregate consumption. Second, even maximizing GNNP is not an operational guideline without the correct shadow prices of the various forms of capital relative to consumption. The correct shadow prices can only be obtained by specifying the problem and then deriving the corresponding efficiency conditions. This is the objective of the following section.

POSITIVE SUSTAINABILITY AND SUSTAINABLE GROWTH

One can note in the history of sustainable development thought, as sketched above, that somewhere along the line, attention was shifted away from development to the question of sustainable growth. We continue that focus in the present section and extend the framework to embody development in the subsequent section.

Positive sustainability posits sustainable growth as neither an objective nor a constraint. Rather, it is based on the central pillar of policy science, the maximization of a single intertemporal welfare function, $\sum_{i=1}^{\infty}\left[B(M_i, A_i)-(c+d)R_i\right]$, subject to resource constraints regarding the amounts of produced capital and natural capital available. B is the benefit from the joint consumption of material goods (M) and environmental amenities (A). Net benefit is obtained after deducting per unit extraction (c) and damage (d) cost associated with the utilization of the resource (R). Damage cost is necessarily included since using the resource may generate pollution, e.g. burning of coal contributes to the increase of greenhouse gas in the atmosphere. The sum of c and d is the total marginal cost of resource extraction.

The total amount of produced capital and the amount of the natural resource consumed are arguments in the aggregate production function (e.g. Toman et al., 1995). Intergenerational equity is incorporated into the planner's objective function by setting the planner's pure rate of time preference equal to zero. Thus, maximization of intertemporal welfare incorporates interlinkages within the total economic and environmental system (*environomy*), dynamic efficiency, and intertemporal equity.

Two necessary conditions are required for *positive sustainability*:

(1) $MB = MC + MUC + MEC = MOC$

(2) $NMP_K = \eta g$

The first is the so-called *Hotelling* condition for optimal resource extraction – extract an additional unit of the resource until the marginal benefit (*MB*) of using the resource is equal to the marginal cost (*MC*) plus the marginal user cost (*MUC*) plus the marginal externality cost (*MEC*). The sum of these three right hand variables is called *marginal opportunity cost*.[l]

The second condition is the Ramsey savings equation, which states that produced capital should be accumulated in any given period until its net marginal product (NMP_K) declines to equal the growth rate (g) of consumption in that period times a measure of the planner's aversion to intergenerational inequality (η), (Ramsey, 1928). Choosing the vectors of the two control variables, M and R, which maximize present value, also determines the rest of the system. Capital formation is the residual aggregate output after subtracting depreciation, consumption, and total extraction costs $(c \times R)$. The change in the stock of the natural resource is $g(A) - R$, where $g(A)$ is the natural growth of the resource (zero for a non-renewable) as a function of its own stock. Thus, consumption is balanced with conservation of amenities and savings. Natural capital conservation is balanced against accumulation of produced capital. Total value of consumption is balanced against total value of capital.[m]

The *positive sustainability* solution provides the dynamically efficient paths of consumption, investment, and natural capital depletion/accumulation. The contrivance of a sustainability constraint is unnecessary. All that is needed is to recognize the interdependence of the economy and the environment and to disallow intertemporal discrimination in the social welfare function (Heal, 2009). Having characterized the socially optimal path of the environomy, one can then proceed to determine conditions under which the optimal path satisfies the sustainability criterion or not (Anand and Sen, 1994). Critical determinants include initial conditions and model parameters, such as the substitutability between produced and natural capital. Moreover, adherence to the Hotelling and Ramsey conditions determines optimal management of the country's aggregate produced capital and natural capital. This implies an optimal drawdown of non-renewable resources, an optimal drawdown or accumulation of

[l]This "Pearce equation" is discussed further in Chapter 2 (this volume). The Pearce equation applies both to fund pollution, such as acid rain that is largely dispersed in a single period, and to stock pollution, such as greenhouse gases. Chapter 2 provides a modification of the Pearce equation, which applies to indirect externalities as well.

[m] Optimal consumption increases monotonically and asymptotically to reach the "golden-rule" steady state level. For simplicity, population is held constant. In the case of constant population growth, the right hand side of equation 2 becomes ηg + n, where n is the population growth rate and g becomes the growth rate of per capital consumption. See Roumasset and Endress (1996) and Endress et al. (2005) for further details and an extension to renewable resources and pollution.

renewable resources, and an optimal accumulation of produced capital. As shown in Figure 2,[n] these conditions move the *environomy* to the limits of the current frontier and move the frontier outward over time. Living standards, incorporating material consumption and environmental amenities, rise as the environomy approaches a "golden-rule" steady state. Win-win efficiency is achieved, and unsustainable growth is avoided (Ayong le Kama, 2001 and Endress et al., 2005).

Fig. 2

Implementation of win-win environmentalism requires modeling important interlinkages and dealing with political impediments to the implied public policies. Policy models of global warming, containing both climate change and the economic system, provide well developed – although not definitive – examples, inasmuch as they solve for specific policy prescriptions. Intergenerational equity can also be incorporated into this approach, as has become common in climate change economics (Heal, 2009). In ruling out discrimination against future generations and allowing for the possibility of renewable alternatives to petro-chemicals and other non-renewable resources, efficient policies are compatible with increasing human welfare, eventually reaching a steady state (Ayong le Kama, 2001 and Endress et al., 2005). Sustainability does not require throwing out policy science that has evolved over the last quarter millennium. Rather, it represents an injunction to extend policy analysis to encompass both system interdependence and intergenerational equity.

PATTERNS OF SUSTAINABLE DEVELOPMENT

Sustainable growth literature, as discussed in the preceding section, presumes allocative efficiency and focuses on the dynamically optimal balance between produced capital (including human) and natural capital. By using aggregate capital and aggregate environmental amenities, the model abstracts from issues of composition across consumption goods and across environmental amenities. But no economy is without waste. Thus, there is a need to add principles governing efficient sectoral composition – each good is produced until its marginal benefit equals marginal cost, including any negative external effects of production.

[n] A variant of Figure 2 first appeared in Roumasset and Endress (2006).

What is known about dynamically-efficient patterns of development? Initially, specialization and capital accumulation (infrastructure, processing and mechanization) in the agriculture sector barely outstrip the dismal Malthusian forces of population pressure and diminishing labor productivity. But population pressure also induces some innovation and specialization in the agricultural sector (Boserup, 1965, 1981). Aided by capital accumulation and fortune, these forces eventually lead to the emergence of industrialization. The possibilities for vertical and horizontal specialization are inherently more compact in industry (especially due to economies of assembly), and the external economies they afford eventually outstrip the negative Malthusian forces (Roumasset, 2008).[o] Manufacturing and the surplus from agricultural development beget capital accumulation. Specialization and capital formation together increase the return to human capital formation, lowering fertility and augmenting the virtuous circle of industrial revolution (Lucas, 1993 and 2001).

Horizontal specialization of final products is further stimulated by vertical coordination provided by big-box retailers. Size of the market allows specialization of component varieties such that standardization is not needed.[p] This process has no natural end point in manufacturing, inasmuch as further market growth allows further vertical specialization and horizontal specialization across intermediate products, tailored to specific end-products. A metaphor can be found in the *new supermarket economics* (Reardon and Timmer, 2007) wherein vertical coordination begets specialization. Farmers are increasingly linked to specific retailers by means of complex chains that transform farm products over space, time, and form. Thus, the process replaces the cumbersome and costly method of indirect coordination via inventories. Dedicated wholesalers coordinate specific farmers with specific retailers with appropriate procurement, quality, safety, and timing standards. This is important for land policy inasmuch as these arrangements confer transaction cost advantages on large farms (Roumasset, forthcoming).

Changing relative factor endowments, technology, demand, and these organizational issues determine *dynamic comparative advantage*, i.e. the pattern of optimal specialization over time (Chenery, 1961). Moreover, specialization co-evolves with human capital (through learning by doing) and economic organization. These in turn create positive spillover effects (since

[o] As mentioned, these Boserup effects are already present in agricultural development and are augmented by vertical and horizontal specialization in agricultural contracting (Roumasset , 2007).

[p] This approach (Dixit and Stiglitz, 1977; Krugman, 1979) has been dubbed "love of variety." Each firm has a monopoly on a particular variety of the product.

knowledge is not entirely contained at the firm level) and further rounds of technological and institutional innovation. In short, specialization is the engine of growth.

The composition of natural capital follows a *natural resource Kuznets curve* (NRKC). Resource depletion increases at the early stage of industrialization. As the comparative advantage shifts towards labor intensive manufactured goods and domestic resource prices increase, imports of natural resources increase and domestic resource extraction slows. For renewables, the reduction of stocks decreases or even reverses as conservation increases, e.g. replanting, bench terraces, fertilizer, and transition to renewable energy sources (Krautkraemer, 1994 and Pender, 1998). These trends are augmented as the service sector grows relative to manufacturing, all resulting in a decline in the value of natural capital depletion, even as resource prices are increasing worldwide. In the case of China, combining the NRKC with the environmental Kuznets curve for most air pollutants yields the result that China's economic welfare, GNNP, is growing as fast or faster than its NNP, i.e. its net national product is uncorrected for natural capital depletion and environmental pollution (Roumasset, et al., 2007).

The final stage of structural transformation and specialization is often referred to as "de-industrialization." Developed countries and the Asian Tigers followed this path of structural transformation. [q] The flying geese [r] metaphor demonstrates how the co-evolution of industrialization is attained by macroeconomic patterns of specialization in the course of sustainable development. As wages increase in developed economies, other countries gain a comparative advantage in labor-intensive, manufactured exports. In the East-Asian model, the lead goose was Japan, followed by the New Industrializing Economies (NIE) of South Korea, Taiwan, Singapore, and Hong Kong. The third layer consists of Malaysia, Thailand and Indonesia, with the Philippines and Vietnam trailing behind. The East-Asian miracle is characterized by capital intensification and human capital accumulation whereby network externalities led to endogenous growth.

[q] See Chenery and Syrquin (1975) for empirical evidence and Branson, Guerrero, and Gunter (1998) for a more recent study.

[r] The flying geese paradigm describes how nations align similar to the V-formation of the geese in different stages of development (Akamatsu, 1962).

WHAT CAN GO WRONG?

In contrast to the positive pathway to sustainable growth, there are many pathways to unsustainable growth, much like Tolstoy's (1878) unhappy families.[s] The first of these, growth through excessive resource depletion and/or pollution as illustrated by the example of Indonesia (Repetto et al., 1989). From 1971 and 1984, the country's gross domestic product (GDP) grew on average 7.1 percent a year. Because it does not account for depreciation, however, GDP is not reflective of a country's real economic growth. Just as capital depreciation is subtracted from GDP to obtain net domestic product, so should the depletion of natural capital be depleted to obtain a more accurate measure of social welfare (Weitzman and Löfgren, 1997; Weitzman, 2003). Indeed, Repetto et al. (1989) found that depreciation of petroleum, timber, and soil resources was valued at 4.5 percent of GDP from 1971-1984.

Dynamic efficiency calls for extracting resources in accordance with the extended Hotelling rule for renewable resources (Stavins, et al., 2003 and Endress et al., 2005). Excess depletion of natural resources, as illustrated by the example of Indonesia, results from failing to align private incentives with social priorities, especially through inappropriate property rights, e.g. the ability of military units to exploit public forests and the nationalization of the oil business. Such institutions are often manifestations of "greedy growth," (northwest arrow of Figure 2) the proliferation of government entities, projects and regulatory policies to transfer rents from taxpayers to the "iron triangle" of politicians, bureaucrats, and special interests discussed below.

Greedy growth in the arena of resource management is unsustainable in the sense that resources are wasted instead of being transformed into produced capital or conserved for future generations. Panayotou (1993) illustrated such unsustainable development projects with subsidized cattle ranching operations in Brazil.[t] The Superintendency for Development of Amazonia (SUDAM) was created to improve the economic development of the region. The well-intentioned program provided certain corporations a tax credit scheme aimed at promoting livestock ranches in the Amazon. Overgrazing and ranch expansion into previously forested areas led to a lose-lose situation for the economy and the environment, as shown by the "greedy growth" arrow in Figure 2. When the ranches failed due to overgrazing and poor management,

[s]Tolstoy's (1878) novel, *Anna Karenina*, begins with, "All happy families are alike; every unhappy family is unhappy in its own way."

[t] Cattle ranching is profitable in the Amazon due to relatively cheaper land prices and higher productivity (Volpi, 2007).

the economy suffered from commercial failure of the ranches and enormous fiscal costs, the latter amounting to more than $US1 billion between 1975 and 1986 (Volpi, 2007). But the failed ranches did not revert to forests. Rather, the overgrazed pasture grasses were overtaken by invasive cogongrass (*imperata cylindrica*) furthering soil erosion.

Unfounded preservationism also results in a lose-lose situation for material consumption and the environment (southwest arrow of Figure 2), especially in developing countries. This inefficient policy alternative prevents sufficient capital formation from increasing wages, thus failing to provide a positive check on population growth. In the absence of jobs in the modern sector, the increased labor force seeks subsistence living in environmentally fragile areas. Thus, preservationism can lead to the unintended consequence of environmental degradation as well as decreasing standards of living (Roumasset and Endress, 1996).

Fragmentation has a stagnating effect on economic development. Wages may rise in favored enclaves without conferring gains in areas of underemployment and low wages. Specialization is limited by the extent of markets. Consumers and producers pay higher prices for goods and intermediate products. Three pervasive forms of fragmentation are geographic, economic, and political. [u]

1) *Geographic fragmentation* - Island economies are unfortunate to have these natural barriers to internal integration.
2) *Economic fragmentation* - Protection by tariff and non-tariff barriers are distortions that pull resources into the protected enclave, distorting factor prices and artificially increasing the real exchange rate. These forces discriminate against agricultural exports and forward linkages into agricultural processing and packaging (e.g. Clarete and Roumasset, 1987).
3) *Political fragmentation* – Entrepreneurs are equal under the law but some are more equal than others. Politically influential individuals and companies can obtain special favors or circumvent the law while others are subjected to bureaucratic red tape, unnecessarily increasing the cost of doing business.

Fragmentation has both static and dynamic effects. Like a system of internal tariffs, high transportation/transaction costs inhibit specialization and exchange, thus lowering national income. Specialization begets more specialization, due to learning-by-doing, human capital

[u] See Roumasset (2003) for a detailed elaboration.

spillovers and growth externalities in general. Fragmentation impedes this process and begets stagnation instead.

In addition to the natural fragmentation from natural trade barriers in an island archipelago, policy and governance driven by rent-seeking promote economic stagnation. A government needs extra-Smithian government powers afforded by their supposed facilitative role in coordinating investments beyond the basic institutions of property, contracts, and markets. However, these extra-Smithian government powers are easily abused. Facilitation via cozy arrangements between the government and industrial-financial conglomerates can lead to erosion of fiduciary accountability as in the East-Asian financial crisis of 1997 and the US-led world recession of 2007-2009. On the other hand, government "prizes" easily turn into mandates, subsidies, and "picking winners" with costly repercussions to economic growth and development (The Economist, 2009). In short, even limited government powers allow for strategic coalition formation to extract unproductive rents from the economy – a phenomenon known as *rent-seeking*.

The potential for rent-seeking is greater in real-world economies whose governments are inevitably larger than the minimal state described above. Figure 3 illustrates rent-seeking with the famous iron triangle (Lowi, 1979; McConnell, 1966), representing alliances between politicians, bureaucrats, and special interests. Politicians form alliances with bureaucrats and special interest groups, who enjoy more sharply focused objectives and ease of organization (Olson 1982; and Olson and Zeckhauser 1966). Special interest groups benefit from lax regulations and special favors. Politicians influence the legal, policy, and fiscal environment to confer rents in return for campaign contributions, favors, and other support. Bureaucrats implement rent-capturing agreements and broaden their power base. With these dynamics, the minority coalition readily tyrannizes the needs of the relatively poor majority. A primary example is protectionism, which confers rents to some industries but reduces total consumer and producer welfare (Corden, 1985). Protectionism decreases the price of foreign exchange, making imports cheaper and discriminating against exports. Since non-primary-good exports are a key engine of growth (World Bank, 1993), their inherent potential for specialization and learning-by-doing is partially lost, thereby stifling economic development.[v]

[v] For an elaboration see Bautista and Power (1979) on the consequences of protection in the Philippines.

Fig. 3

Nature's abundance can ironically be another anti-development force – a phenomenon known as *resource* curse. This term is commonly attributed to countries with large endowments of natural resources, such as oil and gas, whose economic development and governance have lagged behind less endowed countries (Sachs and Warner, 1995 and 2001; Auty 1993, 1990). Economies suffering from a *resource curse* are said to have contracted the "Dutch disease"[w]. The theoretical development of the Dutch disease phenomenon is formalized in the classic papers of Corden and Neary (1982) and Corden (1984).

Two curses could arise from having abundant natural resources:

1. *Dutch Disease Mechanics: Appreciation of the Real Exchange Rate* -The first curse results from real exchange rate appreciation, which lowers the relative price received by other exportables. The core model[x] explains how an intersectoral reallocation of resources is induced by the relative price change due to a boom in an extractable resource.[y] A discovery (boom) of natural resource causes a contraction of other exportables such as the manufacturing sector. Resources are pulled out from manufacturing sector into mining the newly discovered resource. At the same time, income generated from the booming resource sector is spent on consumption of non-traded goods. Both effects go in the same direction,

[w] The term first appeared in November, 1977 issue of *The Economist.* It was used to describe the decline of the Netherland's manufacturing industry after they discovered natural gas in the North Sea in the 1960s.

[x] The model has two sectors: non-traded sector and traded sector. Non-traded sectors produce goods that face high transport cost and typically include production of food and services for local use. A discovery of a resource, divides the traded sector into booming traded sector and lagging traded sector. The contraction of the manufacturing (lagging) sector is explained by the *spending* and *resource movement effect*. Resource movement effect involves the pulling away of factors of production from both the lagging manufacturing and the non-traded sector into the booming (resource) traded sector. This leads to a decline in the output of the manufacturing sector causing a direct de-industrialization. At the initial exchange rate, demand for non-traded goods rises and a real exchange rate appreciation is needed to eliminate the excess demand. This, in turn, exacerbates the reduction in the output of the manufacturing sector – an indirect de-industrialization. Spending effect occurs when income generated from the booming traded (natural resource) sector is spent on consumption of non-traded goods, thereby exerting upward pressure on the price of non-traded outputs. Yet again, demand for traded goods increases further requiring a real exchange rate appreciation to restore equilibrium. Hence, the indirect de-industrialization arising from resource movement effect is intensified.

[y] Corden and Neary (1982) observed that the booming sector is often of an extractive kind, e.g. the minerals in Australia, natural gas in Netherlands, and oil in the United Kingdom.

increasing the real exchange rate and contracting manufactured exports.[z] The appreciation of the real exchange rate implies an increase in the opportunity cost in the production of traded goods thereby eroding the competitiveness of the manufactured exports.[aa]

Exchange rate appreciation *per se*, however, is not a "disease" but an economy's statically efficient response to changing relative prices. Due to the resource discovery or increase in world price, the economy's comparative advantage shifts in favor of "production" of the booming traded sector in accordance with specialization for mutual gain. Resource exports earn foreign exchange for imports more cheaply thereby driving out manufactured exports.

But static efficiency is not everything. Since future prices do not exist for most goods and services, a static market equilibrium fails to achieve dynamic efficiency. If the lagging sector has more potential growth externalities than the booming sector, growth is negatively impacted by the boom. Recall that the engine of growth in the East-Asian Miracle countries was manufactured exports with their abundant and never-ending possibilities for continuing vertical and horizontal specialization and learning-by-doing. Furthermore, the manufacturing sector is a source of forward and backward linkages that generates production externalities (Sachs and Warner, 1995). But the resource boom discriminates against manufactured exports, thus putting the brakes on the engine.

2. *The Returns to Rent-Seeking in Resource-Rich Economies* - The second curse is the more virulent strain of the Dutch disease, *directly unproductive rent-seeking* (Bhagwati et al., 1998). The political economy in resource-rich countries exacerbates the difficulty of sustaining growth (Corden, 1984 and 1982; and Humphreys, Sachs, and Stiglitz 2007). The more there is inherent resource wealth, the higher the returns to lobbying, the greater the lobbying, and the greater the resulting policy distortions. Corden (1984) gives the example of industrialists adversely impacted by the appreciation of the real exchange rate increasing their lobbying effort for tariff and non-tariff protection. Protectionism is said to be the most

[z] Corden and Neary (1982), Appendix 1, also show that there is an ambiguous effect on the output of the non-traded sector depending on whether the resource movement or spending effect dominates.

[aa] Empirical support is mixed. Sachs and Warner (1995) and Auty (1990) find a negative correlation between resource abundance and economic growth. See also survey by Nelson and Behar (2008) and the references cited therein. On the other hand, Brunnschweiler and Bulte (2008) find that abundance positively affects growth. The ambiguity is not surprising because of the endogeneity inherent in the phenomena of interest and the difficulty in estimating a full set of structural equations.

common form of rent-seeking because industrialists are already well-organized to lobby, and their export ox has been gored by the falling price of foreign exchange (Olson, 1982). The lagging sector (other exportables) is hit by a double whammy – both the resource discovery/boom and protectionism lower the value of the foreign exchange that exports earn.

The preceding discussion focuses on natural resource abundance/boom as the source of a curse. Subsequent studies extended the curse to other sources. Palma (2008) investigated how the expansion of tourism[bb] in Greece, Cyprus, and Malta and the "export" of financial services in Switzerland, Luxembourg, and Hong Kong have also increased the exchange rates in these countries. Using cross-country comparisons, Rajan and Subramanian (2006) examined foreign aid as a similar curse. Paldam (1997) studies the adverse impact of grants from Denmark on the Greenland economy. Generally, any exogenous development that brings foreign exchange earnings into the country will have adverse affects on the "lagging sector" whose exports earn a lower price of foreign exchange. If the lagging sector is an engine of growth, such as manufactured exports, there may be a negative effect on economic development. If the exogenous boom increases the rate of return to rent-seeking, there will be an additional negative effect on development. Whether these negative effects outweigh the original positive effects of the boom has not been predicted by theory nor demonstrated unambiguously through empirical studies.

ALL THAT CURSES IS NOT GOLD: A PHILIPPINE ILLUSTRATION

The Philippines has been called a historical underachiever (Briones, 2009), laggard among flying geese (Intal and Basilio, 1998), and stray cat amongst economic tigers (Vos and Yap, 1996). In this section, we illustrate particular patterns of unsustainable development by drawing on lessons from the Philippines with the overall message that rent-seeking deepens fragmentation and economic stagnation.

Lucas (1993) compares the Philippines with South Korea as an illustration of opportunities lost. In the year 1960, the Philippines was at par with Korea in terms of GDP per capita, GDP composition, population, and even exceeded the latter in literacy rates. The country's human capital in terms of educational attainment was very high. The civil, judiciary

[bb]See Copeland (1991) for a formalization of tourism and deindustrialization.

and legal institutions are also relatively well established. However, contrary to expectations, the country's development has been substandard and has veered away from the stylized pattern of structural transformation. Low investments in R&D, rural infrastructure, and detrimental government policies were among the problems.

From the 1950s to the early 1980s, protectionism and import-substitution led to premature and distorted patterns of industrialization (Bautista, Power and associates, 1979; and Clarete and Roumasset, 1987). As opposed to the structural transformation of its neighbors, particularly the Four Asian Tigers, the Philippines largely skipped the primary engine of growth – manufacturing for export. While the Philippines' growth has been restrained, Korea's accelerated. Lucas (1993) refers to this continuing transformation of Korea as a miracle; similar to what transpired in Taiwan, Hong Kong, and Singapore. The Tigers pursued an export-driven model of economic development. The Philippines, meanwhile, followed the import-substituting industrialization strategy. After an initial spurt of finishing-stage import substitution, industrialization stagnated (Power and Sicat, 1971).

There have been ups and downs in Philippine economic growth in the 1990s and the current decade. Despite some years of high growth performance, total investment (public and private) has been mostly in decline, especially after the Asian crisis in 1997. Among other reasons, Bocchi (2008) suggested that the fast-growing service sectors (electronics assembly, voice-based business process outsourcing (BPO), and information and communications technology) remained profitable based on initial investments. Neither backward nor forward integration was forthcoming, nor increasing rounds of specialization. Since many of these services, such as call centers, are exports, they also raise the exchange rate, similar to a resource boom.

Rapid population growth has exacerbated the lackluster performance of the Philippine economy (Mapa and Balisacan 2004; Herrin and Pernia, 2003). In the 1960s, the Philippine population was well within Asian standards at 3 percent. However, while neighboring South Korea, Thailand, and Indonesia successfully slowed down population growth to an average of 0.5-1.3 percent, the Philippine population is still growing at 2.1 percent in the current decade[cc].

[cc] Numerical exercise in Mapa and Balisacan (2004) showed that had the Philippines followed the population trajectory of Thailand from 1975 to 2000, additional increase in income per capita would have been at least 0.76% per year or a cumulative increase of 22%. See also Alonzo, et al. (2004) for comparison of Philippines, Indonesia, and Thailand's population dynamics and its impact on poverty reduction.

As a consequence, the Philippines missed the demographic bonus enjoyed by its neighbors (Herrin and Pernia, 2003). A high level of population coupled with low investment translates to declining labor productivity throughout the economy. This implies mediocre growth of human capital, high unemployment, and the so-called brain drain problems. A national consensus on the importance of population management has remained elusive.

Moreover, the country's capacity to facilitate a high impact of economic growth on poverty reduction has been comparatively weak vis-à-vis its Southeast Asian neighbors, even after accounting for differences in the level of growth that occurred (Balisacan, 2007). Poverty in the country remains a rural phenomenon with three quarters of the poor still residing in rural areas and dependent on agriculture. Poverty remains stubbornly high (at 11% in 2007), and the reduction of poverty and malnutrition is slow relative to other Asian countries.

As an island economy, the Philippines has natural barriers to internal integration. These are exacerbated by inadequate transportation infrastructure and misguided transport regulations, especially shipping (ADB, 2007, Balisacan et al., 2008). As a result of these factors, the growth-enhancing effects of trade liberalization are conferred disproportionately to port cities and their environs (e.g. Metro Manila, Cebu, and Davao). Producers in rural areas are sheltered from international competition to the detriment of consumers and wage earners.

In addition to geographic fragmentation, economic and political fragmentations are also pervasive. Economic fragmentation is manifested by the protection afforded to agriculture, services, and some manufacturing (e.g. steel and some petrochemicals). As a result, the agricultural sector remains inward looking and insulated from productivity-enhancing competition. Political fragmentation is also widespread. Even as trade barriers and bureaucratic red tape unnecessarily increase the cost of light manufacturing, agricultural processing/packaging, and production for export, politically influential entrepreneurs are able obtain exemptions or easy passage through the barriers. For example, even though the poultry lobby has managed to use the WTO apparatus to protect themselves from importation of low market-valued chicken parts, McDonalds has succeeded in exempting themselves. Similarly, Coca-Cola and other large companies have managed to secure low-cost sugar, even as potential small-scale candy makers and canned fruit manufacturers are unable to access the same benefit. While Monsanto and Cargill may be able to accelerate the Bureau of Plant and Industry (BPI) quarantine procedures and other restrictions on importing seeds, farmers who want to experiment

with new varieties would face great difficulty in doing so (Roumasset, 2003; David, et al., 2009). Similarly, implementation of land reform can be delayed or avoided altogether through political influence.

The Philippine experience also exemplifies how rent-seeking can induce other inefficiencies as well. Large conglomerates were able to raise prices and deter entry through political connections (e.g. agricultural commodity, most notably rice and sugar, transport services, electricity, and cement in the 1990s). Some of these were critical inputs to production. The white-elephant convention and "cultural" centers,[dd] the mothballed Bataan Nuclear Power Plant,[ee] and the mercantilistic structuring of agricultural and cement industries[ff] further exemplify the formidable presence of rent- seeking. Other examples are the long-standing NFA rice monopoly,[gg] the exemption of the sugar industry from land reform and WTO provisions, government offices being controlled by political appointees, and barriers that increase the cost of doing business (e.g. permits). Other recent examples include the NAIA Terminal III fiasco[hh] and the controversy on the Philippine National Broadband Network.[ii] Moreover, governance indicators showed that the country fared comparatively poorly among countries with similar per capita GDP levels (ADB, 2007). It garnered the lowest score on control of corruption and political stability since 1996 and on rule-of-law since 2002. Furthermore, the county lost momentum in controlling corruption compared with Vietnam, which has been able to better manage corruption, and Indonesia, which is poised to overtake the Philippines in the rankings.

As reviewed in a previous section, fragmentation and rent-seeking can be exacerbated by a resource curse. In what follows, we use the Philippine case to explore how a similar curse can also be promulgated by transfers, especially foreign aid, foreign direct investments (FDIs), and service-sector activities such as BPO and remittances.

Many activities can be cited that increase the supply of foreign exchange and lower its price (equivalently increasing the exchange rate). In the 1970s, the Philippines suffered from exchange rate appreciation due to the large increase in foreign borrowings used to finance its

[dd] See e.g. Lonely Planet Review (2009.)
[ee] See e.g. Agence France-Pessse (2007) and Olea (2009).
[ff] See e.g. Clarete and Roumasset (1987).
[gg] See e.g. Roumasset (2000).
[hh] See e.g. Liongson (2007).
[ii] See e.g. Fabella and de Dios (2007) and Oliva (2007a,b,c).

trade deficit.[jj] The upsurge of foreign direct investments (FDIs) in the 1990s had a similar effect. Long-term capital inflows have been on the rise[kk] after the passage of the Foreign Investment Act in 1991.[ll] The policy of deregulation and privatization in the service sectors (e.g. water, communications, and transport), especially during 1992-1998, attracted FDIs away from the traditional manufacturing into the services sector. More recently, efforts are made to attract FDI in BPO.[mm] The steady increase of remittances is likely to have the same effect of increasing exchange rate. Remittances accounted for an average of 13 percent of GDP during 2003-2007 (WDI, 2008).

As noted in the preceding section, any activity that brings in foreign exchange earnings into the country would contract the output of the "lagging sector." In the case of the Philippines, manufactured exports have shrunk.[nn] Innovation and exploitation of backward and forward linkages has been sluggish with finishing-stage semiconductors and electronic equipment, which accounts for more than 60 percent of merchandise exports (ADB, 2007). Since manufactured exports serve as an engine of growth, economic development is adversely affected.

If, as suspected, the lagging sector is more labor intensive than the booming sectors, downward pressure on wages and increasing unemployment may also result. This effect has been exacerbated by the high population growth in the Philippines. Outward migration serves as a safety valve, but higher skilled workers and entrepreneurs tend to leave the country, ergo the moniker, "brain-drain." Unskilled workers, who tend to remain in the country, are more likely to live in poverty.

In addition to the exchange rate appreciation and the possible subsequent contraction of other manufactured "exportables," some of these booms increase the returns to rent-seeking, leading to the second curse. What really drove trade deficit between 1970 and 1980 was the chronic budget deficit that reached 4 percent of GDP in 1981. The root cause of this massive budget deficit was "crony capitalism" owing to substantial extraction of rents made possible by

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[jj] After the 1974 oil price shock, the country ran huge current account deficits plummeting to 32% of its trade values (Bautista, 1988).

[kk] Although interrupted by the onslaught of the 1997 Asian Crisis.

[ll] The Act allows for up to 100% foreign equity participation in all investment areas.

[mm] The year 2003 marked a significant jumpstart of services export, most notably BPO, in the Philippines. This made the country a major contender for offshore providers in the Asia-Pacific region next to India, China, and Malaysia (NeoIT 2004). The BPO sector accounted for 2.4% of GDP in 2005 and employed about 163,000 workers (Magtibay-Ramos, et. al 2008)

[nn] The country has low manufacturing exports by regional standards. Growth in the period of 2000-2005 is only 1.4% compared with 6.4% in Indonesia, 7.6% in Malaysia, and 11.8% in Thailand (ADB, 2007).

an iron-triangle reinforced by a strong leader and limited accountability (Roumasset, 2009). The prevalence of rent-seeking activities and corruption inflated the budget deficit through increased external borrowing and misspending. Whether these foreign exchange earnings have indeed exerted upward pressure on the exchange rate remains disputable.[oo]

Nevertheless, the fact remains that these sectoral booms add another distortion to the Philippine economy, and they may have adverse general equilibrium effects on other sectors. Remittances may have invigorated consumption and growth, but without induced specialization, the resulting spending may not have the desirable network and other growth externalities. In the current decade, remittances have been increasingly channeled into investments in real estate partly because of the incentives created by the government through the Pag-Ibig Funds program.[pp] This allows for remittances to be an easy target for taxation or extortion. One example is when remittances are used for commercial construction wherein rents are shared between the housing developer and the minor bureaucrats. As for BPO, although it claimed to have generated employment, numerical simulation indicates that the sector has very low intersectoral linkages with the rest of the economy (Magtibay-Ramos, et al., 2008). Moreover, when transparency and accountability are absent, the blessing could turn into a curse because inefficiency in the system increases.

Some caveats are in order. The above discussions focused on the possible adverse effects of foreign exchange earnings examined in the framework of Dutch disease. This is not to say, however, that we should get rid of these "blessings" any more than one would ban mining a new gold discovery. FDI, BPOs, and remittances may also generate growth externalities, though perhaps not at the same degree as manufactured exports. For example, FDI in banking and telecommunication, induced by deregulation in the 1990s, may have generated some innovations, spillover effects, and learning-by-doing. If the Philippines can follow the example of India, it may also be possible for institutions, human-capital, and knowledge provided by BPOs to create a comparative advantage in knowledge process outsourcing (KPO).[qq] The provision of business and technical analysis, animation services, pharmaceuticals and biotechnology, and architectural

[oo] Tuaño-Amador et al. (2007) and Yue (2007) suspected that the strengthened peso is a symptom that the country has contracted the disease due to rise in remittances. Tan (2007) remains skeptical, pointing out that the performances of the manufacturing and agricultural sectors have been historically slow long before the surge of remittances and need not be explained by Dutch disease but by structural problems that plagued the sector.
[pp] Pag-Ibig Fund Overseas Program for Overseas Filipino Workers (OFW) pays 7% percent interest to any member of the family of an OFW. Workers can also avail of up to PhP 2 M for housing loans (PinoyBlogoSphere, 2009).
[qq] See e.g. Outsource2India (2009).

design may be similarly advantaged.[rr] Similarly, overseas workers may return if and when the economy becomes sufficiently dynamic. These opportunities present policy challenges to facilitate warranted investments. Some general principles are explored in the next section.

FROM VICIOUS TO VIRTUOUS CIRCLE

The struggles of the Philippines do not portend permanent doom. In the words of J.R.R. Tolkien (1954):

> *All that is gold does not glitter;*
> *all that is long does not last;*
> *All that is old does not wither;*
> *not all that is over is past.*

The Philippine case illustrates some of the inefficiencies associated with economic fragmentation. If these forces overcome the positive pull of total capital accumulation and dynamic efficiency, an economy can be trapped in a vicious circle of poverty, population pressure, and resource degradation.

The original Brundtland concept demonstrated that sustainable development must allow for the interlinkages among poverty, population pressure and resource degradation. Figure 4 (left panel) depicts the interaction of population pressure and poverty as the notorious Malthusian vicious-circle and environmental degradation, which exacerbates that circle. Population growth, in the face of a limited resource base, exacerbates poverty by lowering the return to unskilled labor. This in turn prevents mechanisms whereby increased incomes and the rising productivity of human capital lower the demand for children. The population-poverty cycle is exacerbated as households with limited resource-access strive to eke out a living from environmentally fragile areas resulting in further environment degradation. The migration of labor to hillside agriculture may result in an increased importance of agriculture and natural resource in national income and employment (Balisacan and Rola, 2008). However, the end result is stagnation of per capita income, increased poverty, and deterioration of the natural resource base. Moreover, diminishing agricultural productivity growth, limited employment opportunities outside the agricultural

[rr] See e.g. Manila Bulletin (2005).

sector, high population growth, slow poverty reduction, and disfunctional institutions are major impediments to achieving sustained macroeconomic development. The conclusion reached by the Commission is that the problems could be addressed only if the three interacting forces in the vicious circle are taken into account collectively.

Fig. 4

The right panel of Figure 4 shows the flipside of the vicious circle – the *virtuous circle*. The virtuous circle incorporates sustainable growth and patterns of sustainable development. The three pillars of sustainability, total *environomy*, dynamic efficiency, and intertemporal equity, support the virtuous circle of innovation, specialization, and increased social welfare. The double arrows of the circle represent the dual interactions between the three positive forces. Social welfare increases with higher per capita income, better health conditions, and improved education. These three stimulate demand for investment in children's human capital over sheer numbers, thereby reducing fertility and decreasing population pressure (Becker et al., 1990).

What would it take to transform the vicious circle into a virtuous circle? Orbiting into the virtuous circle is not an easy task. Environmental degradation in rural areas is both a cause and effect of poverty. Unshackling the link requires sustained growth of employment opportunities in the general economy, making it attractive for the poor to move away from low-productivity annual crops on marginal, sloping lands into less erosive perennial crops (Balisacan and Rola, 2008) and into the modern sector. A country must secure sources of productivity growth and income diversification through investments in R&D, irrigation, information, and education.

The first requirement for transitioning from the vicious to the virtuous circle is the establishment of appropriate institutions. The New Institutional Economics and the new political economy (e.g. Acemoglu, 2005; Dixit, 1996; Coate and Morris, 1995; Besley, 2007; Rodrik 2007) can be utilized to help understand the role of institutions in sustainable development. Good institutions are prerequisite for economic cooperation, especially for contracting and market development. The core economic principle from Adam Smith (1776) to Acemoglu (2005) has been that well-functioning competitive markets exploit comparative advantage as defined by its factor endowments, technology, market structure and transportation costs (Stolper and

Samuelson, 1941; Jones and Scheinkman, 1977; and Helpman and Krugman, 1985) and transaction costs (Yang, 2003).

But since factor endowments and other above features change over time, so does comparative advantage. Furthermore, it is endogenous due to the role of specialization and learning-by-doing (Yang, 2003). As comparative advantage changes, new investments become profitable; but these are interdependent, involving both supply and demand-side linkages (Stiglitz, 1993). To exploit these interdependencies, mechanisms for investment coordination are needed that go beyond the basic institutions of property, contracts, and markets.[ss] The government can either facilitate agreements between private groups and between the private and public sectors that coordinate investments (Roumasset and Barr, 1992) or give "prizes" such as preferential financing for high-performing exporters (World Bank, 1993 and Stiglitz, 1993).

Getting the right institutions is a prerequisite but not a sufficient condition for development because of the presence of externalities. An example is illustrated in Bukidnon, Philippines wherein policy and institutional initiatives evolved from centralized to decentralized forest ownership and management. Forest clearing has been prevented but because agricultural intensification persists, soil erosion continued, soil fertility declined, and water resources were further degraded (Rola and Coxhead, 2005). To correct for these, going beyond the market is required in order to adjust the prices. Thus, the second condition is to get the prices right.

Inasmuch as good institutions stimulate growth due to specialization, getting the prices right accelerates growth. Right prices should allow not only for optimally changing relative prices between consumption, capital, and resources, but changing relative prices sbetween different consumption goods as the comparative advantage changes over time. Furthermore, the presence of externalities calls for corrective prices to bring us closer to optimal outcomes. To facilitate this, economists are increasingly viewing the economy and the environment as a single interlinked system with a unified valuation methodology (Hamilton and Clemens 1999, Dasgupta 2007).

The third condition for the endurance of the virtuous circle is for transparency and accountability to become more than buzz words.[tt] Transparency includes information systems

[ss] Competitive futures markets could also coordinate investments, but they are not well-developed for most goods, even in developed countries.

[tt] Possibly the most famous of world leaders to have called for transparency and accountability are Mikhail Gorbachev (Rhodes, 2007) and Barack Obama (Ambinder, 2009).

that reveal what the government is doing, what the economic consequences are, what groups enjoy the benefits, and who bears the costs. For example, economic benefit-cost studies inevitably increase transparency. The justice system provides market accountability through the system of contract, tort, and property law, and a commercial code. With this legal support, producers and consumers are accountable to one another. Administrative accountability subjects government officials and programs to similar principles. User fees, benefit taxation, and constitutional limitations on excess deficit spending are examples (Roumasset, 1989). Similarly, bureaucrats can be held accountable to operational performance standards.

CONCLUSIONS

Sustainable development encompasses sustainable growth and dynamically efficient development patterns. Sustainable growth is given a solid and operational framework by positive sustainability, which provides specific guidelines for the accumulation/depletion of produced and natural capital. Resource management and pricing is guided by the Pearce equation. Optimal extraction occurs where the marginal benefit from consuming the resource is equal to its marginal opportunity cost. Resource pricing, ecosystem payments, and non-market valuation of environmental resources should be guided by the sum of extraction, marginal user, and marginal externality costs. In some cases, however, it is not feasible to reach an internal optimum as described by the Pearce equation, because so doing would deplete the resource below some technical threshold or safe minimum standard (Chapter 2). In such cases, the shadow price of the resource is given by its marginal opportunity cost, but not the resource price.

Pursuit of sustainable development is the road less travelled. Many countries exhibit unsustainable development (Dasgupta, 2007). Others are growing the *environomy*, but with unnecessary departures from the ideals of dynamic efficiency and intergenerational equity (Roumasset, et al., 2007). The lesson learned from the Philippine illustration is that policy and governance, driven by rent-seeking, exacerbate natural fragmentation and retard economic development. In addition, foreign exchange earnings from foreign aid, foreign direct investments, remittances, and tourism can promulgate a *resource curse* – causing a further drag on manufactured exports, the engine of growth in developing Asian countries, and increasing the returns to rent-seeking. Rent-seeking further aggravates economic fragmentation. The resulting

low rate of economic growth exacerbates population pressure and environmental degradation, leading to a vicious circle of unsustainable development.

An economy can escape from the vicious circle and transition into a virtuous circle by incorporating the principles of sustainable growth and development. For sustainable development not to be at odds with policy science, positive sustainability must be combined with efficient sectoral development and poverty reduction. The key is cultivating an economic environment that is conducive to specialization and innovation. These, plus productive and human capital formation and the efficient conservation of natural resources are all part of sustainable development policy. Government policies should be framed by the principles of positive sustainability – dynamic efficiency and capital formation that allow for standards-of-living to perpetually increase, eventually approaching a golden-rule state wherein per capita welfare increases at the rate of technical change.

The role of public policy in sustainable development is gleaned from the oldest lesson in economics – facilitate, don't dictate (Smith, 1776). Rent-seeking stifles innovation through fragmentation and stagnation. Transparency and accountability are the enemies of rent-seeking. A systems approach that takes into account the *environomy*, combined with dynamic efficiency and intergenerational equity, will promote meaningful sustainable development.

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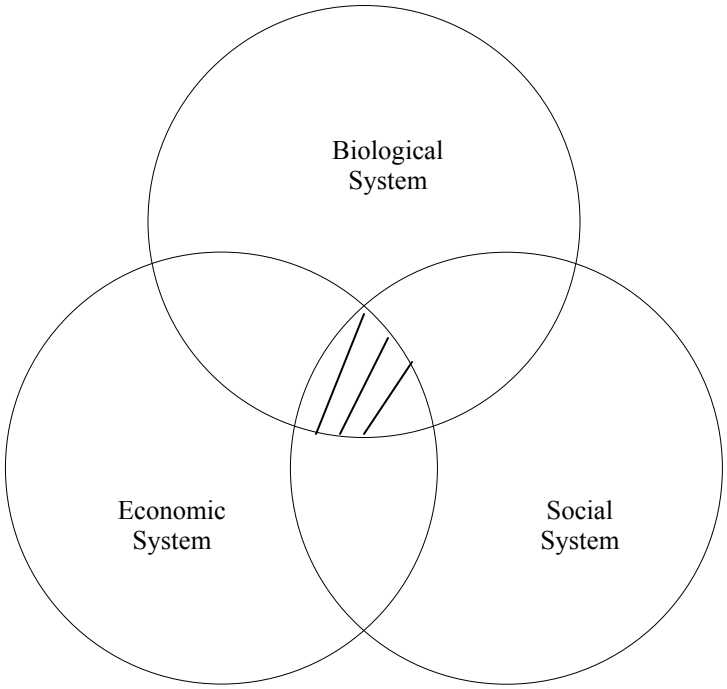

Fig. 1. Barbier's Venn Diagram (adapted from Barbier, 1987).

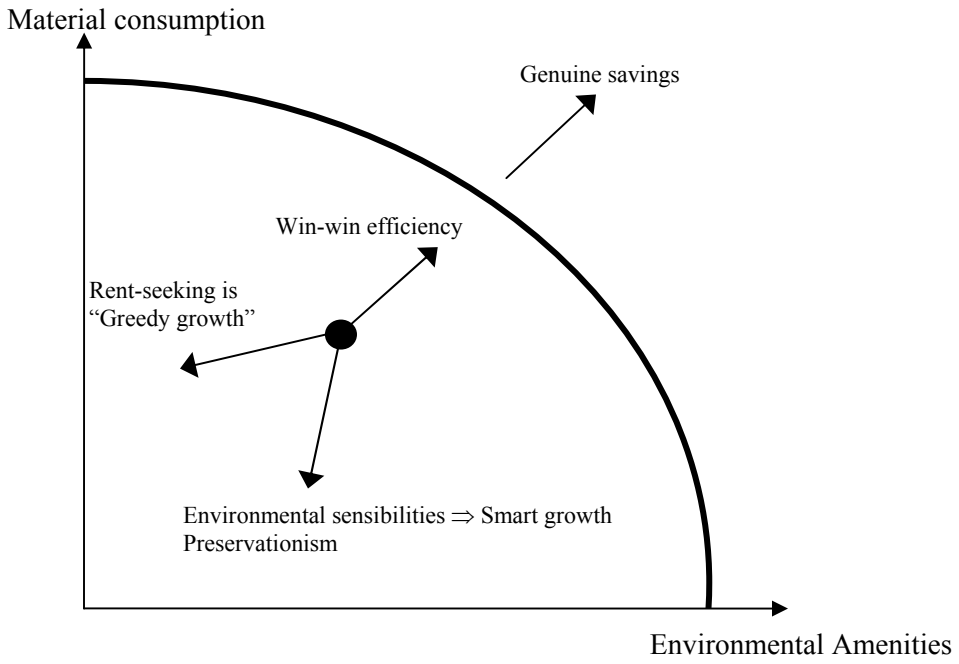

Fig. 2. Positive sustainability.

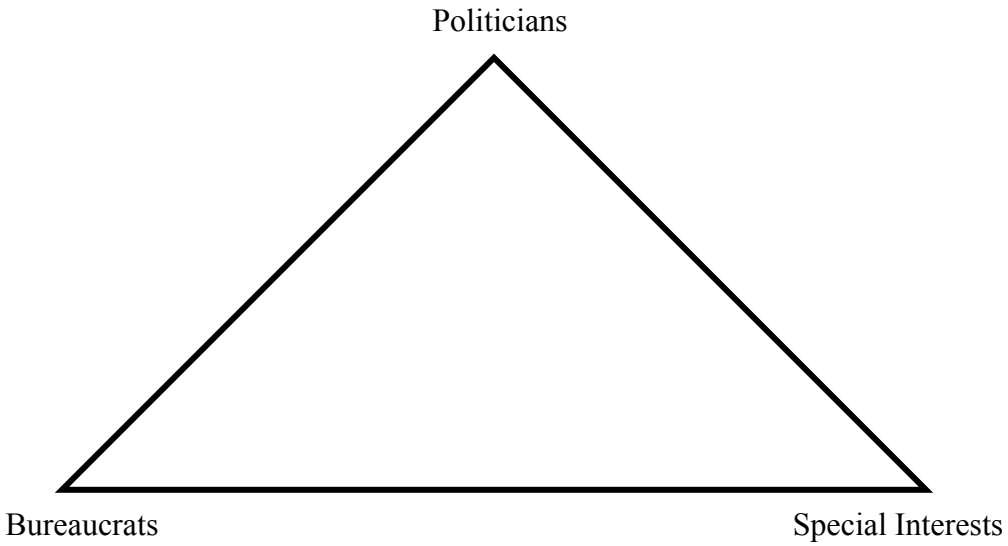

Fig. 3. Rent-seeking and the iron triangle.

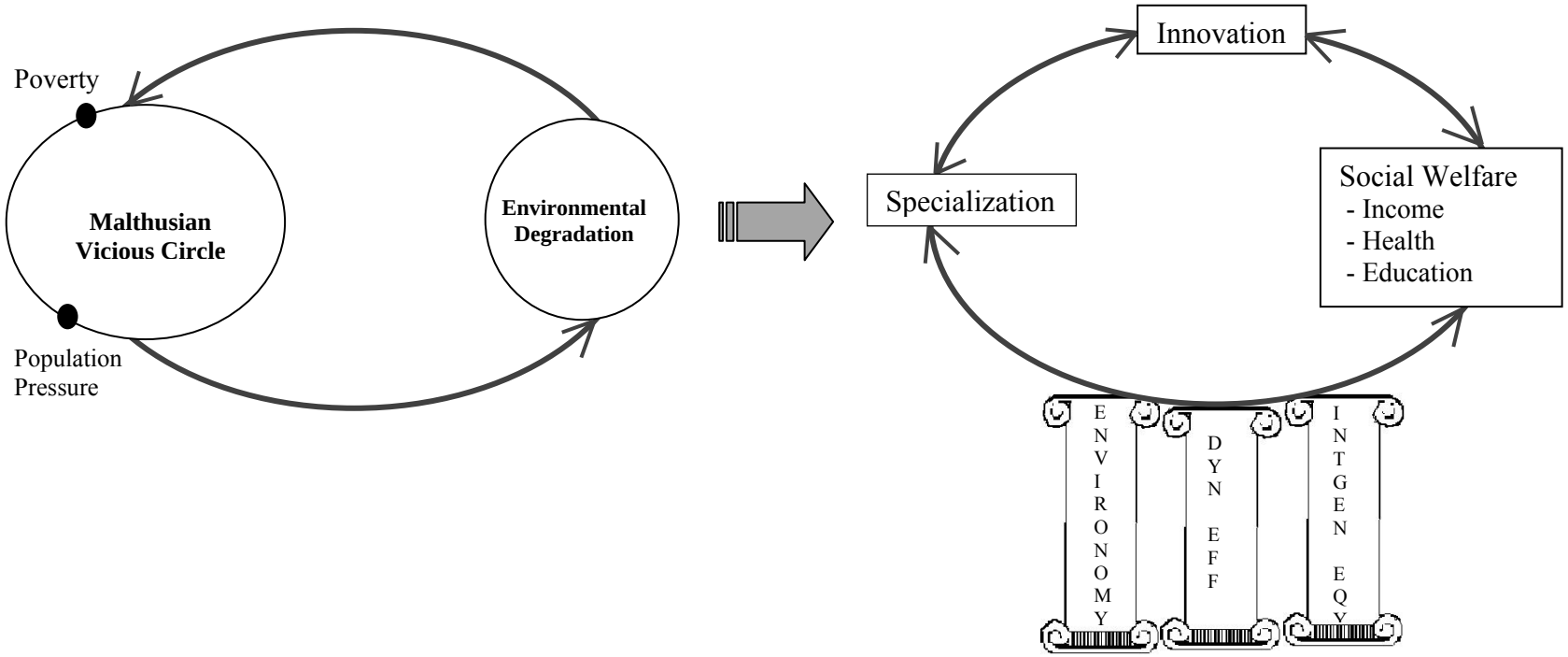

Fig. 4. Unsustainable and sustainable developmen