

# **Diminishing Returns and Economic Sustainability; The Dilemma of Resource-based Economies under a Free Trade Regime.**

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**‘And the land was not able to bear them, that they may dwell together...’**  
Genesis XIII, 6.

(quote used by Alfred Marshall, *Principles of Economics*, London, 1890, in order to emphasise the role of Diminishing Returns as a fundamental factor in human history.)

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**‘I apprehend (the elimination of Diminishing Returns) to be not only an error, but the most serious one, to be found in the whole field of political economy. The question is more important and fundamental than any other; it involves the whole subject of the causes of poverty;...and unless this matter be thoroughly understood, it is to no purpose proceeding any further in our inquiry’.**

John Stuart Mill, *Principles of Political Economy*, 1848.

This paper explores the impact of Diminishing Returns on world poverty and sustainable growth. Diminishing Returns is an economic factor which not only heavily influences the behaviour of costs, wages, and standard of living in any resource based economy - particularly in Third World economies - but, I shall argue, this factor is the key to understanding the concept of sustainability. This paper argues that the strong warning from John Stuart Mill quoted above is as valid today as it was almost 150 years ago. Mill’s warning has, however, been largely ignored, almost completely so in the period following the World War II.

Part one of the paper traces how Diminishing Returns disappeared from economic theory as neo-classical economics and general equilibrium analysis took over from other, less abstract, economic paradigms. Part two discusses the impact of Diminishing Returns vs, increasing returns if they were to be reintroduced in international trade theory. Part three describes how ‘The Triple Curse’ of Diminishing Returns, perfect competition, and price volatility, combine and mutually reinforce each other in maintaining vicious circles of poverty and unsustainable growth. Part four describes how a few resource-rich nations - Australia and Canada taken as examples - managed to escape the ‘Triple Curse’ which threatens all resource-based economies. The concluding part discusses the need for a wide-ranging overhaul of the World Economic Order, an overhaul which once again incorporates the lock-in effects created by Diminishing Returns in resource-based economies. The most important conclusion is that perhaps a key building block of the present international economic order - *the absolute supremacy of free trade under any circumstances* - will have to be modified when the effects of both Diminishing and Increasing Returns are again incorporated into international trade theory .

## **1. Diminishing Returns, or, How our Oldest Economic Law was Forced out of International Economic Theory.**

Diminishing Returns is the oldest of all economic laws known to mankind. It was first described by the Greek philosopher Xenophon - the man who also coined the term economics - around 550 BC. Diminishing Returns is the main factor behind most, if not all, mass migrations of human history. Diminishing Returns was the reason why Abraham and Lot parted - after a strife between their respective herdsmen - as the quote from *Genesis 13* on the cover of this paper reminds us. We would claim that many Third World problems today - like the apparent tribal problems in Rwanda - are caused by nations being *locked into* comparative advantages in economic activities subject to Diminishing Returns with their population rising.

Diminishing Returns occur when one factor of production is held constant, while the other factors of production are expanded. As a consequence of the one factor being held constant,

the increased input of the other factors yield less and less benefit. In general terms, any company or nation could be subject to Diminishing Returns in any economic activity. If Microsoft had not extended their office space as the company grew, they, too, would have suffered from Diminishing Returns as more and more personnel would have to work more and more cramped in the same small office area. Of course, there is no reason why Microsoft (or any other economic activity not based on natural resources) should refrain from buying more office space or more of any input as their production expands. In 'normal' economic activities these new inputs are available, as output grows, at commercial terms - price and quality - which are *not inferior* to what they already have.

Here lies the basic difference between resource-based economic activities and all other economic activities: When output is increased in any resource-based activity - agriculture, fishing, and mining - there is always one point, after which the crucial resource is no longer available at the same quality or in the same quantity as the previous 'unit' of the same resource. If specialised in agriculture, a nation will sooner or later have to resort to inferior land - if Norway specialised only in growing carrots, we would in the end have to grow carrots on top of the mountains. If specialised exclusively in fisheries, the nation would fish the oceans empty. If specialised in mining, the nation would have to mine deposits with decreasing quality of ore. As a result, the resource-based nation is locked into an economic activity which yields less and less as its specialisation in the resource-base activity deepens. The more such a nation produces of the specific resource-based product, the poorer it gets, and the more the environment suffers. This is what I call *the double trap of resource based nations: poverty and economic degradation increase hand in hand as the nation continues to specialise according to its comparative advantage in international trade.*

Historically, there have been two ways of escaping the trap of Diminishing Returns:

1. The first way to escape the trap of Diminishing Returns is the one given in the Bible. Abraham and Lot solved their problems by Lot taking his huge herds Eastward into the plains of Jordan and Abraham taking his herds to the land of Canaan. This is the first and most 'primitive' logical response to Diminishing Returns: to move on as long as there is uninhabited land to move on to. This is of course the way of life of all nomadic tribes. Consequently, as the father of neo-classical economics, Alfred Marshall, pointed out, Diminishing Returns is 'the cause of most migrations of which history tells.'<sup>1</sup> This includes the huge 19th and 20th Century migrations from Europe to North America and Australia. Diminishing Returns has always been an important fact of life, and has, until this Century, always been present in more or less rudimentary economic theory all through human history.
2. The second, more sophisticated way of avoiding the trap of Diminishing Returns, was discovered during the Renaissance. This strategy consisted in building what Michael Porter would call a *created comparative advantage* in activities not subject to Diminishing Returns. The basis for the economic changes of the Renaissance was a new interpretation of the Holy Scriptures. Man's duty was no longer seen as living in the product of God's Creation. Since Man was created in God's image - and God was the Creator of the Universe - Man consequently also had a duty to God also to create, to learn, to innovate, and to invent<sup>2</sup>. Founded on this new way of thinking, the economic strategies of European

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<sup>1</sup> Marshall, Alfred, *Principles of Economics*, London, Macmillan, 1890, p 201.

<sup>2</sup> This development is discussed in Reinert, Erik and Arno Daastøl, 'Exploring the Genesis of Economic Innovations: The religious gestalt-switch and the duty to invent as preconditions for economic growth', in

nations starting in the late 15th Century were based on building science and knowledge, on developing manufacturing industry which could add value to national resources, on the use of machinery in more and more activities, on innovations<sup>3</sup>, on creating economic empires where the colonies provided the raw materials and constituted markets for increasing return (i.e. manufactured) goods, and where the European mother country provided knowledge and manufacturing. Important philosophers and ‘statesmen of science’ behind these knowledge-based strategies were Henry VII, Elisabeth I, and Francis Bacon in England, Gottfried Wilhelm von Leibniz and Christian Wolff in Germany, and Jean-Baptiste Colbert in France. This was a system where ideas flowed freely, but where each European nation nursed the creation of its own manufacturing industry. In this way the European nations created a comparative advantage inside a social framework receptive to new knowledge and new technologies, in activities subject to what Schumpeter called *historical increasing returns* - a dynamic combination of increasing returns and technical change. The enduring success of the economic policies of the Renaissance can best be understood by contemplating that the nations which were to be made rich through this policy - the European powers - are still rich, whereas the areas which were to be poor, the colonies, are still poor after several hundred years.

To Third World countries today, the first option is no longer *physically* feasible, due to the lack of empty land. The second option is not *politically* feasible because it invariably also involves measures which violate the principle of free trade; the principle which forms the very foundation of the present world economic order. As a consequence, many of the poorest Third World nations face the double curse of acute poverty and ecological disaster. I would claim that if we study how resource-rich nations - the US, Australia, Canada - have escaped the trap of Diminishing Returns only by *consciously* building industrial strength outside the resource-based activities, do we find a solution to the problems of the Third World. In 19th Century United States, the strategy for economic development was based on the wise slogan ‘Do what the English did (starting in 1485), don’t do what the English tell us to do.’ Today, the slogan for the Third World ought to be: ‘Do what the United States did, not what the United States tell you to do’.

The United States is a good example of how a nation locked into raw material production escaped the trap of Diminishing Returns. As a young republic the United States had its *comparative advantage* in the cotton-and-slave business, and only escaped this trap through huge efforts and high tariffs. Well-known men in the United States, who spoke up against specialising in resource-based activities, are Alexander Hamilton, Benjamin Franklin, Abraham Lincoln, Andrew Jackson, and Thomas Jefferson - all of them personalities whose portraits today adorn the US dollar bills. They all saw the problems of a United States locked into only exploiting its natural resources, and promoted industrialisation behind tariff barriers until sufficient industrial strength had been built.

The US arguments were based more on the superiority of the ‘productive powers’ of industry than on the inferiority of resource-based activities - but the message about their inferiority was always clear. Consequently, in 19th Century United States theories of free trade were seen as most harmful until the nation had build what was then called ‘productive powers’ - a

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*European Journal of Law and Economics*, In *European Journal of Law and Economics*, Vol 4, No. 2/3, 1997, and in *Christian Wolff. Gesammelte Werke, Materialien und Dokumente*, Hildesheim, Georg Olms Verlag, 1998, pp. 233-283.

<sup>3</sup> Francis Bacon (1561-1626) wrote both *An Essay on Innovations* and *The Advancement of Learning*, The latter published in 1605.

term related to today's term 'competitiveness'. The English free-trade doctrines were the doctrines of the slave-owners.<sup>4</sup> In an attempt to keep the free trade doctrines of the English economists out of the nation, US President Thomas Jefferson also tried, in vain, to stop the publication of David Ricardo's *Principles of Economics* in the United States. The showdown between the two schools of economic thought came with the Civil War: The free trade and resource-based Confederate South fighting the protectionist and industrialising North.<sup>5</sup>

The Third World continues to specialise in resource-based activities subject to Diminishing Returns. In many Third World countries - particularly in Latin America - we find the same 19th Century conflict as in the United States, between the 'industrialists' (The North in the US Civil War) and the raw material producers (The South in the US Civil War). The difference is that in Latin American countries, the 'South' won their version of the Civil War, and industrialisation was truncated. Economic actors whose vested interests lay in the exploitation of natural resources - not in industrialisation - won the political battle. This aspect of Latin American history - the 'modernisation schemes' which failed - are a seriously underresearched area.<sup>6</sup>

As we shall discuss more in detail in Part 3 of this paper, technical change in resource-based activities carries with it completely different effects than it does in normal manufacturing (Increasing Return) activities: Technical change increases the pressure on the natural resources by making commercially profitable the exploitation of resources further into the realm of Diminishing Returns. New equipment makes it possible to catch the 'last fish in the ocean'. The wage-rising effect which accompanies technical change in manufacturing industry, does not result, therefore, from technical change in Diminishing Return activities. Technical change in Diminishing Return (resource based) activities also tends to come imbedded in new machinery, not as a result of knowledge created near the resource itself. As a result of this, there are few spillover effects to the rest of the economy from knowledge created in the resource-based sector.

The position of Diminishing Returns in today's economic theory in no way reflects its practical importance, probably because the founding father himself - Adam Smith - did not take the phenomenon into consideration. Indeed, Adam Smith, heavily influenced by the French physiocrats, saw agriculture, subject to Diminishing Returns, as the only 'natural' state of affairs. A basic assumption for Adam Smith, as well as for neo-classical economic theory, is that perfect competition, as in agriculture, is the ideal situation. To the alternative economic tradition - outlined later in Chart 1 - the world moved forward as a result of human learning, innovations and *dynamic imperfect competition*.

To most economists today, economics started with Adam Smith. For this reason, today's most influential economist, Paul Samuelson, makes the mistake of stating, in the chapter of his

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<sup>4</sup> The most complete account of the economic theory of the slave-owners is contained in *Cotton is King, and Pro-Slavery Arguments*, Augusta, Georgia, Pritchard, Abbot & Loomis, 1860. This is a massive tome of 908 pages, where the core of the economic arguments against the industrialisation of the United States are found on pages 19-226.

<sup>5</sup> For an account of this, see Salisbury, Allen, *The Civil War and the American System. America's Battle with Britain, 1860-1876*, New York, Campaigner Publications, 1978, and Draper, John William, *History of the American Civil War*, New York, Harper, 1867. 3 volumes.

<sup>6</sup> Two interesting studies have appeared on this aspect of Peruvian history: Gootenberg, Paul, *Between Silver and Guano, Commercial Policy and the State in Postindependence Peru*, Princeton, Princeton University Press, 1989, and McEvoy, Carmen, *Un proyecto nacional en el siglo XIX, Manuel Prado y su visión del Perú*, Lima, Universidad Católica, 1994.

influential textbook where the history of economic thought is outlined, that ‘In the half-century after (Smith’s) *Wealth of Nations*, the law of Diminishing Returns was discovered.’<sup>7</sup> Samuelson assumes that what Adam Smith does not mention, was not known at that time. In fact, the devastating effects of Diminishing Returns have been known since Biblical times. We shall see that a similar mistake is made by a presently prominent US economist, Paul Krugman, when it comes to understanding Increasing Returns, the mirror image of Diminishing Returns.

Diminishing Returns is a term often introduced at an early stage to students of economics. In Samuelson’s classic textbook, the concept of Diminishing Returns is introduced early as ‘a famous technological economic relationship’.<sup>8</sup> But most students of economics will go through their studies, even up to a Ph.D. without ever encountering a practical example where Diminishing Returns is found in some activities (resource-based), and its mirror image, Increasing Returns in others (manufacturing). Neo-classical production-possibility curves may contain Diminishing Returns and Increasing Returns, but when it comes to practical policies, the implications of having one group of nations specialise in Diminishing Return activities (Traditional Third World) and one in Increasing Return activities (First World) are never discussed. Paul Samuelson excludes this Diminishing Returns/Increasing Returns counterpoint in his most famous theoretical work, the one proving factor-prize equalisation in international trade.<sup>9</sup> In his perhaps most famous work Samuelson shows that if free trade is introduced, everybody in the world will in the end be equally rich. This theory is based on the standard assumptions of neo-classical theory, which does not take into consideration that some activities are produced under Diminishing Returns while others obey the laws of its mirror image, Increasing Returns.

To the English classical economists, Diminishing Returns was a very important factor. Indeed, Diminishing Returns underlies Malthus’ dismal view of world population growing much faster than world food production. Since land is of different quality, and Malthus assumes that the best land is cultivated first, ‘the productive powers of labour as applied to the cultivation of land must gradually diminish and as a given quantity of labour would yield a smaller and smaller return, there would be less and less produce to be divided.’<sup>10</sup> To Nassau Senior, an economist who was important in England in his day, Diminishing Returns was one of the ‘four fundamental axioms of Political Economy.’ As early as in 1613 the Italian economist Antonio Serra pointed out the importance of Diminishing Returns in explaining the relative poverty of Naples compared to the wealth of Venice, which he saw as a result of Increasing Returns.<sup>11</sup> To German authors the principle of Diminishing Returns was equally important. In the 1850’s, Wilhelm Roscher discusses Diminishing Returns and relates this to the ‘bearing capacity’ or ‘carrying capacity’ of lands and nations - terms strikingly close to today’s ‘sustainability’.<sup>12</sup> In the 19th Century, only American authors - faced with the enormous prairies still to be cultivated - paid little attention to Diminishing Returns.

As we briefly mentioned initially, Alfred Marshall - the founder of today’s neo-classical economic theory - emphasises the importance of the ‘Law of Diminishing Returns’ in the

<sup>7</sup> Samuelson, Paul, *Economics*, 1976, 10th edition, p. 841.

<sup>8</sup> Samuelson, Paul, *Economics*, *ibid*, p. 24.

<sup>9</sup> Samuelson, 1949 and 1950.

<sup>10</sup> Malthus, Thomas Robert, *Principles of Political Economy*, 2nd Edition, London, Pickering, 1836. pp. 273-274.

<sup>11</sup> Serra, Antonio, *Breve trattato delle cause che possono far abbondare li regni d’oro e argento dove non sono miniere*, Napoli, Lazzaro Scoriggio, 1613.

<sup>12</sup> Roscher, Wilhelm, *Principles of Political Economy*, Chicago, Callaghan, 1882.

first edition (1890) of his main work *Principles of Economics*. Marshall leaves no doubt about the importance of this economic factor: ‘This tendency to a Diminishing Return was the cause of Abraham’s parting from Lot<sup>13</sup>, and of most of the migrations of which history tells. And wherever the right to cultivate land is much in request, we may be sure that the tendency to a Diminishing Return is in full operation.’ There is all reason to believe that Diminishing Returns plays an equally important role in the Third World today. Later in this paper we shall attempt to show this, using data from Bolivia, Ecuador, and Peru. In today’s economics profession - which is completely cast in the mould of equilibrium analysis – the counterpoint of Increasing and Diminishing Returns is not part of the professional toolbox. In my personal opinion this has devastating results for poverty and environment alike.

A succinct recommendation for economic policy can be found in this first edition of Marshall’s *Principles*: Tax economic activities subject to Diminishing Returns and give bounties to activities subject to Increasing Returns.<sup>14</sup> Yet Marshall is the person who must carry the main responsibility for leaving out Increasing and Diminishing Returns from economic theory. Over the eight editions of his *Principles*, we can observe how the importance of Diminishing Returns is reduced in Marshall’s mind. From being listed in the index as a *Law* of Diminishing Returns, in the eighth edition we find it listed as a *tendency*. The fact that Marshall in the eighth edition no longer capitalises the first letters in Diminishing Returns (but writes diminishing returns) could be from purely orthographic considerations, but we note that the first letters in ‘Capital Goods’ are still capitalised.

Why did Diminishing Returns and its mirror image Increasing Returns, disappear as a counterpoint in economic theory? Why do famous economists like Marshall and Samuelson on the one hand acknowledge the transcendental importance of Diminishing Returns in human history, but quietly leave this factor out when they construct the economic theories on which our World Economic Order presently rests? In today’s standard economics encyclopaedia, *The New Palgrave*, Diminishing Returns (decreasing returns) is only briefly discussed under the heading of ‘Economies and diseconomies of scale’. One explanation for the lack of interest in the subject could be that this factor no longer awakens any interest in the First World, where economic theory is being produced. There is no *demand* for theories involving Diminishing Returns. In my view the answer lies more on the supply side: Diminishing Returns does not ‘fit’ the choice of methodology and language used in the profession. I shall attempt to explain this in the following paragraphs.

With neo-classical economics, economic theory came to be modelled after late 19th-Century physics - economics became ‘social physics’. Mathematising the profession required making certain fundamental assumptions, and as a result of these assumptions, economic activities - for all practical purposes - came to be seen as being ‘alike’. This was the price paid for achieving ‘general equilibrium’. As was repeatedly and consistently pointed out by the majority of 19th Century German and American economists, English classical theory suffered from the fundamental weakness of being a theory of *exchange*, not of *production*.<sup>15</sup> Before the classical theory, the different circumstances under which production took place in different industries were seen as having great influence on national standards of living. Not only were some economic activities seen as being ‘better’ than others, but achieving a

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<sup>13</sup> ‘The land was not able to bear them that they might dwell together; for their substance was great so they could not dwell together’, Genesis xii 6.

<sup>14</sup> Marshall, *ibid*, p. 452.

<sup>15</sup> see Reinert, Erik, ‘Symptoms and Causes of Poverty: Underdevelopment in a Schumpeterian System’, in *Forum for Development Studies*, No. 1-2, 1994, pp. 73-109.

harmonious balance between the different sectors of an economy was seen as being of great importance. In neo-classical general equilibrium analysis - analysing the economy as a 'black box' inhabited by clones of 'representative firms' - these considerations disappeared from the mainstream of the economy.

In order for economics to become a 'true science', economists had to assume away the Increasing/Diminishing Return dichotomy, since its existence was not compatible with general equilibrium. For all practical purposes all economic activities became 'alike' in that they were all generally assumed to operate under perfect information and under constant returns to scale. The choice of methodology - comparative statics based on 19th Century physics - meant that all factors which were not compatible with equilibrium had to be left out of the theory. As Paul Krugman succinctly put it: 'Economic theory came to follow the path of least mathematical resistance'<sup>16</sup>. The choice of tools came to determine what was included and what was excluded in economic theory. Whether the factors excluded were important in real life or not was, after an initial period of soul-searching doubt by people like Marshall, no longer an issue. David Ricardo was at one point faced with the objection that his theories were not relevant: The map did not correspond with the real world. To this Ricardo is supposed to have replied that this was 'so much the worse for the real world'. Nowhere in the history of economics is this description more fitting than when it comes to the exclusion of Increasing and Diminishing Returns from economic theory in the late 1800's.

Alfred Marshall knew of the importance of Increasing Returns from what he himself called his 'Wanderjahre' in industry, and, as we have shown above, he knew about the historical importance of Diminishing Returns. Yet, he must take the main responsibility for leaving these crucial factors out of modern economic theory, as they violated the concept which came to be the centrepiece of economic theory: General Equilibrium. The particular physics-based mathematical language chosen as the means of communication in the economics profession brought with it the assumption of constant returns. This happened not because anybody at that time thought these assumptions to be realistic, they came purely as a necessary by-product of *the choice of tools* made collectively by the profession.

Marshall was indeed very worried about excluding Increasing and Diminishing Returns. His own attempt to defend leaving Increasing Returns out of economic theory is remarkable. Marshall here introduces a biological analogy where firms are seen as trees in a forest, where old ones die out only to be replaced by new ones. Since 'after a while, the guidance of the business falls into the hands of people with less energy and less creative genius', the monopolising tendencies of Increasing Returns would be counteracted. This may be true from the point of view of firms, but, in my view, definitely not of nations. From an evolutionary or Schumpeterian point of view, the opposite could be argued: Since knowledge is very cumulative, the succession of firms operating under Increasing Returns, each growing and dying as Marshall implies, could explain the creation of a virtuous circle, which leads one nation to 'forge ahead' of other nations.

One important result of Marshall's attempt to solve the problem of Increasing Returns, was that he assumed the existence of the 'representative firm' - that 'average' which in today's economic theory is assumed to be the sole inhabitant of the economic world. All economic activities, and all firms, came in this way to be 'alike' in today's standard economic theory. Our lack of understanding of unequal economic growth is fundamentally a result of this

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<sup>16</sup> Krugman, Paul, *Rethinking International Trade*, Cambridge, Mass., MIT Press, 1990.

*equality assumption*. The equality assumption which is built into neo-classical theory, almost by definition produces theories of *even* economic growth. In Chart 1, I have schematically outlined the genealogy of theories which explain why economic growth is so *unevenly* distributed. In these non-equilibrium theories, Increasing and Diminishing Returns play important roles, explicitly or implicitly. The theoretical lines in Chart 1, with the exception of evolutionary economics, have virtually died out. Evolutionary economics has very little representation in European or US economics departments, but is used in policy formulation in the EU and the OECD. Evolutionary economics has, in my view, enormous potentials in exploring the links between underdevelopment and sustainability. Unfortunately, very few attempts have been made in this direction.<sup>17</sup>

Nobel price winner in economics, James Buchanan, puts the fundamental problem which has trapped neo-classical economics in the *equality assumption* as follows, under the heading of *Equality as Fact and Norm*:

⇒ ‘Any generalised prediction in social science implies at its basis a theoretical model that embodies elements of an *equality assumption*. If individuals differ, one from the other, in all attributes, social science becomes impossible.’<sup>18</sup>

The rise of the economics profession to being a ‘true science’, was thus achieved at the cost of ignoring any impact of the diversity of economic activities on the economy. Only by assuming away any such diversity between economic activities, did Paul Samuelson reach his conclusion that we would all be equally rich if the world adopted free trade.

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<sup>17</sup> see Reinert 1994, *op. cit.*.

<sup>18</sup> Buchanan, James, *What Should Economists Do ?*, Indianapolis, Liberty Press, 1979, p. 231. Italics added.

**Chart 1.**

However, in the real world, Increasing and Diminishing Returns continued to operate as before, in many ways these factors had higher impact than before 1900. Huge trusts and multinational enterprises developed, and in the last decades we are witnessing an increasing globalisation of the economy. The basic moving factor both behind the multinational corporations and the process of globalisation is basically only one: A dynamic and knowledge-based version of Increasing Returns to scale - what Schumpeter called *historical increasing returns*. Assuming this factor away reduces the explanatory power of economic theory to virtually zero when it comes to understanding the distribution of wealth both nationally and globally.

Seen in a micro-perspective, the fundamental problem arising from the basic assumptions of constant returns - in the general equilibrium approach and of standard international trade theory - is that the assumption of constant returns to scale in effect removes any fixed costs in the economy. In an economy where all production takes place with constant returns to scale over all ranges of output for all goods, there would be no trade at all. Each person would become 'a microcosm of the whole society', as Buchanan puts it.<sup>19</sup> We are faced with the fundamental paradox that with the standard assumptions underlying Samuelson's pro-free trade proof - perfect information and constant returns to scale - all trade would cease to exist ! Every individual on earth would be completely self-sufficient. In order to explain why trade exists at all, we have to introduce factors which violate the assumptions which prove that we shall all be equally rich if we only let free trade be the governing principle of the world economic order ! The very factors which cause international trade, are the very reasons that we live in a world where economic development is uneven. Two fundamental factors at work here are the dynamic and cumulative effects of Diminishing and Increasing Returns to scale.

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<sup>19</sup> *ibid*, p. 236

**Table 2.1.**  
**RICARDO'S THEORY OF COMPARATIVE ADVANTAGE**

A static comparison of costs of production in England and Portugal:

	Labour cost of production (in hours)	
	1 unit of wine	1 unit of cloth
Portugal	80	90
England	120	100

In England more labour is needed to produce wine than cloth - consequently the price of wine must be higher than the price of cloth:

1 unit of wine = 1.2 units of cloth

In Portugal the price of wine will be lower than the price of cloth:

1 unit wine costs  $80/90 = 0.89$  units of cloth

We open up for trade and assume that the price will establish itself at 1 cloth for 1 wine. In this way it will pay for both countries to trade.

We assume:

England has 60.000 labour hours at her disposal, Portugal 72.000

Specialising in wine, Portugal will be able to produce 900 wine units, England 500.

Specialising in cloth, Portugal will be able to produce 800 cloth units, England 600.

If each country puts half of the labour force at work in each industry, world production will be:

Portugal 450 wine + England 250 wine = 700 wine

Portugal 400 cloth + England 300 cloth = 700 cloth. **Total 1400 units.**

Under specialization production will be 900 wine + 600 cloth = **1.500 units.**

Conclusion: The world is 100 units richer with free trade than without.

## 2. Diminishing Returns and Trade Theory.

Today's world economic order rests on the Ricardian trade theory and Samuelson's proofs from 1949 and 1950, where the Increasing/Diminishing Returns dichotomy is excluded, and where all economic activities are 'alike'. The standard Ricardian trade theory which proves that the world will be richer if each nation sticks to its comparative advantage is outlined in Table 2.1. on the preceding page.

In the 19th Century, German, American and Japanese economists almost in one voice criticised Ricardo and the English economists for 'jumbling all economic activities together as if they were alike'. There are, in the view of these economists, important differences between economic activities. *It is in these differences between economic activities*, argued 17-19th Century non-English economists following on Serra, *that we find the reasons as to why some nations are rich and some are poor*. I have elsewhere<sup>20</sup> argued that this *activity-specific* view of economic growth was the basis for the industrialisation of the First World - that this is essentially why the North got rich and the South stayed poor. Perusing today's textbooks in development economics one finds that both the issue of Diminishing Returns and of the activity-specific aspect of development are completely absent.<sup>21</sup> Present development economics seems to reflect the 'averaging' argument which is at the core of neo-classical analysis. Therefore, I have argued, our policies towards the Third World tend to address *symptoms* rather than *causes* of underdevelopment.<sup>22</sup>

On the intuitive level, the activity-specific argument for wealth goes like this: We know that in Norway the pay of the average lawyer is about 600.000 NOK<sup>23</sup>. The average pay of a person washing dishes or washing floors is about 120.000 NOK, or 1/5 of that of a lawyer, before taxes. Let us put all the lawyers in one country, where they pay their taxes, and all the people doing washing jobs in another country, paying their taxes in that second country. Now, they start trading, each specialising according to their comparative advantage. We intuitively understand that the 'lawyer nation' will be richer than the 'washer nation', both in terms of private wealth and in terms of public wealth from the taxes collected. Still today's world economic order fundamentally rests on Samuelson's elegant mathematical proofs that these nations will become equally rich. How does this happen? Simply by Samuelson having assumed away - like most of economic theory - any differences between the profession of law and the profession of washing dishes.

The 17-19th Century argument for an *activity-specific* view of economic growth resulted in policies helping industrialisation in the nations of the present 'North'. They also formed the basic rationale for prohibiting manufacturing in the colonies. It is remarkable how the majority of economists before 1900 - with the exception of most, but not all, English classical economists - were fully aware of the fact that colonies, by supplying raw materials in exchange for manufactured goods were getting a bad deal, that they, in today's terms, were being 'underdeveloped'. That exporting raw materials in order to import manufactured goods was 'bad trade' leading to poverty was common knowledge before Ricardo - both in England and elsewhere. This knowledge was part of the mercantilist belief system, an economic system which grew out of the Renaissance policy of *promoting and protecting new knowledge*

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<sup>20</sup> Reinert 1994.

<sup>21</sup> Meyer, Gerald, *Leading Issues in Economic Development*, Sixth Edition, New York, Oxford University Press, 1995.

<sup>22</sup> Reinert, 1994.

<sup>23</sup> *Dagens Næringsliv*, September 15, 1995, s.5.

was an important part of government policy.<sup>24</sup> In the next chapter we shall discuss the reasons *why* the realökonomisch-oriented mercantilists - under certain conditions - were right in their policy towards raw materials.

In this context, it is extremely important to note that the famous repeal of the corn-laws in 1846 - which is normally seen as the break-through for free trade - was not at all in conflict with the old mercantilist economic theory. No longer protecting English agriculture would - also in the pre-Ricardian philosophy - be an advantage to England. She would now export more manufactured goods in order to import her corn - a classical example of 'good' trade. The repeal of the corn-laws was just as much a confirmation of the old role - punish the producers of raw materials and give bounties to manufacturing industry (see quote from Marshall above) - as it was a victory for free trade.

In international trade theory the confirmation that exporting raw materials was 'bad' trade finds its best expression in a 1923 article by US economist Frank Graham.<sup>25</sup> A simplified version of Graham's argument is reproduced in Table 2.2. Graham here provides a numerical example of how and why a country producing raw materials may be better off under autarky or by protecting industry, than under free trade. Graham gives a more accurate rendering of Antonio Serra's theory and of why Marshall was right in his recommendation of taxing activities subject to Diminishing Return industries (agriculture, fisheries, and mining) in order to give bounties to activities produced under Increasing Returns (industrial goods).

Reinert (1980) provides a discussion of the role of Increasing and Diminishing Returns in economic theory. In addition this book presents three case studies, showing how the historically most important export industries of Ecuador, Bolivia, and Peru - bananas, tin, and cotton - are constantly producing under extreme conditions of Diminishing Returns. In other words: In all these countries, the cost of producing one extra unit of export product was found to be considerably higher than the average costs at the present volume of activity. The empirical findings - and additional data from the Cuban sugar industry - strongly suggest that Diminishing Returns as described by the Graham model is actually a *normal state of affairs in Third World raw materials exports*, and that this model is indeed a realistic representation of the economic forces which created - on a global level - a rich North and a poor South. Numerical examples from Reinert (1980), corresponding to Graham's thesis, are shown in Charts 2.1. through 2.5. This work suggests that the averaging out of all economic activities, which characterises neo-classical economic theory - the fact that factors Increasing and Diminishing Returns have been excluded - is a main reason for our failure to understand the uneven growth of the North and South. As already indicated, it is argued that this is particularly so if the term Increasing Returns is defined as Schumpeterian *historical increasing returns* - a term which includes static increasing returns, as well as the technological change which has accompanied the industrial activities operating under Increasing Returns.

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<sup>24</sup> This is discussed in Reinert and Daastøl, *op.cit.*

<sup>25</sup> Graham, Frank, 'Some Aspects of Protection further considered', in *Quarterly Journal of Economics*, Vol. 37, 1923, pp. 199-227.

**Table 2.2.**  
**GRAHAM'S DYNAMIC THEORY OF UNEVEN**  
**ECONOMIC GROWTH**

**Increasing and Diminishing Returns in International Trade**  
**- a Numerical Example**

**STAGE 1: World income and its distribution before trade:**

Country A				Country B			
Man- days	Output per man-day	Production		Man- days	Output per man-day	Production	
200	4	wheat800		200	4	wheat800	
200	4	watches	800	200	3	watches	600

**World production: 1.600 wheat + 1.400 watches. In wheat equivalents:  
3.200**

**Country A's income in wheat equivalents: 1.714 wheat**

**Country B's income in wheat equivalents: 1.486 wheat**

**Price: 4 wheat = 3,5 watches**

**STAGE 2: World income and its distribution after each country specialises  
according to its comparative advantage:**

Country A				Country B			
Man- days	Output per man-day	Production		Man- days	Output per man-day	Production	
100	4,5	wheat450		300	3,5	wheat1050	
300	4,5	watches	1.350	100	2	watches	200

**World production w. trade: 1.500 wheat + 1.550 watches. In wheat  
equivalents: 3.271**

**Country A's income in wheat equivalents: 1.993 wheat**

**Country B's income in wheat equivalents: 1.278 wheat**

International trade theory - and indeed today's Economic World Order - implicitly assumes that all economic activities are 'alike'. Based on this assumption, standard trade theory predicts a world of 'factor-price equalisation': that all nations will be equally rich. In the real world, however, different economic activities give rise to different standards of living. From a theoretical trade-theory point of view, we can divide all economic activities into three groups:

- 1) Activities subject to Increasing Returns to Scale, typically manufacturing industry. We shall call these '**positive**' variants.
- 2) Activities which are neutral to scale, typically the traditional service sector. We shall call these '**neutral**' variants.
- 3) Activities subject to Diminishing Returns, comprising all resource-based activities. We shall call these '**negative**' variants.

The theory which forms the basis for the present world economic order - where Samuelson's proof of factor-price equalisation is the crowning achievement - assumes that all economic activities are of the 'neutral' variant. To the industrialised countries, whose activities are 'positive' variants - subject to increasing returns - this theory is **irrelevant but helpful**. They are much better off than what the theory assumes. To the resource-based nations, whose activities are 'negative' variants - subject to Diminishing Returns - this theory is **irrelevant but harmful**. These nations are much worse off than what the theory assumes.

Industrialised countries have come to specialise in activities based on human knowledge - both in traditional industry and in a growing knowledge-based service sector. The nations whose comparative advantage has led them to specialise in natural resources (Diminishing Return activities) are locked into a historical trajectory where technical advances are fighting a losing battle against Diminishing Resources in the export sector. The resulting downward pressure on wages and employment in its turn leads to more pressure on the natural resources, by desperate human beings in the informal sector trying to carve out a miserable living from nature. The result of both pressures - in the export sector and in the informal poor sector - is unsustainable development.

The 1980's provided a minor revolution in international trade theory. Under the heading of 'New Trade Theory' US economist Paul Krugman re-introduced Increasing Returns to trade theory.<sup>26</sup> A fundamental problem of this revolution - from the point of view of the Third World - is that Krugman correctly sees that the 'neutral' variety in our scheme above is not very significant in real life, but he only brings in the 'positive' variants into the discussion - Increasing, and not Diminishing Returns. His conclusions for trade policy are therefore exactly the opposite of those which are valid for the Third World. By only including the 'positive' variations from the standard model, and not the 'negative' ones, Krugman concludes that this is yet another argument for free trade.

Krugman traces the origin of this idea back to Frank Graham's 1923 article. He does not seem to be aware that Graham's presentation, rather than being the first to identify the issues raised by the 'New Trade Theory', is the *last* statement of a major 19th Century debate. This debate was a key factor in creating 'The American System of Manufacturing', a system which protected US industry for about 100 years in spite of its inefficiency compared to English industry. The US argument was that it was better to be less efficient than England in Increasing Return activities, than to be the world's most efficient producer of raw materials, e.g. cotton.

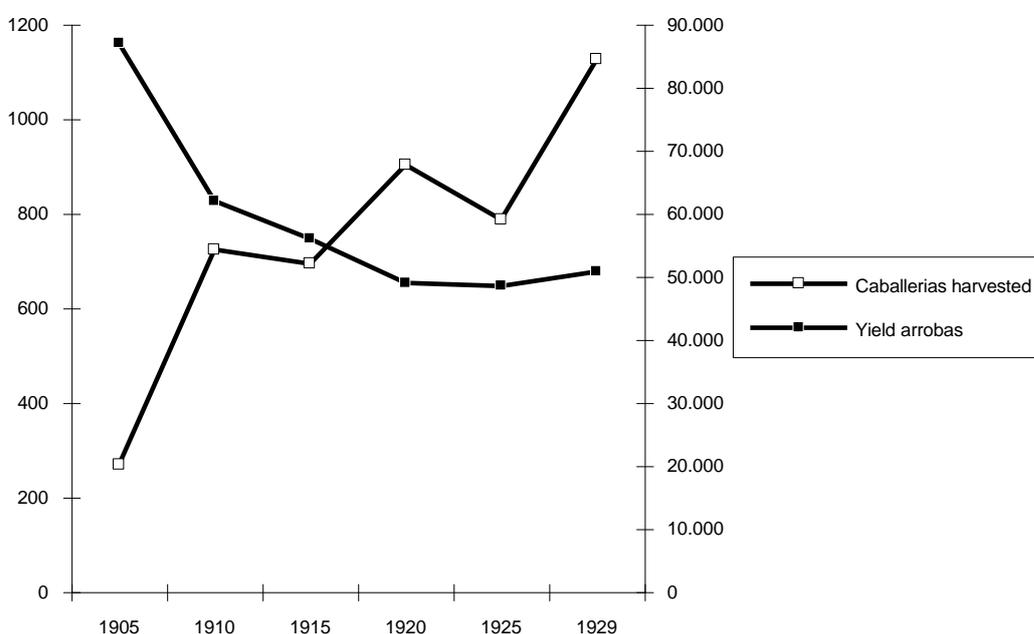
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<sup>26</sup> Krugman, Paul, *Rethinking International Trade*, Cambridge, Mass., MIT Press, 1990.

As we have discussed, this issue of protection or free trade was a key issue in the US Civil War, where the protectionist North won over the free trade South.

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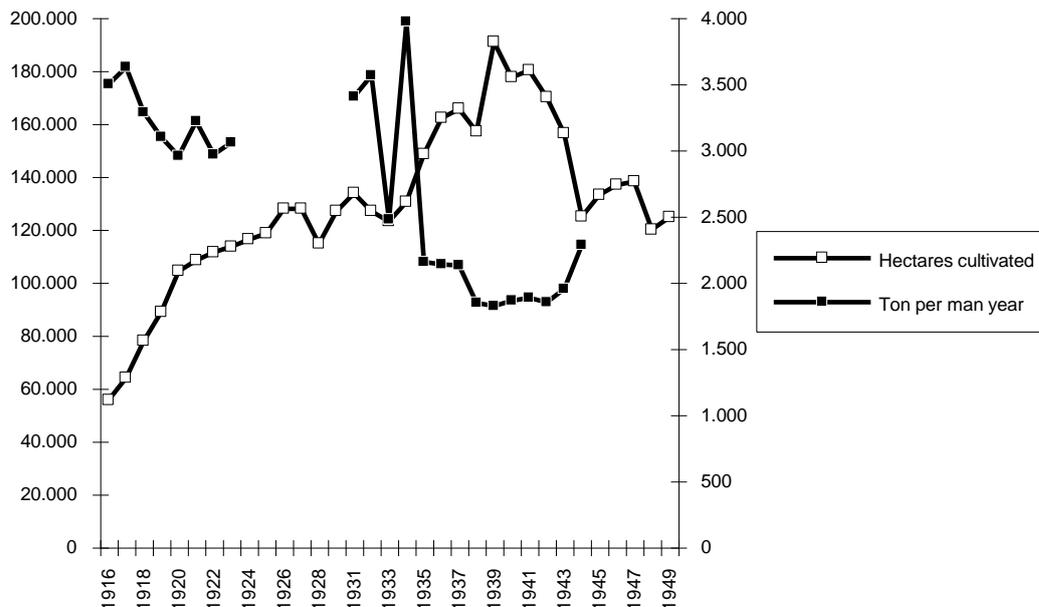
**Chart 1**  
**Cuba: Diminishing Returns in the Banes Division of United Fruit, 1905-1929**



Source: Reinert 1980, page 228. Area and yield: United Fruit. Banes Division. Agricultural Department, Operating Statistics (1905-1950).

In this chart we can observe how an extension of the area under cultivation drastically decreases the yield of sugar as a result of Diminishing Returns. This tendency is particularly strong early in the period. After World War I we can only assume that technical change, fertilisers etc. keeps the tendency towards Diminishing Returns at bay.

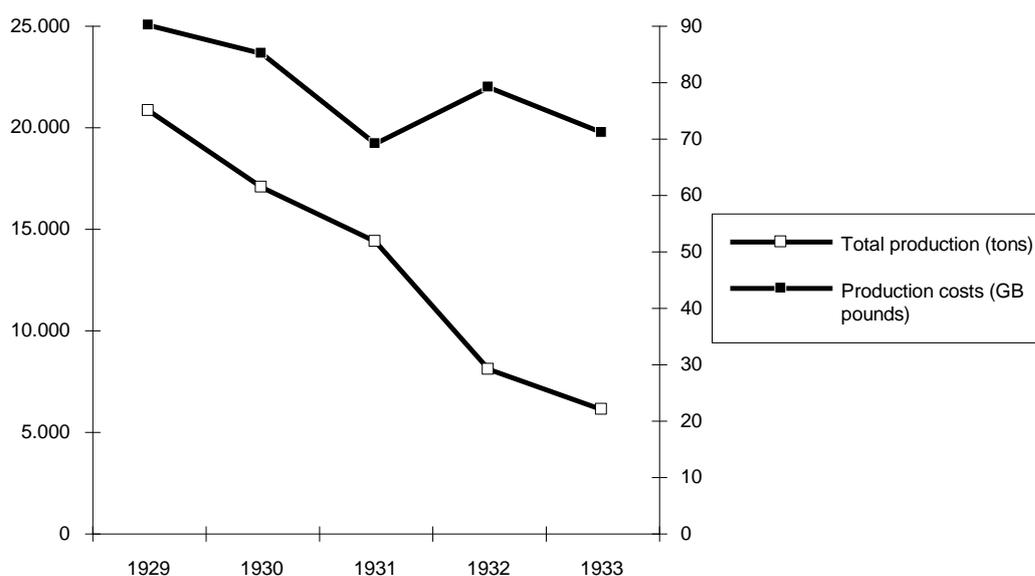
**Chart 2**  
**Peru: Diminishing Returns to Labour Productivity in the Cultivation of Cotton**



Source: Reinert 1980, page 215. 'Anuario Estadístico del Perú', and 'Extracto Estadístico del Perú', various years. Apparently official statistics lack one year's data.

This chart shows the Diminishing Returns to labour productivity in Peru's main export product in the period in question - 1916 through 1949. The chart shows the typical 'mirror image' of *intensity of exploitation of a natural resource* and *productivity*. If production *increases*, the productivity of labour *decreases*. This is the opposite phenomenon of what is normally observed in manufacturing industry, where Increasing Returns to scale produces the exact opposite effect. The counterpoint of *Increasing Returns* in manufacturing, and *Decreasing Returns* in resource-based activities is the mechanism which Antonio Serra pointed to in 1613 when he explained the wealth of the Republic of Venice - having no natural resources - and the poverty of the Kingdom of Naples and The Two Sicilies - being very rich in natural resources.

**Chart 3**  
**Bolivia: Reversal of Diminishing Returns Effects by**  
**Contraction of Production Due to the Great Depression.**  
**Tin Mining: Production Costs for One Ton of Fine Tin,**  
**Delivered in Catavi.**

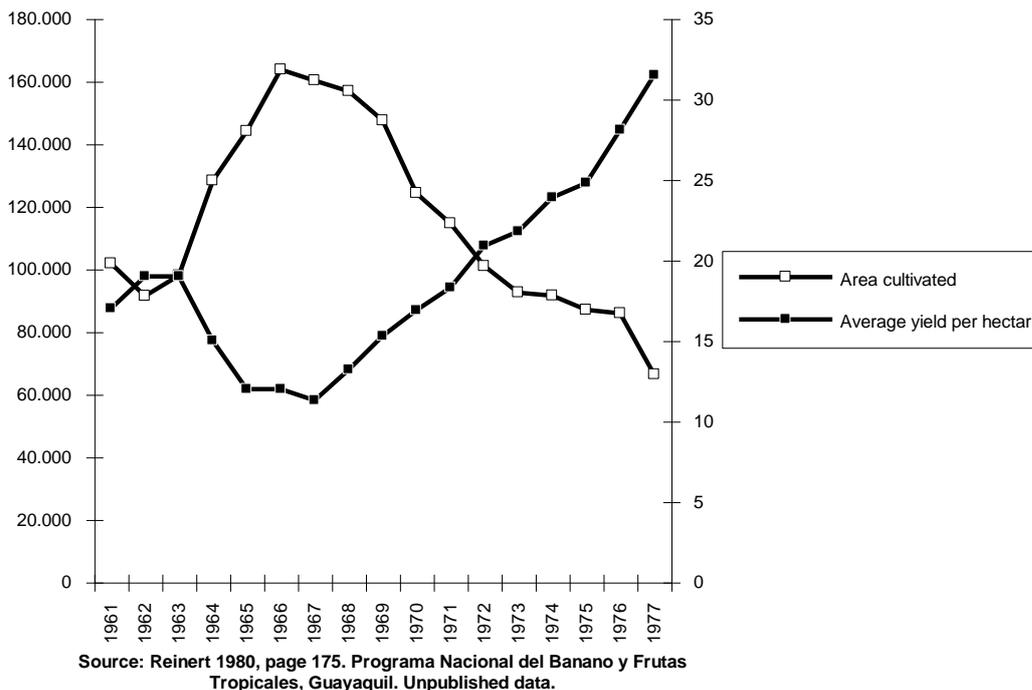


Source: Reinert 1980, page 194. 'Foreign Minerals Quarterly', vol. 2, No. 4.  
 Quoted in: Gutierrez Guerra, Rene; 'Situacion Economica y Financiera de Bolivia', La Paz, Editorial Universo, 1940, page 18.

This chart shows abnormal cost developments in the main export product of Bolivia at the time - tin - due to strong effects of Diminishing Returns. The Great Depression caused the demand for tin to decrease - and consequently also the production. As a result of the contraction in volume of production, the cost of producing one ton of tin decreased considerably. Again, this is exactly the opposite of what would happen in manufacturing industry under the same circumstances. In manufacturing, the amount of fixed costs involved would cause unit cost to skyrocket as a result of a similar decrease in output. In mining and agriculture, a cut in production will put the least efficient mines and the least efficient plots of land out of production first, and unit costs will therefore *decrease* instead of *increase* when production is contracted. Malthus, in his *Principles of Political Economy*, describes this mechanism very well, particularly on pp. 178-179.<sup>27</sup>

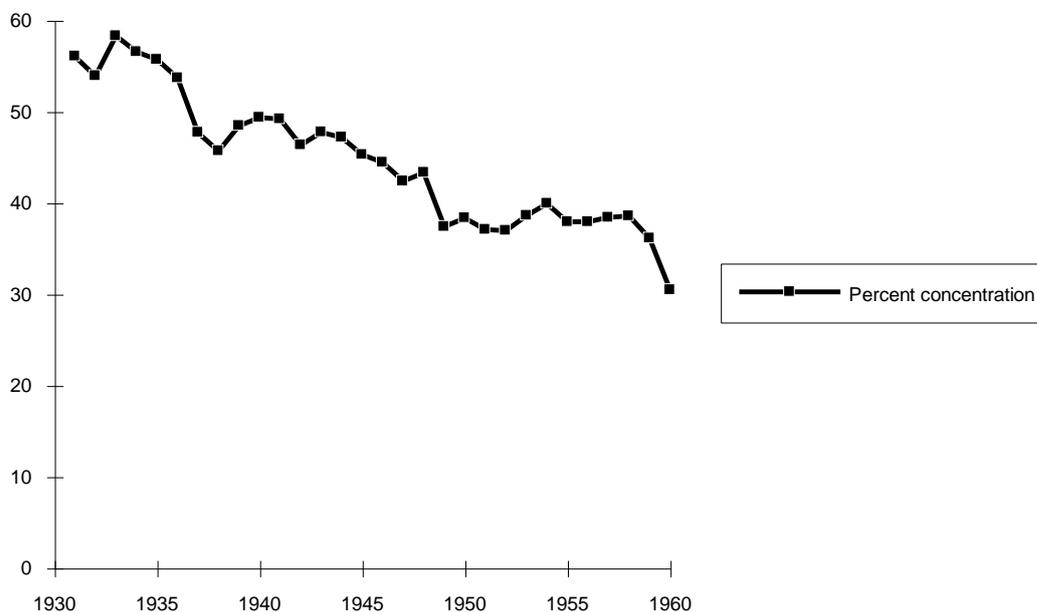
<sup>27</sup> Malthus, Thomas Robert, *Principles of Political Economy*, London, Pickering, 1836.

**Chart 4**  
**Ecuador: Diminishing Returns in Banana Production 1961-1977**



This chart again presents the typical ‘mirror image’ of *increasing production* and *decreasing productivity* resulting from Diminishing Returns. This is an essential element of the mechanisms which lock resource-based nations into a low-productivity and low-wage trap - leading to unsustainable development. Being free from the Sigatoka Disease which had invaded Central American banana plantations in the early 1960’s, Ecuador saw a golden opportunity to develop the nation based on an absolute advantage in banana production. However, the more bananas Ecuador produced, the poorer the banana producers got. The reason why this specialisation in international trade lead to more poverty, can be understood from this chart, which was assembled from unpublished data.

**Chart 5**  
**Bolivia: Diminishing Returns Due to Falling Average**  
**Concentration of Tin in Ore.**



Source: Reinert 1980, page 191. Bolivia. Ministerio de Planificacion. 'Tabla de Concentracion Media del Estano Exportado', elaborated by Juilo Garcia. Quoted in: Gomez, Walter: 'La Minería en el Desarrollo Economico de Bolivia', La Paz, 1952, page 242.

This chart visualises one aspect of the lock-in effects created by dependency on natural resources. We can observe how, over a period of 30 years, the average concentration of ore in the tin mined in Bolivia is reduced by 50 per cent. More efficient machinery to some extent compensates for this, but there is a continual fight between technical progress and Diminishing Returns which leaves no room for the wage increases which accompanies technical change in the manufacturing industry. Being completely uncompetitive in manufacturing industry, Bolivia is permanently trapped in the poverty created by an exclusive dependency on natural resources.

From the point of view of the Third World, today's fashionable 'New Trade Theory' suffers from an inexcusable omission. Krugman and his colleagues only resurrect half of Frank Graham's argument, the part which is relevant for the First World - i.e. Increasing Returns - and leave out the other half of the argument which is of crucial importance to the Third World, i.e. Diminishing Returns. This is also the case in the paper where Krugman specifically argues New Trade Theory from a Third World perspective. 'Trade, Accumulation, and Uneven Development'.<sup>28</sup> By ignoring Diminishing Returns, the New Trade Theory distorts the theoretical discussion in the following ways:

<sup>28</sup> Published in the *Journal of Development Economics*, Vol. 8, 1981, pp. 149-161. Reproduced as Chapter 6 in Krugman (1990).

1. In Krugman's eyes, the non-constant returns argument essentially becomes yet another argument for free trade. It is true, as Charles King argued already in 1721,<sup>29</sup> that trading manufactured goods for other manufactured goods is beneficial to both trading nations. This assumes, however, that the goods are subject to the same degree of increasing returns - that the trade is 'symmetrical'.
2. By not differentiating between *degrees* of increasing returns, he ignores the very different roles played by different manufacturing industries.
3. By essentially continuing a static analysis, Krugman leaves out the complex cumulative dynamics of technical change and path dependency.
4. By leaving out Diminishing Returns the New Trade Theory leaves out both the main factor locking in the greater part of the Third World in a Myrdalian vicious circle and also a key mechanism which prevents sustainable growth in resource-based economies.

### 3. The 'Triple Curse of Natural Resources', Path Dependence and Insustainable Development.

- ◆ *'It's the eternal paradox - the poor live in nations which are rich from Nature's bounties'*, José Cecilio del Valle, economist and vice president of the short-lived Central American Republic. About 1830.<sup>30</sup>
- ◆ *'The higher the civilization of a people, the less does it depend on the nature of the country'*, Wilhelm Roscher, German economist and inspirer of Marx and Schumpeter, founder of the 'New Historical School' of Economics in Germany. About 1860.<sup>31</sup>

Economic literature is surprisingly full of references to *lack of natural resources* as an important factor in explaining economic growth. We have already mentioned Antonio Serra who explained the wealth of Venice as coming from being forced by lack of natural resources into Increasing Return activities. Due to Increasing Returns the Venetians could produce the minor miracle of selling their products cheaper than anybody else, while at the same time they could pay their workers higher wages than anybody else. And, in today's terms, both the volume of production and the dynamic learning effects achieved by the Venetians provided extremely high *barriers to entry* for would-be competitors.

Serra's 1613 analysis is extremely persuasive in analysing *why* the natural resources of Naples were an impediment to economic growth. Other authors comment on this phenomenon, but give less complete explanation as to why the 'curse of the resources' occurs.

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<sup>29</sup> King, Charles, *The British Merchant or Commerce Preserv'd*, London, John Darby, 1721. 3 Vols., Vol. 1, p. 3.

<sup>30</sup> The best edition of Valle's works is published as *Obras de Don Josè Cecilio del Valle*, Ciudad de Guatemala, Tipografía Sancez & de Guise, 1930. 2 Volumes.

<sup>31</sup> Roscher's four-volume *Grundlagen der Nationalökonomie* appeared in 26 editions, the first edition in 1854. This work formed a school of thought which was to dominate German economic and industrial policy until the 2nd World War. Roscher was the first economist to incorporate Increasing Returns and mass production in an economic textbook. His dynamic world view formed a platform for later dynamic theories, of economists with such diverse views as Marx and Schumpeter. The quote is taken from the US edition of his textbook: *Principles of Political Economy*, Chicago, Callaghan and Co., 1882, Volume 1, page 137.

Often the lack of natural resources has been seen as an advantage for a nation. The lack of natural advantages leads the population to rely on acquired skills, not on Nature's bounties. The old saying is that 'Necessity is the mother of invention', and the assumption is that one lives better off inventions than off the land. Holland's wealth was seen as partly resulting from their 'establishing themselves in a swampy little corner' in a 17th Century economic tract <sup>32</sup>, and thus becoming traders, manufacturers and bankers for the rest of Europe. The argument that the lack of natural resources is important for wealth creation is found also in the discussion of Japan and modern Italy - 'we cannot live off the natural resources, so we have to create a living by transforming the raw materials of others'. On the other hand the contrast between natural wealth and human poverty is also a frequent object of comments, as with José Cecilio del Valle above. Similarly a 19th Century French traveler, Alcides d'Orbigny commented in the 1840's that Bolivia was 'like a beggar sitting on a throne of gold'.

From an economic point of view, are there any reasons why nations which specialise in making a living from their natural resources should be poor? Isn't it a gigantic paradox, like José Cecilio del Valle pointed out? In my view, the 'resource paradox' is of a complex nature, where three economic factors combine to create what I choose to refer to as '**The Triple Curse of Natural Resources**'. These are three purely economic factors, which interact among themselves and with other socio-economic variables creating the vicious circles which characterise underdevelopment.

'The Triple Curse of Natural Resources' stems from three factors which all are in the blind spots created by equilibrium analysis:

- 1) **Diminishing Returns**
- 2) **Perfect Competition**
- 3) **Price Volatility**

The effects of **Diminishing Returns** have been discussed earlier in this paper.

**Perfect Competition** is in many ways seen at the same time as being an assumption and an implicit goal of neo-classical economic theory. However, as I have discussed in

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<sup>32</sup>'An Inquiry into the Connection between the present Price and Provisions...', p. 63:

**Table 3.1.**  
**THE 'QUALITY INDEX' OF ECONOMIC ACTIVITIES.**

earlier papers<sup>33</sup>, the historical economic strategies of First World nations and the very essence of strategies of any corporation - national or multinational - are to *avoid* perfect competition. Indeed, under true perfect competition there is no profit to be made at all, and there is an enormous downward pressure on wages. I have argued elsewhere that the present competitiveness debate in the industrial world is in reality a systematic search for imperfect competition.<sup>34</sup> To Marx the collapse of the whole capitalist system under falling rate of profits would come as a result of perfect competition. Michael Porter of Harvard Business School uses the term 'dog industries' to describe the industries subject to perfect competition - industries where he advises his customers to stay out. Here we find a case of complete agreement between Karl Marx and Harvard Business School, which, surprisingly, is not the only one. Marx and Porter both share the same view of the dynamics of technological change as being crucial in maintaining wealth in a capitalist system. The dynamics of how it is *imperfect* - not perfect - competition which is the true source of what we call economic development, is a complex one which I have tried to outline in the other papers referred to. A summary of the factors at work is found in Table 3.1. - The Quality Index of Economic Activities, where most raw materials get a very low score as 'low quality activities'. We shall see in Section 4 how this score may be improved.

**Price Volatility** is important to an economy in many ways. Company owners who know that the price level of their products is subject to sudden reversals through mechanisms which are totally out of their control, will be very reluctant to give wage rises. Indeed, in industries subject to large price fluctuations, the owners who have *not* given wage rises will often be the only ones which survive a prolonged crisis. Furthermore, in industries suffering from high price fluctuations, the profitability of a company will depend more on the owner's skill in *timing sales*, than on his skills in producing and in running his business efficiently. This encourages a 'casino economy', where building knowledge bases and production skills will play an inferior role to that of 'gambling'.

A very important feature of monoculture resource-based economies, is that the national wage level and level of economic activity in general tend to fluctuate with the world market price of their commodity. Real wages are reversible, if not in terms of local currency, then in terms of real wages, with massive devaluations being the ultimate mechanism which brings real wages down. When prices boom again, the general sense that 'this cannot last' prevents spending in assets which could build a viable economy. This boom and bust pattern is well known in most Third World countries.

Extreme **price volatility** is, generally, a phenomenon observed only in raw materials. Manufactured goods may often fall in price, but they rarely rise again (unless their quality has been radically changed). Figure 3.2 shows how, in principle, price fluctuations decrease with increasing refinement. The left hand and fluctuating part of the graph can be seen as cocoa beans, coffee, or fresh salmon. The right hand part of the graph can be read as respectively: milk chocolate, Nescafé, or smoked salmon.

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<sup>33</sup> Reinert, Erik, 'Catching-Up from Way behind. A Third World Perspective on First World History', in: Fagerberg, Jan et. al (Eds.), *The Dynamics of Technology, Trade and Growth*, Aldershot, Edward Elgar, 1994, and 'Competitiveness and its Predecessors - a 500-year Cross-national Perspective', in *Structural Change and Economic Dynamics*, Vol. 6, (1995), pp. 23-42.

<sup>34</sup> Reinert 1995.

**Figure 3.2.**  
**PRICE FLUCTUATIONS WITH RESPECT TO GRADE OF**  
**REFINEMENT AND TIME.**

The low refinement regime is dominated by perfect competition, low and unstable prices, and reversibility of real wages. The high refinement regime is dominated by imperfect competition, ‘stickiness’ of wages and prices, high stable prices and large barriers to entry.

Source: Dietrichs and Reinert, 1994.

Together the elements of 'The Triple Curse' combine to reinforce one another. They create lock-in effects in positions of ecological insustainability - there is simply no other means of subsistence available to many people than that of carving out a living from destroying nature. Destroying nature is the logical *individual* response to one's survival being challenged - creating problems for the *collective*. In spite of the strength of 'The Triple Curse' in creating and strengthening mechanisms of vicious circles, some nations have escaped the curses and are rich in spite of the fact that their main export earnings come from natural resources. How did they achieve this ? We shall look at the solution to this in the next paragraph.

#### **4. Escaping the Resource Paradox into Sustainability - the Lessons from Australia and Canada.**

We can divide all economic activities in the world in two broad categories:

- a) Activities where the supply of one factor of production is limited in quantity and/or quality by nature. These are resource-based activities which are all subject to Diminishing Returns. Nations dependent on Diminishing Return activities - *and where little alternative employment exists* - may find that they are *locked into* a dependence upon these raw materials, that the *barriers to exit* from this dependency are enormous. Under these circumstances the nation may, in effect, be locked into a situation where the only possible livelihood for a large part of its inhabitants is to carve out a living destroying the environment (burning rain forests, polluting rivers with chemicals needed for washing gold, etc.) In manufacturing industries their skills lag so far behind those of the advanced countries, and their markets for such goods are so small, that they are effectively locked out of manufacturing in a free-trade regime.
- b) Activities where the supply of all factors of production is expandable at the same or lower unit costs (with the exception of temporary bottlenecks). Nations who have a large part of their economy within such activities - including a manufacturing sector - will find that, even though Diminishing Return activities may account for the bulk of their exports, the unsustainable pressure on their national resources is of a much less serious nature, and - due to a lack of absolute poverty - much more easily controlled by legislative measures.

Many countries have historically been in the situation of being exclusively in Diminishing Return industries, but through conscious counter-market activities, they have got their resource situation under control, while still depending on raw materials for a large part of their exports. Two prominent examples are Australia and Canada, and in my view the only way to achieve a sustainable economic development in resource-based Third World countries is by following the examples of these two nations.

The Australian and Canadian strategies to escape the 'resource curse' carry with them many elements for the 'disequilibrium economists' who are shown in Chart 1. The basic element in the strategy is the following reasoning, taking the example of Australia: According to Ricardian trade theory, Australia should have specialised completely in the production of wool, where the nation not only has a comparative advantage, but also an absolute cost advantage in the world. Yet, in spite of this clear recommendation, the two main government reports on economic policy in Australia this Century - the Brigden Report<sup>35</sup> and the Vernon

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<sup>35</sup> Brigden, J.B. et. al, *The Australian Tariff: An Economic Inquiry*, Melbourne, Melbourne University Press, 1929.

Report<sup>36</sup> - both see the dangers of specialising according to their comparative advantage, which today is the standard solution for all resource-based Third World nations. The Australian argument is very similar to the arguments forwarded by the influential Canadian economist Harold Innes (1894-1952)<sup>37</sup>, and indeed the industrial and trade policies of Australia and Canada have been remarkably similar. Both these countries, however, went completely against the recommendations which the First World today gives to Third World countries in the situation where Australia and Canada once were.

The Australian (and Canadian) argument, starting in the late 19th Century, is, in practice, a copy of the strategy previously employed by the United States to get out of its dependence on raw cotton. The Australian and Canadian arguments for embarking on the strategy are slightly different than the US arguments, however, based as they are more on the danger of the 'inferiority' of raw material production, than on the 'superiority' of manufacturing, the key argument used in the United States. This is the essence of the Australian argument:

⇒ **If our nation specialises completely in one resource-based product, e.g. wool, two things will happen which will for ever prevent us from getting into the club of wealthy nations. First, the price of wool will fall, because we shall be producing so much of it. Second, and more important, having no other alternative source of mass employment, we shall be taking our wool production into areas of Diminishing Returns, to places where productivity will be much lower than in our best areas. There will be no natural checks - no deterrents - to this process of taking the whole nation into producing massively under Diminishing Returns. An automatic consequence of this process will be that wages will have to fall as population increases. In short: An exclusive dependence on natural resources will lead us into a poverty trap.**

The solution to this dilemma was to build an alternative source of employment, an industrial sector which would establish an alternative source of employment and a 'natural' level of high wages. With the new source of employment in place, an alternative employment opportunity and wage level would prevent wool production from getting into Diminishing Returns. The wool industry would simply not be able to pay high enough wages in other than the most productive areas for wool. In less efficient areas wool production will no longer be profitable.

However, both Canadians and Australians knew that their industry for a small market could never compete with English industry. In spite of this, they reasoned that having an industrial sector - in a competitive local market - would be better than having no industrial sector at all. Being a relatively inefficient lawyer was seen as better than being the world's most efficient washer of dishes, to revert to an example used earlier in this paper.

## 5. Conclusions.

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<sup>36</sup> Vernon, J. et. al, *Report of the Committee of Economic Inquiry*, Canberra, Commonwealth Government Printing Office, 1965..

<sup>37</sup> For a representative selection of Innes' writings, which are also very relevant to Third World problems, see Innes, Harold, *Staples, Markets, and Cultural Change. Selected Essays*. Edited by Daniel Drache, Montreal, McGill-Queen's University Press, 1995

This paper confirms and reinforces a important conclusion - with significant practical consequences for poverty and sustainable growth - which was arrived at in Reinert (1980). This conclusion has been confirmed by recent experiences in resource-based economies, and historically by the experiences of the United States, Australia and Canada:

**‘...economic activities subject to Diminishing Returns will never by themselves - in the absence of a manufacturing base - be able to raise a country out of poverty...’<sup>38</sup>**

The actions of individual human beings, who, like in Rwanda, feel the consequences of Diminishing Returns threatening their physical survival, bring with them disasters of biblical proportions, just as the quote from Genesis used by Alfred Marshall, the father of neo-classical economics, alludes to. Wilhelm Roscher associates the existence of Diminishing Returns with what he more than 100 years ago called ‘the carrying capacity’ or the ‘bearing capacity’ of a nation. Roscher - in many ways the spiritual forefather both of Marx and Schumpeter - thus anticipated what we today refer to as sustainability. Philosopher and economist John Stuart Mill says that unless we thoroughly understand Diminishing Returns, ‘it is to no purpose proceeding any further is our inquiry’ of wealth and poverty.

In spite of this, today’s economics profession have placed their analysis at a level of abstraction where the Increasing/Diminishing Returns counterpoint in international trade is not discussed at all. The Increasing/Diminishing Returns issue is neither compatible with General Equilibrium, nor with the political demands of the First World for theories supporting free trade. The perverse effects of nations being forced deeper and deeper into Diminishing Returns can be seen in the violence of Rwanda, in the ‘technological retrogression’ ably described in a recent Ph. D. thesis at the University of Oslo <sup>39</sup>, and in the way sustainable development is within reach in some rich nations, but seems contrary to the ‘natural order’ in many poor nations. We see the symptoms, but - since the 2.000 year old basic factor is not part of today’s economic theory - we fail to understand **the most fundamental underlying mechanisms of poverty and environmental degradation in the Third World**. As a natural consequence, we are utterly unable to do something to stop both poverty and environmental degradation in the countries which are locked in the trap of Diminishing Returns. Instead, we continue to treat the symptoms of poverty, and not the causes.

The basic obstacle to improve the situation of nations in the trap of ‘Diminishing Returns’ is that any serious efforts at building skills outside the natural resource area will enter into conflict with the principle of universal free trade. All presently industrial nations, when they escaped the resource trap, only did so through conscious policies of moving their economies away from dependence on natural resources. In all cases, this strategy included a period where the principle of free trade was sacrificed. Only when, and if, the presently industrialised world can be brought to understand that the core of a strategy to overcome **the dual trap of poverty and environmental degradation** must incorporate the key elements of what used to be *their own* economic strategies - those employed historically by the First World - only then is there any hope for solving today’s problems of poverty and sustainable development. As long as the present world economic order prohibits the poor Third World countries from adopting the historically successful strategies of the First World, we are going to see ever more Rwandas and ever more Somalias.

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<sup>38</sup> Reinert, Erik, *International Trade and the Economic Mechanisms of Underdevelopment*, Ann Arbor, University Microfilm, 1980, p. 148.

<sup>39</sup> Endresen, Sylvi, *Technological Retrogression*, University of Oslo, Department of Geography, 1995.