

## Conference proceedings

# Institutional Change and Ecological Economics: Extending the Exploration of Human Ecology and Human Economy

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## **Abstract**

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Ecological economics has made great strides in the understanding of how the human economy is embedded in a finite and limited biophysical system. Unfortunately its further development is hindered by the continued acceptance of many facets of the neoclassical paradigm as regards market efficiencies and by the lack of sufficient attention to the institutional context in which economic activity takes place. It is hard to imagine degrowth and the attainment of a sustainable steady-state economy within the institutional context of mature capitalism, and even harder to imagine how the transition would be made from the growth-based economy to degrowth without first understanding and secondly, transforming, the present institutional arrangement.

## **Keywords**

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Ecological economics, evolutionary economics, human ecology

# 1 Introduction

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The promise of ecological economics is that it will lead to an understanding of how to reconcile the economy with the biophysically limited planet in a way that other economic paradigms have not. The great insight of ecological economics has been to place the human economy within a broader biophysical system, subject to nature's laws, and to assert that we must limit human economic activity to the capacity of the earth to provide resources and to assimilate material and heat waste. Great strides have been made by a generation of ecological economists in valuing natural capital and ecosystem services and discussing the ways we should alter national income accounts and market prices to account for these. Yet despite this progress and the radical rhetoric of the steady state economy, the question of how to effectively and appropriately transform the economy to limit the scale of economic activity has not been sufficiently explored. There is much confusion about the restructuring of the economy at a time when, confronted with adverse consequences of cumulative growth, we need clarity to take decisive and meaningful action.

## 1.1 Institutional Ambiguity and the Question of Scale

Founding ecological economist Herman Daly has said that "we need a plan for remodeling the house we live in while we are living in it, so that it will conform as much as possible to the basic principles of a steady state economy, without rendering us homeless in the meantime." (personal communication) He's right, but it's important to be clear about what is necessary to meet our objective; that is, to realign our economy within biophysical limits and to do so quickly. To this end ecological economics needs a more thorough institutional analysis of our present economic arrangement. This will be a small but important first step in orchestrating a fundamental economic change. The term institutional is used in the tradition of evolutionary economics and includes an understanding of the evolution of our economy, its foundational underpinnings and the belief system and ideology that derive from it. The institutional configuration of the economy defines its logic, and dynamic. Our present institutional arrangement is market capitalism, where private property, production for profit and the centrality of markets for the production and distribution of our material existence are foundational principles. The economic system demands capital accumulation and all that attends it and without growth and accumulation the basic needs of the working classes for meaningful work and steady employment go unmet. There is an inherent dynamic of growth punctuated along the way by cyclical and secular stagnation. As well, our ideological predisposition is to value material accumulation as growth, and adhere to the belief that self interest is not at odds with social welfare if it is organized through competitive markets. Adam Smith's invisible hand metaphor still has its ideological sway despite the fact that the economy has evolved away from a world of small independent producers.

Obviously there exists a problematic relationship between our economic institutions and our material conditions where containing growth and consumption is now a central ecological and economic problem. Yet this tension has not been sufficiently disentangled so that the direction of sound and necessary institutional change is clear. Ecological economics has evolved into two branches to meet the challenge of biophysical limits, and each has contributed to the discourse on and understanding of our problem but each has insufficiently explored the question of necessary institutional change. For purposes of exposition we label the two branches based on their emphasis: natural capital and steady state (no growth) economics. The two branches are connected and not mutually exclusive and both trace their roots back to the seminal work of Herman Daly.

The first branch discusses the problem of biophysical limits in the shadow of natural capital. Folke, Hammer, Costanza and Jansson asserted: "A principal task of ecological economics is to seek ways to keep the scale of human society within sustainable bounds...To achieve sustainability; we need to incorporate ecosystem goods and services into economic accounting. The overriding research issue is to find the most sensible ways of assigning value to natural resources and natural capital." (Jansson, et al.1994: 13). Natural capital becomes the central focus of policy and change. There is no explicit discussion of institutional change except to advance the methodology and reach of natural capital accounting. In this branch of ecological economics a direct discussion of the problem of economic growth is absent. The basic question of whether fully valuing natural capital is likely under our present economic arrangements or whether it would be sufficient, *ceteris paribus*, to solve the problem of biophysical limits is not explored and there seems to be little appreciation for the fact that valuing natural capital does not constitute a fundamental structural change in our economy.

The second branch is that exemplified in the work of Daly and then Daly and Farley who also acknowledge

the importance of accounting for natural capital but additionally question economic growth directly. They promote the idea that a steady state (no growth) economy is one that develops but doesn't grow in a material sense and offer this as the best option to our present problem. They state in this regard: "While growth must end, this in no way implies an end to development, which we define as a qualitative change..." (Daly and Farley 2004:6) Daly and Farley are very explicit about their view of this change: "We never start from a blank slate. Present institutions must be reshaped and reformed, not abolished. This imposes a certain gradualism... We have neither the wisdom nor the time to start over again without our most fundamental institutions, even if we could imagine alternatives." (Daly and Farley 2004: 362). More specifically, in Daly and Farley's framework, the idea of development without growth is accommodated by separating allocation, scale and distribution. It is assumed that the scale of economic activity and distributional problems can be addressed with macroeconomic policy, and once this is done allocation can be left to the market. In this way we are supposed to effectively dematerialize growth. Within this framework the motivation for development is that a firm will make biophysically sound commodities, as specified by the limits of scale, thereby gaining market share, expanding profit and investing somewhere else. The hope is for GDP growth without problematic biophysical implications; a dematerialized process of capital accumulation. The basic question of whether or not development without growth (dematerialized growth) is possible or whether it makes institutional sense in an economy where market arrangements have been left in tact for purposes of allocation is not explored. Nor is there exploration of what dematerialized growth might look like.

## 2 Materials and Methods

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The methods of this paper are literary. We survey the important writings of ecological economics found in peer-evaluated journals and scholarly books as regards the intellectual development of two strands of ecological economics: natural capital and the steady state economy. We assert that ecological economics is not yet a successful guide to a sustainable economy because it fails to grasp the institutional context in which economic growth occurs.

## 3 Results: The Problematic Roots of Ecological Economics

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There is a danger in not clearly understanding the necessary institutional configuration of an economy that can function within the biophysical limits of the planet. Specifically, a lack of clarity about the structure of such an economy creates ambiguity about what needs to be changed and how we might get from here to there. In the interstices of that ambiguity the tyranny of the status quo is likely to hold fast. This is primary a reason ecological economics why has failed to make a significant dent in policy. Policy in a capitalist economy is about achieving acceptable levels of growth. Historically market capitalism has been good at material expansion. Adam Smith wrote his famous book *An Inquiry into the Nature and Causes of the Wealth of Nations* to systematically illuminate the benefits of capitalism in expanding a nation's wealth, and he meant that in a material sense. He referred to this as the 'goods and necessities of daily life'. (Smith 1937). It is not clear that a no-growth market economy makes much sense and there is no question that formidable management problems would be encountered for such a peculiar arrangement. Tim Jackson lays out the challenge when he states: "The capitalist model has no easy route to a steady state" (Jackson, 2009).

The fundamental reasons for the failure of ecological economics to provide a clear guide to transition to an economics of a full world are an incomplete understanding of the institutional contexts of market economies and a theoretical commitment to neoclassical economics. Neoclassical economics is based on unrealistic and simplistic assumptions about human nature, biophysical reality and the structure of markets, yet these assumptions are nonetheless essential for its efficiency conclusions. As well, the problem of concordance looms large in neoclassical economics; that is, this framework doesn't match the reality it is meant to describe (Bromley: 1990). In spite of the dissatisfaction with neoclassical economics ecological economics has not satisfactorily severed its ties with neoclassical economics nor has its dissatisfaction with neoclassical economics been adequately and systematically articulated. These ties predispose ecological economics to an incomplete discourse and map for reconfiguring our economy in the face of biophysical limits. Some substantiation of this claim is clearly warranted. On a superficial level ecological economics adopts the semantics and categories of neoclassical economics.

For example, Herman Daly discusses the fact that we are reaching biophysical limits by claiming that we are at a point where aggregate marginal costs of further growth outweigh aggregate marginal benefits. The idea is that microeconomics has a when to stop rule (where  $MC=MB$ ) but there isn't an analogous rule for the macro economy. (Daly and Farley, 2004, 17) This analogy is misleading in that it implicitly conflates marginal analysis, which is supposed to apply to rational individual decisions in an isolated market with the dynamic of accumulation in a market economy. It is one thing to say we've produced widgets to the point where the extra benefit from another widget is less than the extra cost of producing it but another entirely to say that these myriad individual rational decisions aggregate to form a stable macroeconomy operating at a full-employment equilibrium. Nonetheless the unfortunate choice of language doesn't lead us in the direction of exploring the connection between the dynamic of accumulation in market capitalism and the problem of biophysical limits. Certainly from the perspective of institutional change the problem is not simply figuring out when to stop at a macro level, it's figuring out how to stop and the latter is a question of economic institutions.

Neoclassical economics concentrates on the problem of scarcity but it is never scarcity in an absolute sense only in a relative sense. Ecological economics defines our present circumstances by the fact that natural capital is now the stock that has become scarce; that is, relative to human made capital. The implication is that it is a shift in the domain of scarcity that has occurred and although we know this shift is distinctively different than relative scarcity in a neoclassical sense. Unfortunately the semantics are disturbingly similar. Again we are led toward the emphasis on valuing and accounting for natural capital, the new and heretofore unaccounted for, domain of scarcity. Ecological economics explicitly claims that natural capital is not infinitely substitutable with human made capital as the smooth isoquants of neoclassical production functions would indicate, it introduces the term "critical natural capital" and the distinction between strong and weak sustainability to distinguish itself from neoclassical economics; that is, to reassert itself back into the domain of absolute scarcity but the damage to inquiry has already been done. While there is no question that valuing natural capital is important, this approach leaves a more critical assessment of the logic, dynamic and evolution of our economic system and the evolution and complexity of the devaluation of 'natural capital' unexplored. As well the assumption is that by accounting for natural capital we have incorporated the limits of nature into the economic process. The problem is not simply a problem of biophysical limits; we also have the problem of economic institutional arrangements. Both are involved in our present impasse.

Natural capital itself is used in the neoclassical sense of capital being the stock that produces a flow. Hence natural capital is the stock that comprises the flow of natural resources used to produce goods and services that have economic value. These are analogous to its manmade capital counterpart, and the theory itself was explicitly adapted from neoclassicist John Hick's idea that sustainable levels of spending are those that maintain capital intact (Daly 1990). The specific institutional circumstances which delineate its purpose in the economy are never fully illuminated. The complex institutional arrangement surrounding capital which has reconfigured humanities relationship to itself and to nature is reduced to an input into the production process, an input that has now become relatively or absolutely scarce as the case might be. The questions of the profound ways our relationship to the natural world have been altered under a market economy are never broached in neoclassical or ecological economics. Neither is the fact that natural capital is utilized for purposes of capital accumulation, compromising its ecological integrity and further altering the noneconomic relationships humans have to the natural world. Yet a full acknowledgement of the changes in our human ecology and what that portends for humanity would surely result from a more robust institutional analysis of natural capital. So called natural capital is embedded in the fabric of a noneconomic relationship that humans have to the natural world that must be a consideration of human well being.

The whole notion that scale, distribution and allocation can be disaggregated theoretically or practically lies soundly in the neoclassical/Keynesian tradition and follows the legacy of Paul Samuelson's 'Grand Neoclassical Synthesis'. Samuelson asserted that market processes could best determine efficient allocation and equitable distribution. The Keynesian state would be needed only to create policies designed to maintain effective demand, economic growth, provide for public goods and correct for externalities. Daly modifies Samuelson's framework. He differs with Samuelson regarding income distribution because he has the insight to realize that the neoclassical notion of equity is little more than restated efficiency, and is not the same as justice. Yet the major difference comes with emphasis of macroeconomic policy which for Daly is to limit scale.

Allocation, accumulation and distribution are part of an articulate and institutional whole. We can disaggregate them from the perspective of policy if our intent is to provide stimulus to the economy. In this case, the common institutional DNA that links them is not violated. If our intent is to limit the growth of the economy we have a different matter on our hands and the connection between allocation, scale and

distribution can't be so easily ignored. Decommissioning the market economy from setting scale, yet leaving the institutions of accumulation in place, as well as those of competitive price-forming markets implies that the private investment process and its rewards and challenges in a mature market economy must be carefully managed in order to assure an outcome that will not further stress the biophysical limits of the planet. This is a daunting task to say the least because the whole idea of entrepreneurial activity is to allow the firm to make decisions. As well the fruits of the decision making when reinvested must be managed to produce no material growth. The institutional tension involved in limiting scale while allowing market institutions the job of allocation would be ongoing because the institutional arrangements that allow for allocation are obviously part of a more fundamental dynamic. Yet this discussion remains insufficiently explored. Many ecological economists dislike the very idea of economic planning, but the implication of Daly's work is that distribution and optimal macroeconomic scale must be planned. By leaving allocation to markets, and claiming that markets do one thing, allocate, and they do it very well, separates pricing from accumulation and distribution. No neoclassical advocate of efficient pricing would ever make this separation, nor would any Marxist.

As well, the chronic problems of unemployment that are counteracted by growth remain unresolved in a framework that separates scale, allocation and distribution. Tim Jackson highlights this problem succinctly: "...the general trend in capitalism is towards increasing labor productivity. Since this means producing the same quantity of goods and services with fewer people, the cycle creates a downward pressure on employment that's only relieved if output increases." (Jackson, 2009: 62) (This only partly owes to the inner logic of capital accumulation and partly because we throw lots of cheap oil at the process of production.) Obviously the social structure of accumulation can affect this process as a strong union movement can result in the sharing of relative surplus value. Indeed the challenge of eliminating growth is magnified by the tendency in the market economy to stagnation since our solution to stagnate is growth. The economist Eric Roll recognizes that questioning growth itself is a significant change in the history of economic thought and he distinguishes this concern with the preoccupation with stagnation. Roll states that in the realm of growth theory: "The real rebellion has taken the form of a questioning of growth as such, or, at least, of certain aspects of material growth. The oddity of this reaction with its frequent fear of 'excessive' growth is in striking contrast with the fears of the late thirties of the 'mature' economy which, it was argued, had reached the limits of growth and was, therefore, condemned to stagnation." (Roll, 1974: 590) Yet the two are inextricably intertwined. Government policy can be used to counteract the inherent instability in the accumulation process and the tendency to stagnate but only if the policy promotes growth. But a no growth policy will make the downside of instability worse. Clearly the poverty reduction and employment changes from growth will depend on the way growth is stimulated. For example, progressive economists Barry Bluestone and Bennett Harrison provide empirical evidence that poverty reduction proceeds most rapidly in periods of growth. But they advocate a liberal growth agenda to increase aggregate demand through increases in wages and social spending. It is not clear that the conservative growth agenda of wage cuts, environmental destruction and the channeling of productivity gains into unregulated and speculative financial markets will have the same effect (Bluestone and Harrison 2000). The structural connection between growth and employment remains insufficiently explored in ecological economics. Many have pointed to work sharing as the way to decouple growth from employment but this is no easy challenge (Victor 2009, Jackson 2009). Decoupling employment from growth may prove as difficult as decoupling growth from carbon emissions.

Finally Daly was very clear that the market can be relied on to achieve allocative efficiency, a neoclassical concept. He states: 'the market, of course, functions only within the economic subsystem, where it does one thing: it solves the allocation problem by providing the necessary information and incentive. It does that one thing very well. What it does not do is solve the problems of optimal scale and of optimal distribution.' (Daly, 1996: 50) The point here is not to argue about whether markets are efficient or not. Everyone knows that the model of perfect competition (technically necessary for efficiency) does not provide a realistic approximation to economic reality. And both ecological and neoclassical economics (including Daly and Farley) acknowledge that there are whole classes of goods that can't be left up to the market to allocate efficiently. No one denies the fact that a market is a useful institution to register information for economic decision making after prices are tweaked to include all costs and benefits (which, of course, is never possible since externalities are ubiquitous). As imperfectly as it might work there is no question that without this institution another method for allocation would have to be constructed. The problem with the concentration on efficiency is not that markets are not efficient in a technical sense (though this is surely a theoretical problem), rather it is that the emphasis on efficiency helps to avoid any discussion of more fundamental economic change and in this way it is both strategic and ideological. Ecological economics thereby taps into the ideology of efficiency. Ideology is a critical part of the institutional configuration of any economy and the lens through which we derive our economic

worldview. The belief that we won't have to question the foundational underpinnings of the market economy itself, in our quest for development without growth, is reinforced because of the emphasis on efficiency. Strategically, the attachment to efficiency helps to avoid a discussion about how allocation might take place without the market. So exactly what needs exploration is thereby avoided.

## 4 Discussion

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### 4.1 New Directions for Ecological Economics

The salient facts of our historical moment are the dynamic and reality of exponential cumulative growth coupled with impending biophysical limits in the present time period and not just in the distant future. These limits can no longer be ignored, but addressing them calls into question the configuration of our economy and the ideas that have guided us in economic matters over the past several centuries. Ecological economics must extricate itself from the neoclassical roots that impose limits on economic inquiry and encourage a robust understanding of the dramatic misalignment of our institutional arrangements and biophysical reality. While neoclassical economics provides some insight into how a market functions it provides little insight into the functioning of a mature market economy. The fallacy of composition tells us that the whole is not merely the sum of its parts. An understanding of the logic and dynamic and evolution of our economic system, its foundational underpinnings, and the habits of thought that accompany it will give us a fuller picture of our economic system so that we can understand the economic challenges of this historical moment. It is important to highlight something of the directions that ecological economics might go if its tool box were expanded in ways that have been discouraged by its foundational attachment to neoclassical economics.

### 4.2 Understanding Ideology and Economic Evolution

Adam Smith used the metaphor of the invisible hand to describe the competitive market. The benefit of the invisible hand was that it gave legitimacy to an economic system that was coming of age in the 18th century. Smith held that self interest would lead to social welfare in a society where small-scale producers competed by means of price reduction and quality improvement. Furthermore a competitive market system would enhance and extend the division of labor and lead to economic growth. Smith's metaphor captured something of his historical moment when market capitalism was gaining momentum and the last vestiges of feudal society were being dismantled. Smith also posited that our human moral sentiments would constrain the most rapacious behavior, as we all interacted in small communities and our behavior was visible to the community. He gave the economic system the stamp of a "natural order," consistent with human nature and the laws of the universe. Yet no sooner had he articulated the emerging economic order in these ways than it changed (Foley 2008).

Thorstein Veblen, the early 20th century American economist was clear about this process of change when he commented: "Adam Smith spoke the language of what was to him the historical present, that is to say the recent past of his time....What had gone before was the era of handicraft and the petty trade, the habitual outlook of which had become (second) nature to the thoughtful men of that time; what has followed after is the era of the machine industry and business enterprise, in which the "natural" laws and rights handed on from the era of handicraft are playing the role of a "dead hand"(Veblen 1964). Veblen's insight should not be ignored. The era of the machine industry and business enterprise was a logical evolution from Smith's world of mostly petty commodity production but let there be no question that it has made the ideas and observations handed down from Smith less a description of economic reality and more of his historical moment. Had it not been for the technological innovation of internal combustion and the use of fossil fuel capitalism might have remained modest and the machine industry and business enterprise might not have so quickly rendered obsolete Smith's metaphor. But that is not our history. Instead we find ourselves at an historical moment where it can be said that material conditions created in the wake of this economic revolution and our institutional arrangements have never been more poorly aligned. We are threatened with ecological collapse and a need to limit growth yet growth is what the economy is designed to do. Growth is our zeitgeist. And the stagnation in a mature capitalist economy has only been resolved by anti ecological measures, among them wasteful expenditures and government policy to encourage material growth. While competitive markets theoretically call forth efficiency, the macroeconomy stagnates in the absence of waste. Unfortunately ecological economics, like neoclassical economics, has no clear and understandable transformation mechanism to move from the rational

individual firm to the macroeconomy. Indeed moving toward a full world economics must begin with a more thorough understanding of the complexity of our present circumstances.

Certainly the last 200 years of our experiment with a market economy have moved it away from any resemblance to that envisioned by Smith who saw an economy made up of small independent producers each serving the consumer by serving himself. Much has changed in the economy since Adam Smith was standing on the streets of Edinburgh. Instead of a butcher, brewer and baker on every corner we have multinational corporations, massive and ubiquitous fossil fuel technology, nuclear technology, globalization, speculative bubbles enhanced by computer technology, extensive concentration and centralization of capital etc. It is a stretch to make the case that self interest leads to social welfare or, to put it more directly, that the interest of a firm like ExxonMobil is synonymous with the interest of the common man at the gas pump.

Smith's invisible hand metaphor still resonates 200 years later because there is both ideological force and ideological inertia in it. The invisible hand has long since ceased to describe the actual workings of globalized capitalism so that the resilience of his metaphor does not owe to its ability to describe economic reality, but instead is testament to the inertia of ideas fertilized as they might be by atavistic survivors of the past. The small businessman comes to mind. The economic expression of this ideological disposition is now found in the neoclassical (and ecological economic) notion of efficiency and its refinement; Pareto optimality: given the distribution of income, in a perfectly competitive market we end with an outcome where no one can be made better off without making someone else worse off therefore we have done the best we can. Moreover the market based outcome cannot be improved upon by a redistribution of income. Every distribution has its own Pareto efficient outcome. An equal society, according to the dictates of neoclassical welfare theory is not better than one consisting of islands of privilege in a sea of misery and want. It does not matter that this model has been critiqued from within for its inaccurate assumptions of human behavior, its disconnectedness from physical laws and its failure to describe economic reality. These are testament to its ideological staying power. Markets do not function efficiently because it isn't within the nature and logic of market capitalism for them to do so. Speculation, not accounting for the full cost of production, exploitation and mal-distribution of income, the concentration and centralization of capital are not aberrations of our economic system. Instead, they reveal much about the way it works, its logic and dynamic, but we aren't encouraged to explore this logic and dynamic instead we pivot our analyses around efficiency which tethers us to our present belief system and our institutional arrangements.

### **4.3 Reconnecting Allocation, Distribution and Scale**

The theoretical soundness of separating allocation, distribution and scale needs to be more closely examined owing to the contradictions and cross institutional purposes that surface in the face of placing limits on scale and leaving market institutions in place for purposes of allocation. There is a rich economic tradition of seeing allocation, distribution and scale as intimately connected. Smith, Ricardo, Malthus, Marx, Veblen, Keynes, Baran and Sweezy and many more all come to mind, yet the ideas of these economic icons are almost entirely absent from the discourse in ecological economics. If we reintegrated their ideas back into our discussions we might find more institutional clarity in how to reconcile the economy with biophysical limits. In fact, the proposition of no growth compels us to explore the ideas of a broader spectrum of economic thought.

The idea that the value produced by one class could be appropriated by another was taken as a given in the many debates of the early 19th century and distribution between classes had implications for the process of accumulation and growth. For David Ricardo and Thomas Malthus the debate concerned the division of the economic surplus (the difference between the value of social output and the costs of production) between landed aristocrats and the emerging capitalists. Restrictions on trade in agriculture would affect the distribution between profit and rent and Ricardo argued this had important implications for the expansion of the economy. Malthus was less concerned than Ricardo about this problem because he recognized early on that finding sufficient investment outlets might be problematic in which case wasteful spending was as good as anything for the economy. Karl Marx held that the value produced by workers was appropriated by capitalists in the form of surplus value and this provided the means of accumulation toward which the capitalist was compelled. Marx thereby connected the distribution of income between workers and capitalists to the process of accumulation.

Many economists explored the problems of accumulation in a mature market economy. Marx saw that the accumulation process was wrought with contradictions. Capitalist competition by means of technological change inevitably led to overproduction, under-consumption that would ultimately jeopardized the

accumulation process and lead to periodic crises. Thorstein Veblen talked in a slightly different way about a mature capitalist economy and the problems of overproduction. The interconnections in the economy made it chainlike so that any downturn in one sector would quickly spread to another. Veblen developed the notion that in a mature market economy business would sabotage industry; that is to say, the corporation would choose to respond to overproduction, not by lowering prices, but by functioning with excess capacity. The result would be unemployment and workers going without at the same time the economy had the technological capacity to produce more (Veblen 1964).

As well, John Maynard Keynes realized that in the modern economy prosperity was not just about forming the correct prices in order to bring forth equilibrium. It was about financial gain, often from speculation. The investment process operated in the world of uncertainty. Investment money put on the table today may not yield profits for a considerable time period, if at all. If savings equaled investment it is probably by accident, not the result of market processes arriving at equilibrium interest rates thus it was entirely possible to find the economy with insufficient aggregate demand where it could stagnate indefinitely without government intervention especially since falling wages couldn't be counted on to take up the employment slack.

Paul Baran and Paul Sweezy, latter day political economists working in the same tradition as the classical economists, also analyzed the mature capitalist economy. Starting from the classical notion of economic surplus they argued that modern capitalism is dominated by giant corporations (or oligopolies) which maximize long term profits by avoiding price competition, extending market share, and reducing the cost of production. As a result the economic surplus tends to rise and needs to be absorbed, if it is not, production will decline and chronic stagnation will appear. Baran and Sweezy stated that there were three methods of absorbing this rising economic surplus: it could be consumed, invested or simply wasted. To analyze the increase in consumption to levels sufficient to avoid stagnation Baran and Sweezy chronicle the development of the "sales effort." Mass consumption was not the result of rational consumers maximizing their subjective utilities subject to limited incomes, but a conscious effort on the part of profit seeking corporations and the state to assure that consumption levels are adequate to absorb economic surplus. It is certainly possible to see the over extension of credit in our present era in the same vein. Investment directly absorbs the economic surplus but simultaneously creates more surplus to be absorbed in the next period. Waste such as planned obsolescence could also serve as a potential absorber as well as war.

The ideas of these economists vary but there is similarity between all of them. A mature market economy has little to do with firms efficiently allocating and more to do with the process of accumulation and its inherent contradictions and problems. Problems of stagnation, endemic to the system, seem to necessitate growth in one form or another. If we see the market economy in this light, the structural challenges associated with limiting growth are clarified.

Economists have now begun to explore the idea of trying to manage a no growth market economy but this work is far from complete. Peter Victor uses a standard Keynesian macro economic model to project what necessary changes would have to occur to have no or slow growth for the Canadian economy without catastrophic effects. The feasibility of such an outcome depends on the ability to stabilize population, engage in extensive redistribution of income and environmental management, and reduction in the work week to prevent unemployment. Additionally Victor warns that "something quite new" would be required with respect to "investment, productivity, technology, trade and consumption." For those who oppose management and planning of an economy there will be disappointment in Victor's no growth market economy because it is, if nothing else, a wholly managed affair. The question of how easy it might be to have development without material growth is not clearly answered and Victor's analysis leads us to ask an obvious question: is it worth it? That is to say, if no growth is what we want, it might certainly be easier to orchestrate this using a different framework, but Victor like Daly is politic and that is a consideration as well.

Tim Jackson comments, in a similar vein, on the difficulties presented in managing macroeconomic variables (our present institutional structure) if no growth is our aim: "The balance between consumption and investment, the balance between public and private sector, the role of different sectors, the nature of productivity improvement, the conditions of profitability. All of these are likely to be up for renegotiation." (Jackson 2009: 81-82) Jackson specifically discusses investment for sustainability and identifies the ways in which it will be different than conventional investment: "Investment in resource productivity won't always bring preferential returns unless the relative price of labour and materials changes substantially. Some investments in renewable energy will only bring returns over much longer time frames than traditional financial markets expect. And investments in ecosystem protection and maintenance might not bring conventional financial returns at all, even though they are protecting vital ecosystem services for the future and may also be contributing to employment" (Jackson 2009:82).

Development without growth, as both Victor and Jackson point out, is institutionally difficult to manage within the context of market capitalism where sloughing off costs is a way of economic life, an imperative as real as the need to find cheap labor, and where the dynamic and contradictions of accumulation make it extremely difficult to manage the problems of unemployment, poverty and biophysical limits at the same time. Their work challenges ecological economics to further extend the exploration of the institutional limits of managing a market economy not to grow.

#### 4.4 Exploring Human Ecology and Economy

The profound questions about the effect of human economy on human ecology are easier to discuss in a framework that doesn't simply view the natural world as another form of neoclassical capital. Moving away from this emphasis is essential to more clearly link human economy and human ecology. There is a rich history of extending the analysis of capital in the history of economic ideas. Marx is probably the best example, writing 3 volumes entitled *Capital*. Marx was very clear that capital wasn't simply tools used to produce things. Instead it was tools embedded, as it were, in particular social relations and it was those social relations that had a profound influence on the nature of work and the relationships of people to each other and to nature. Ownership rights to what was produced, who used the tools, under what conditions and for what purpose and what it did to the creative process of work were all highlighted in Marx's discussion of capital.

In a similar way Karl Polanyi labeled land a fictitious commodity. Land (like people) was not produced to be bought and sold. Polanyi stated: "To allow the market mechanism to be the sole director of the fate of human beings and their natural environment...would result in the demolition of society." (Polanyi 1944: 73) Polanyi said of land (nature): "The economic function is but one of the many vital functions of land. It invests man's life with stability; it is the site of his habitation; it is a condition of his physical safety; it is the landscape and the seasons" (Polanyi 1944:178). Yet with the concept of 'natural capital' we have rendered silent a discussion of the profound changes in the relationship between humans and the natural world that have been carved out of this most recent experiment with domestication; market capitalism.

The category of 'natural capital' will not encourage us to explore the relationship between human economy and human ecology. We are in danger of irrevocably destroying the ecological integrity of the planet and with it we will leave a legacy for present and future generations that profoundly alters the possibilities of their lives. The question of human ecology and economy is a question of finding our place among the vast life and landscape of the planet; life and landscape that have been the source of inspiration, imagination and inventiveness and have quite literally helped to create us. Our categories of analysis need to extend rather than limit this exploration.

## 5 Conclusion

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Ecological economics remains unfinished. It is important to move forward to refine and further explore the institutional change necessary to bring about a meaningful resolution of the problem between biophysical limits and our economic arrangements as the threat of exponential growth moves relentlessly forward. Some things are clear. Neoclassical roots do not serve ecological economics well for this purpose. These foundations help ecological economics to avoid the difficult questions that must be answered.

Since the millennia of settled agriculture, we have profoundly altered our human ecology with economic activity and called it progress. We have been able to domesticate, with few exceptions, with impunity. Our experiment with the market economy is simply the most recent variant in this process. The mark of modernity and post industrial capitalism is that we now have to confront the profound questions of human ecology and economy. Ecological economics began this process but it is critical to extend its reach and its analysis. Identifying the relative scarcity of natural capital, accounting for it and calling for development without growth aren't sufficient to this historical moment. They move us in the direction of ineffective and insufficient change. To understand fully the dilemma humanity faces we must understand the social role growth has played in extending not just material goods but also employment. Ecological economists and other advocates of living within nature's limits will unlikely find a sympathetic audience for its sustainability agenda if we do not address the issue of employment. But given the current institutional arrangement of globalized capitalism degrowth is manifest as mass unemployment and stagnation. The search for a just institutional structure in which living within our biophysical limits is compatible with access to meaningful work is crucial to advancing the agenda of degrowth now and the

steady state in the future. It is the challenge and responsibility of ecological economics to extend the movement to reconcile economy with biophysical limits but for this it is clear that new foundations must be erected.

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