AN EVOLUTIONARY EFFICIENCY ALTERNATIVE TO
THE NOTION OF PARETO EFFICIENCY

Irene van Staveren, Institute of Social Studies, Erasmus University Rotterdam

staveren@iss.nl – version August 2011.

ABSTRACT

The paper argues that the notion of Pareto efficiency builds on two normative assumptions: the more general consequentialist norm of any efficiency criterion, and the strong no-harm principle of the prohibition of any redistribution during the economic process that hurts at least one person. These normative concerns lead to a constrained and static notion of efficiency in mainstream economics, ignoring dynamic efficiency gains from more equal allocations of resources. The paper argues that a weak no-harm principle instead provides an endogenous efficiency criterion which shifts attention away from equilibrium analysis in hypothetically perfect markets towards an evolutionary analysis of efficiency in real-world, non-equilibrium markets. Moreover, such an evolutionary notion of efficiency would be less normative than the Paretian concept.

INTRODUCTION

The transition from neoclassical economics to the mainstream economics of today may be perceived in a variety of ways. One way, admittedly a simplified one, is by focusing on the major shifts that have occurred in micro and macro economics over the past three decades as well as the emergence of the meso level in economic analysis connecting the micro and macro level, and, so important in evolutionary economics. For macro economics, the shift may be summarized under the broad label of the New Growth Theory, involving concepts such as endogenous growth

(Lucas, 1988; Aghion, Caroli, and García-Peñalosa, 1999), increasing returns (Romer, 1986; Acemoglu, 1996; Rima, 2004), and the increasingly shared recognition that the fallacy of aggregation seriously challenges the construct of a representative agent (Colander et al., 2008). Hence, in the era of new growth thinking, the old neoclassical assumptions of constant returns to scale, a necessary trade-off between equity and efficiency on a well-defined possibilities frontier, and free markets as a precondition for an efficiency optimum, are now increasingly recognized as no longer necessarily valid (Bénabou, 1996). Or, to put it stronger in the words of Samuel Bowles and Herbert Gintis (2000: 1425) these Walrasian assumptions "should be shelved in the museum of utopian designs".

In micro economics, the move beyond neoclassical economics is driven to a large extent by developments in behavioural and experimental economics (Smith, 1991; Kahneman, 2003), which in turn have spurred the recognition of evolutionary economics and game theory (Hodgson, 2002; Witt, 2003; Gintis et al., 2005). The insights from these developments have proven the old assumptions underlying welfare economics to be mistaken. Economic agents do not always pursue their self-interest (Fehr and Gächter, 2000), they appear to care for efficiency as well as equity, even helping the worse-off at own cost (Charness and Rabin, 2002; Engelman and Strobel, 2004 and 2006), attaching intrinsic value to equality (Lutz, 2001) and treating a particular level of rewards as entitlements (Falk, Fehr, and Zehnder, 2006). Their behaviour is influenced by various psychological and social effects which give their actions meaning (Klamer and McCloskey, 1995; Akerlof and Kranton, 2008), while incomplete contracts, bounded rationality and principle-agent problems lead to impacts of uncertainty, interactions, transaction costs and power on efficiency (Bardhan, Bowles and Gintis, 2000; Witt, 2003; Bandiera, Barankay and Rasul, 2005; Smith, Paton, and Vaughan Williams, 2006), and agents appear to behave along various ethical routes next to utility maximization, in particular following the principled morality of deontology (White, 2004) as well as the contextual morality of virtue ethics (McCloskey, 2006; van Staveren, 2007).

Finally, the emerging field of meso economic analysis, in particular in the areas of technological change, global value chains, networks, clusters, and dynamic poverty analysis has shown the importance of evolutionary economics with concepts such as endogenous preferences, path-dependence, and endogenous change (Witt, 1994; Bowles, 1998; Gereffi, 1998).

Given this transition from a narrow neoclassical to a pluralist mainstream economics, in which many old assumptions of welfare economics have been shown to be empirically mistaken and theoretically inconsistent, it is surprising to see that the major economic evaluative criterion of neoclassical economics – Pareto efficiency – is still the dominant criterion of efficiency in

most of economic research, assessing whether no one can be made better off without making anyone else worse off. Whereas in evolutionary economics, Pareto efficiency is explicitly rejected and replaced by a much more general view of efficiency as emerging in a dynamic process of innovation and adaptation but as not completely achievable due to inherent limitations to the economic process such as uncertainty, bounded rationality, path dependence, and norms that express cultural traditions and power relations. This evolutionary view of efficiency needs further elaboration. Valuable attempts have been done to operationalize an evolutionary efficiency concept in relation to communication (Dudley, 1999; Dolfsma, 2005). I would like to take this up more generally but first like to argue that such elaboration must not ignore the normative foundations of efficiency notions in general and the Pareto criterion in particular. Amartya Sen already recognized that the widespread belief that efficiency is a value-neutral evaluation criterion has resulted in a reductionist efficiency analysis limited to the Pareto criterion, which, he argues, is "a very restrictive informational basis for welfare economics" (Sen, 2008: 623)[1].The extensive use of the Paretian criterion may be explained by its intuitive attractiveness: as long as it is possible to improve the situation of one or more persons without affecting the situation of anyone else, resources have apparently not been used to their full potential. But this is a static view, belonging to the Walrasian approach to economics (Hodgson, 1993). Bowles and Gintis (2000) have concluded their critique of Walrasian economics by reminding their readers of recent research indicating that some redistributive policies are likely to increase allocative efficiency in a large variety of markets. As a consequence, they have pointed out, "the canonical efficiency equity trade-off – whose ineluctable logic is given prominent place in most introductory texts – may be up for reconsideration" (Bowles and Gintis, 2000: 1427).

In this paper, I would like to follow up on this point, arguing, first, that the seemingly neutral criterion of Pareto Efficiency is unable to reflect a social optimum and to select among multiple equilibria, precisely because it relies upon a strong no-harm principle. Second, I would like to attempt to provide some flesh to the bones of the evolutionary idea of adaptive efficiency, as an imperfect and endogenously emerging optimum. I do recognize, however, that this is a preliminary attempt and still far from a well-developed evaluative criterion. This alternative relies on a weak no-harm principle, which will allow for a selection of the least inefficient equilibrium through analysing the nonlinear dynamic relationship between the distribution of factor inputs on

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[1] For example, the *Journal of Economic Literature* classification system distinguishes code D63 for "equity, justice, inequality, *and other normative* criteria and measurement" (emphasis is mine), from code D61 "allocative efficiency; cost-benefit analysis", implying that efficiency would be a non-normative evaluation criterion as compared to the criteria referred to in code D63.

the one hand and efficiency gains on the other hand. In this way, efficiency becomes endogenously determined without a preference for the status quo distribution or any need for a prohibition to compare outcomes between individuals. The argument will be methodological rather than technical or empirical, in order to show that the most urgent problem is not so much the definition of the optimum equilibrium (see for an example of this, Rehme, 2007) or empirical support (see for an example of this, Banerjee and Duflo, 2003), but the commonly adhered to view that Pareto efficiency is a value neutral evaluation criterion that has common sense logic and which therefore requires no alternative[2].

The section below will explain the normative foundations of the Paretian criterion. The next section will argue why this leads to a flawed efficiency criterion, whereas the following section will discuss the example of the efficiency of land productivity to illustrate my argument. Finally, the paper will argue that from an evolutionary perspective, efficiency may be defined in an endogenous way relying on a weak moral norm rather than the strong moral norm that so much constrains the Paretian criterion.

THE NORMATIVE FOUNDATIONS OF PARETO EFFICIENCY

Here, I will not discuss the well-known literature pointing out that the conditions for competitive markets are almost never met in real world markets. Indeed, real world markets tend to exhibit economies of scale, externalities, barriers to entry, imperfect and asymmetric information, incomplete contracts, principle-agent problems, as well as transaction costs, uncertainty, market power and asymmetric bargaining power, and last but not least, a variety of formal and informal institutions. Hence, competitive markets are not likely to reach Pareto efficient solutions without emerging institutions and intervening policies. Nor will I review the literature that has critiqued the Pareto criterion for ignoring equity as a valuable evaluation criterion on its own. The point that a Pareto optimum may well allow for dramatically unequal outcomes has been well made by others and is now generally accepted (Sen, 1987; Lutz, 1999; Schultz, 2001).

Instead, I would like to argue that the problem with Pareto Efficiency is not merely that it is so difficult to reach or that it can occur at extreme levels of inequality, but rather that the Pareto criterion takes on a particularly strong normative position while pretending that it is a neutral

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[2] I fully agree, though, that more work needs to be done on theoretical proof, modeling, and empirical testing of the nonlinear relationship between factor inputs and efficiency measures such as factor productivity or GDP growth.

criterion, as opposed to evaluations of equity, and that this prevents it from selecting the most efficient equilibrium among multiple equilibria. The generally accepted trade-off tends to reinforce the criterion's presumed neutral status, shifting efficiency to the 'positive' side and equity to the 'normative' side of welfare economics. However, the placement of Pareto efficiency on the 'positive' side of economic evaluation hides two normative foundations.

Consequentialism

The first normative foundation of the Paretian evaluation criterion is concerned with its location of the good as lying in an outcome. This is an expression of consequentialism, which is an ethic in which one evaluates the good not by principles or processes but by outcomes. As David Hume already recognized, any type of consequentialism implies an 'ought' position, and Hume therefore rightly located consequentialism on the normative side of the Cartesian positive/normative dichotomy.

The ethics of consequentialism necessarily follows instrumental reasoning, as Jean Hampton (1992) has explained. Instrumental reasoning, 'do X in order to achieve Y', implies a consequentialist norm. For the Paretian criterion, this norm is expressed in its definition: *allocate resources in such a way (X) that no one can be made better off without making anyone else worse off (Y)*. Now, what is crucial to instrumental reasoning, Hampton has argued, is that it cannot deduce consequentialist norms from non-normative foundations: its norms are inescapably founded on moral reasoning: "… we must conclude that one cannot reduce normative statements to non-normative elements: or alternatively, we cannot hope to build authoritative prescriptions from entirely natural components – unless, of course, the natural is understood to include the normative, as those who deny the fact/value distinction insist. But for those who maintain that distinction, trying to 'naturalize the normative' is impossible" (Hampton, 1992: 234).

Is such normativity indeed the case for Pareto efficiency? If not, what might be possible non-normative consequentialist norms for Pareto Efficiency? Here, I will briefly consider two possible candidates: a natural norm and a norm arising from logic. A natural norm might be found in the condition of scarcity. Although scarcity is a relative notion in economics, it is generally regarded as ultimately driving all economic behaviour. Hence, scarcity seems a *natural* ground from which rationality, competition, and innovation emerge. Pareto efficiency, therefore, seems to follow from the natural condition of scarcity: given the nature of resources as being limited, efficiency appears *a natural objective* to pursue. But scarcity is not so natural as it seems. Scarcity is for a large part constructed by human behaviour, through the endogenous creation of wants leading to neighbourhood effects and bandwagon effects, as Thorstein Veblen (1931)

recognized; through strategic behaviour leading to collusion and market power as analyzed by Joan Robinson (1969); and through manipulation of relative scarcity by the accumulation of intangible resources, such as information, strategic skills and the power to control (Webster,1999). As a consequence, scarcity is not so much a purely natural phenomenon but to a considerable extent a *social and cultural construct*, as economic anthropologists have pointed out for decades (see, for example, Mary Douglas and Baron Isherwood, 1996, on moral goods). Moreover, even if scarcity was given by nature, it is surely not the only condition to which economic behaviour is subjected: economic agents also have to counter uncertainty, control risk, process more information than they can handle, seek cooperation, etc. Singling out, without justification, scarcity from the varied list of conditions that all provide key parameters for economic behaviour, implies a normative stance. For these two reasons, scarcity cannot serve as a non-normative consequentialist norm for Pareto Efficiency.

Another possible candidate for a non-normative norm for Pareto efficiency is logic. For example, in a simple equation of positive real numbers, $a + b = c$, in which $a < c$, logic informs us that $b > 0$. Hence, b is the *necessary* element to complement a in order to get c. However, logic is a form of reasoning and not of justification. It may just as well be that not c but a is put on the right-hand side, so that the equation now reads $c - b = a$. Now, a particular economic action, a, becomes the right-hand side variable, or desired outcome, which may be attained by reducing efficient outcome c, by the size of b. In other words, logic cannot form a non-normative basis for the Pareto criterion because it is not reason but judgment that assigns whether a, b, or c should be placed on the right hand side of the equation as the desired outcome.

Nature and logic, two possible candidates for a non-normative consequentialist norm for Pareto efficiency, appear not to be neutral at all but are biased by power and judgment. This brings us to the intuitive ground for any efficiency criterion, namely some form of prudent resource-use, as opposed to a waste of resources. This, of course, is a normative criterion. The consequentialist norm of the Paretian criterion therefore is indeed a *moral* norm, because it judges less waste of resources to be more desirable than more waste of resources. This moral norm of the minimization of waste underlies every concept of efficiency – the Paretian definition is no exception to this. The way in which this norm is operationalized, however, is not the same for all possible concepts of efficiency. In the Paretian criterion, the norm of minimization of waste is defined in terms of maximizing total utility without redistribution, while the Arrow-Debreu proof fills in a particular way in which resources may be allocated to reach this, namely through free markets. The consequentialist norm underlying Pareto efficiency, hence, is narrowed down to a situation of (X) as a free market equilibrium and (Y) as maximum total utility without

redistribution. Obviously, this leaves open the possibility that some Pareto Efficient solutions come about not through free markets but through government intervention, collective action, or the exercise of power. The Pareto efficient free market equilibria, however, often imply multiple equilibria so that $(x_i, y_i) \rightarrow$ n for i = 1, …. n, which are all efficient given a particular initial distribution, and the Paretian criterion is not in itself capable of selecting the optimum among these. In fact, all these free market equilibria represent what Roland Bénabou and Jean Tirole (2006) have labelled "a belief in a just world", the belief that people generally get what they want through effort and hard work when they are free to provide for themselves. Hence, the Arrow-Debreu set of Pareto efficient equilibria seem to imply, inadvertently, yet another form of consequentialism, namely the belief of justice being done when agents are free to choose.

Deontology

The second normative foundation of the Paretian criterion derives from a very different ethic than consequentialism, namely deontology. Deontology is a principled ethic in which the good is defined not by outcomes but by rights, duties, laws, and other principles. The deontological principle of Pareto Efficiency is expressed by restriction (Y) that no one should be made better off *at the expense of anyone else*. This particular deontological principle is a strong no-harm principle. It strictly forbids any redistribution between individuals after the initial distribution of endowments, even when doing so is likely to improve total outcome, as Pigou already noted in 1929. So, deontological restriction (Y) limits consequentialist allocation (X) to the sub-set of non-redistributive allocations, that is, to free market allocations.

Lionel Robbins' (1952) positivist insistence in 1935 that individual utility is purely subjective and cannot be compared between individuals has blocked the grounds for redistribution in efficiency analysis in neoclassical economics. Happiness economics, however, provides a response to the information problem of incomparability by providing an inter-subjective measure that allows for a comparison of individual satisfactions (Frey and Stutzer, 2002). This, in turn, allows for redistribution of marginal satisfactions until these are equal, while increasing total satisfaction, and hence, efficiency. However, such a purely subjective approach does not deal with the problem of perverse preferences, adaptive preferences, and other problems related to the reliance on purely subjective wellbeing information, so that an efficient allocation equalizing marginal happiness may still not be the most efficient allocation possible.

The strong no-harm principle is often ascribed to John Stuart Mill, but he did not clearly distinguish between a strong and a weak form of the no-harm principle. On the one hand, he defended individual liberty against interference by the state, whereas on the other hand he

supported redistribution of resources to the poor and to women, for example in his support for the Poor Laws (1917: 754-7). Others, like Isaiah Berlin (1969) and Sen (2002), have discussed the difference between the strong and the weak no-harm principle in terms of negative liberty ('freedom from' interference) versus positive liberty (enabling disadvantaged groups to provide for themselves, to acquire 'freedom to'). The debate about negative and positive freedom and the strong and weak no-harm principle has not yet been resolved, while philosophers have proposed further distinctions of the no-harm principle (Ripstein, 2006). For this paper, the basic distinction between a strong and a weak no-harm principle is sufficient: a strong no-harm principle does not allow, as a matter of principle, any redistribution even when it would lead to a net aggregate welfare increase, while a weak no-harm principle allows redistribution up to a certain point, such as the equalization of marginal utilities in the original theory of cardinal utility of Bentham.

Pareto Efficiency, hence, appears to take a clear normative position. On the one hand it expresses, like any other efficiency criterion, a consequentialist norm that judges waste as undesirable, while on the other hand it relies on a strong deontological norm that opposes any redistribution after the initial distribution, even when that would appear to increase efficiency in the dynamics of the evolving economic process.

THE INEFFICIENCY OF THE PARETO CRITERION

Some economists may be disturbed by the implication that Pareto efficiency does not appear to lie on the neutral side of a neat efficiency/equity trade-off, and that there is actually no neutral side at all to efficiency. On the other hand, most economists will perhaps not really feel troubled as long as the criterion does what it promises to do: evaluating states of economic affairs according to their relative efficiency. The problem, however, is that it does not perform this function very well, as evolutionary economists know so well. In the next section, I will show that the normative foundations of Pareto efficiency are part and parcel of this problem, so that the reasons why Pareto efficiency cannot be achieved in real world economies are not only practical – due to, for example, path dependency and bounded rationality – but also normative. This recognition is important for the development of an evolutionary alternative notion of efficiency, as I will argue.

Utility maximization: desire fulfilment versus efficient resource-use

Utilitarianism is a form of consequentialism, as utility maximization through Bentham's consequentialist norm of 'the greatest happiness for the greatest number' reflects a concern with outcomes. The choice for individual utility as the unit of measurement in welfare economics implies that it is not resource-use which forms the measure for evaluating efficiency. Rather, the assumption is that when utility is maximized, this can only mean that resources must have been used to their maximum, otherwise someone's utility could have been increased without hurting anyone else.

This assumption, however, is debatable because there is no one-to-one relationship between utility and resources. Mainstream economics has recognized that preferences may include psychological desires, relying on feelings of jealousy and other emotions, or on status, leading to the consumption of positional goods as well as non-rival, non-excludable goods that are produced in households (warm glow feelings), communities (social capital) or by nature (a beautiful sunset). In other words, the space in which Pareto efficiency is measured is not the space of resources, but that of desire fulfilment, including desires that are only partly related or even completely unrelated to resource-use (enjoying listening to birdsong or taking pleasure in humiliating one's employees) as well as desires that are highly resource-intensive or even wasteful (status symbols and other positional goods) or preferences that are harmful for oneself but indulged in because of myopia, limited information, or weakness of will (from smoking to over-eating – also referred to as preference pollution by David George, 2001). As a consequence of the weak, irregular, or sometimes even absent relationship between resource-use and utility, utility maximization, like happiness maximization, does *not necessarily* imply that resources are being used in their most efficient way, not at the individual level, nor in the aggregate.

Considering, in addition, that interpersonal utility comparisons are not allowed but that only the sum total of utility matters with a *given initial distribution* of endowments, efficiency gains from redistribution away from those with low marginal utilities (the 'haves') to those with high marginal utilities (the 'have-nots') are ignored. Such redistributions, if allowed, are not only likely to increase total utility but also to increase the efficiency with which resources are used. This is because the 'have-nots' are likely to use resources in a more productive way (more needs-oriented) than the 'haves', who are more likely to waste resources on positional goods (more want-oriented)[3]. In agricultural economics this has become known as the inverse farm-size

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[3] When using a social welfare function or applying a Kaldor-Hicks compensation in Paretian analysis, which allows for complementing equity concerns with the efficiency side of the criterion, shifts along the efficiency frontier will allow for redistribution, at the same level of efficiency. But such a utilitarian win-

productivity relationship, in which small plots of land generate higher productivity than large plots due to very intense labour use, which outweighs any economies of scale of large plots. In other words, redistribution implies not only marginal utility gains but is also likely to induce more efficient resource use because progress can only be made through intensifying the only available non-fixed resource (labour).

Strong no-harm principle: voluntary exchange versus efficient resource-use
The belief in a just world, an expression of libertarianism, assumes that the status quo distribution of endowments is just, as long as individuals have acquired their endowments through voluntary acts such as exchange. This implies that when agents have agreed to an exchange, each of them must have made a gain, otherwise they would not have agreed to the transaction. Moreover, libertarianism implies that competition in free markets provides individual agents with the incentives to use resources efficiently thanks to the opportunity to make gainful exchanges. This link between incentives and free exchange is probably the reason why economists so widely support the narrow interpretation of the Arrow-Debreu proof. In this libertarian view, interference with agents' free choices will generate disincentives, which in turn will reduce the efficient use of resources. More precisely, disincentives would induce the rich to reduce their production until their marginal earnings would equal the marginal tax rate they face, while the poor would reduce their production with the size of the subsidy they would receive. Hence, efficiency – measured as total production with available resources, rather than in utility terms – would go down with interference in free exchange. Unless, of course, redistribution would be neutral to the incentive structure, as proposed by the Kaldor-Hicks compensation in welfare economics through which winners compensate losers and still receive a net gain. But when losers have low bargaining power, which may occur even under democracy and competitive markets for those on the short side of markets (Bowles and Gintis, 2000; Walsh, 2003), it is very likely that only limited

win situation is highly arbitrary: the shape of the social welfare function cannot be derived from individual utilities, as these are highly subjective and face the problem of what Sen called the Paretian liberal. And the Kaldor-Hicks compensation has its own problems, as it is not likely that redistribution will actually happen, give the power differences between winners and losers. The implication for efficiency remains problematic. How can we know that such redistributions in utilitarian terms will lead to resource efficiency? A social welfare function is likely to reflect political power, norms of fairness, or other social and political forces, which are not necessarily dominated by an objective to minimize the waste of resources. Hence, as long as Paretian analysis and social welfare functions remain in utility space, there is no convincing way to ensure that Pareto efficiency coincides with resource efficiency.

compensation, or no compensation at all will be made. So, the Kaldor-Hicks compensation is generally not feasible given an unequal distribution of endowments to begin with.

A deeper problem with the libertarian belief that free exchange ensures justice by providing the best incentive structure for efficiency to occur, is that it ignores the real world situation in which quite often some agents lack the endowments for any beneficial exchange – even in the absence of market imperfections. In other words, libertarianism assumes that exchange is by definition voluntary when not forced or constrained from outside. But voluntary exchange may also involve involuntary losses when there is too much imbalance in endowments and opportunities, and hence, inequality in bargaining power between market parties. That is why genuine voluntary exchange can only exist when there is a feasible non-exchange option (Sen, 1981c; Walsh, 2003). Without such a fall-back, exchange of one's last resource or even of non-economic goods such as one's children or bodily integrity, will not be voluntary, but simply the only option available for short-term survival. So, paradoxically, voluntary exchange will only be voluntary with what Sen (1981c) has labelled a feasible option for autarky. Distress sales or underinvestment may be regarded by libertarians as voluntary in a static sense, but they undermine an agent's resource base, and hence, crowd out productive capacity in the long run. This is clearly not voluntarily chosen by agents while it is neither efficient in a dynamic sense, making people dependent on others or the state. Distress sales or underinvestment can only be prevented by trade-independent security, deriving from resources such as savings, wealth, community care, access to commons, public goods or welfare support. Most people who experience a disadvantaged exchange position have very few resources to provide for themselves, except their labour power. And even this may not be in demand, as it may be only potential rather than actual labour power, due to lack of nutrition and health (Dasgupta, 1993), or it may not earn sufficient market value to survive (Kurien, 1996), or a combination of factors including lack of aggregate demand keeping the demand for labour low at any wage rate (Walsh, 1996).

The libertarian strong no-harm principle, hence, will not necessarily result in efficient resource-use because free markets provide no guarantee for trade-independent security, without which incentives may be distorted. Agents with very limited endowments may sell their last assets, crowding out their productive potential for own use or exchange, or disabling their children's human capital formation, while those with abundant endowments may acquire factors of production in excess to what can be put to its most productive use. While at the same time, the thus acquired surplus by advantaged groups may serve to fulfil wasteful desires as well as enable them to accumulate power, which would further distort an efficient allocation of resources. That is why Aghion, Caroli and García-Peñalosa (1999: 1656-1657) have argued that efficiency

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requires not just a one-time redistribution, but sustained redistribution, calling for "…permanent redistribution policies in order both to control the level of inequality and to foster social mobility and growth." Therefore, only an institutional setting of markets that acknowledges basic entitlements or other mechanisms that prevent inequality-inducing accumulation will be able to reflect genuine free trade. Sen's capability approach moves in this direction but has not yet delivered an efficiency criterion that goes beyond the Paretian criterion (Sen, 2002)[4].

In conclusion, the narrow interpretation of the consequentialist norm of efficiency and the strong no-harm principle have provided the Pareto efficiency criterion with a rigidity that not only reflects a clear normative position, but also, and partly because of this normative position, ignores many forms of inefficient resource-use. Hence, an alternative efficiency notion should break with these normative foundations in order to be able to incorporate a wide variety of dynamic sources of efficiency. This would lead to an evolutionary notion of efficiency. But before discussing that, I would like to go through an example of the dynamics of the efficiency of land productivity, which serves as an illustration of the multiple sources of evolutionary efficiency in which efficiency and equity are intertwined.

AN EXAMPLE OF THE EFFICIENCY OF LAND PRODUCIVITY

The following example draws on the literature on determinants of land productivity and serves to illustrate the various inefficiencies implied in the Pareto criterion. In this example, we assume a big landowner A and landless rural labour B_i , with i = 1 …. n, a proportion α (0<α< 1) of whom are hired on-and-off as day labourers or seasonal workers, depending on agricultural production cycles and market demand for agricultural products. The rural wage rate is at subsistence level while labour supply exceeds labour demand, resulting in unemployment of the size of (1-α). A mainly grows cash crops for exports and buys part of the food for his own consumption on the market, which includes imported food. The labourers consume local and imported food depending on what is available on the market for their wages. The example now focuses on the

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[4] Sen (2002) has adapted the Pareto criterion to capabilities defined as 'weak efficiency of opportunity-freedom': "a state of affairs is weakly efficient in terms of opportunity-freedom if there is no alternative feasible state in which everyone's opportunity-freedom is surely unworsened and at least one person's opportunity-freedom is surely expanded" (Sen, 2002: 518). But this criterion keeps the strong no-harm principle in tact, and thereby its problems.

use of the last hectare of A's land, which I will refer to as the marginal land. There is a free land market and the current situation of production by A, with the use of labour of αB_i, is Pareto efficient in the sense that no one can be made better off without hurting either A or B_i. There may be, however, various sources of inefficiency that are not captured by the Pareto criterion in this situation. Some imply that the theoretical conditions for Pareto efficiency have not been met (in particular the presence of market failures), while others go beyond these and even hold under the restrictive assumptions for Pareto efficiency. The four examples below will only reflect the latter sources of inefficiency.

a) *A may keep the marginal land unused because his marginal utility from signalling richness is higher than the marginal utility from additional earnings derived from the sales of crops, even when the marginal value of production exceeds the market price. This under-use of land arises from a preference based on status in a rural social context in which status is signalled by owning surplus land.*

Inefficiency arises from underproduction of crops due to informal institutions that result in wasteful preferences. This source of inefficiency was signalled several decades ago by the agricultural economist Margaret Reid (1943), who referred to decadent and luxury consumer patterns as implying waste of productive resources such as land. More recent research on psychological utility and endogenous preferences suggests that such unproductive uses of resources in traditional and modern societies are not uncommon (Bowles, 1998).

b) *There is a principal-agent problem which induces A to supervise B_i, which leads to transaction costs.*

Labour productivity of B_i would be higher if workers would own the land, because they would have full control over the surplus value of their labour (Sen, 1981a and b; Taslim, 1989). Hence, the productivity of the marginal land is sub-optimal, *not* (only) due to lower investment in technology or material inputs such as fertilizer, but due to sub-optimal labour productivity and costs of supervision.

c) *A may not hire additional B_i even though B_i is offering labour at or below the going wage rate, because A's capital/labour ratio is set in response to subsidized prices for fertilizer, irrigation, tractors and other investment goods. Hence, labour is under-used and the proportion $(1-\alpha)$ of B_i that is not hired by A lacks the entitlements to provide themselves with a basic livelihood, let alone to invest in their and their children's human capital.*

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The problem here is the state's agricultural policy that is biased by lobbying activities of big landowners. The capital subsidies are generally not available at the same favourable conditions to small scale producers, as van den Brink et al. (2006) have argued in a World Bank overview study on countries such as South Africa, India, and Brazil. "Large farmers are often well-organized and well-connected, and are able to lobby governments for special tax breaks, subsidies, and other special distortions. The consequence of these distortions is invariably that they face lower effective capital costs relative to labour costs, and therefore over-invest in more machines that replace labour than they would have had they not been able to obtain the tax breaks, subsidies and cheap credit" (van den Brink et. al, 2006: 21).

d) *Even without state subsidies, A's capital/labour ratio may be relatively high so that not all B_i available at market wages will be hired due to a choice of capital investment based on average land conditions, not the conditions of the marginal land. Marginal land of big landowners is likely to include forest, hillsides, dry areas, etc. which require a much higher labour intensity than is optimal given the average capital/labour ratio for A.*

The problem here is underproduction of crops in relation to the underused labour available in the labour market. The origin is not market failure but the size and heterogeneity of the land, combined with asymmetric bargaining power in factor markets, which induces a higher average capital/labour ratio than is socially optimal.

In all four cases, redistributive land reform would generate efficiency gains, even though making A worse off, by taking away a hectare of land (with compensation). If the marginal land would be redistributed over landless labour B_i, the total production of crops would increase, underemployment and unemployment would decrease, the average capital/labour ratio would come closer to its social optimum, with capital productivity, land productivity and labour productivity all increasing. The literature on the inverse farm-size productivity relationship points out that small scale farms are more productive than large scale farms through the high labour productivity on such family farms (van den Brink et al., 2006). Labour is used to such a high extent that some even speak of self-exploitation (Barrett, 1996) – but when the reservation wage is very low and current and future livelihood is insecure due to uncertainties around food prices, child survival, non-farm employment and migration, maximizing labour productivity by using all

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available farm labour to its physical limits is a rational strategy at the individual level[5]. But such behaviour it is not an optimal strategy, as evolutionary economists have recognized for similar situations (see, for example, Pagano, 2000).

In conclusion, it is important to note that although market failures often play a role in the inefficiency of large scale production, market failure is not the main cause. The underlying problem is the highly unequal distribution of land and its impacts on innovation and productivity – precisely the issue that the Pareto criterion excludes from efficiency evaluations through its strong no-harm principle.

TOWARD AN EVOLUTIONARY NOTION OF EFFICIENCY

The consequentialist norm of efficiency as the minimization of waste was recognized already by Adam Smith, Karl Marx and Thorstein Veblen. Vivian Walsh (2000: 21) reminds us that Smith "is savage when he sees the surplus being squandered by the profusion of the great" and he also reminds us that Marx' concept of exploitation included the recognition of waste of the surplus on luxury when it is shifted from labour to capital. While Thorstein Veblen (1931: 126) has criticized the waste of conspicuous leisure and consumption, arguing that "the utility of both alike for the purposes of reputability lies in the element of waste that is common to both. In the one case it is a waste of time and effort, in the other it is a waste of goods." The explicit definition of efficiency as the minimization of waste was given only years later, after the Paretian criterion had been introduced, namely by Margaret Reid in the 1930s (1934; 1943). She referred to waste in *consumption* when the rich consume far more than the poor; waste in the *production* of goods that have negative externalities (giving the example of tobacco); waste through inefficient *methods of production* (partially related to economies of scale); and waste through *market equilibria* allowing for the under-use and under-investment of production factors (leading to sub-optimal land-use and unemployment). In her work in agricultural economics, Reid (1943) argued that the partial production for own use among US family farmers was rational in a dynamic perspective in

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[5] An important note to this is that in most parts of the developing world, the majority of such farmers are female, who on top of limited access to land also tend to be discriminated against in access to human capital, technology, and other resources. Following a traditional gender division of labour in households, female farmers tend to specialize in food production to feed their families, while trying to produce a surplus for local markets or export in order to generate the necessary cash for investment in technology, non-food consumer goods and services for the household, and investment in the human capital of their children.

a context of uncertainty about yields and world market prices, and therefore efficient for the US food sector. The production for own use protected family farmers from food insecurity and distress sales in bad times and provided a buffer against too high market volatility. Hence, Reid's understanding of efficiency was a pragmatic one, rejecting the welfare theoretic assumptions of utility maximization, perfect markets, constant returns to scale, and absence of power, while recognizing that real world economies are influenced by uncertainty, dynamics, power relations and asymmetric institutions. Whereas Veblen already recognized that these imperfect conditions of markets require a shift away from efficiency as a static criterion of evaluation – the evaluation of an equilibrium – towards a dynamic criterion, evaluating waste in the economic *process*, rather than in an idealized market *outcome*, as Mark Blaug (2001) has formulated it so aptly.

Efficiency as the minimization of waste will only achieve such minimization over time when the strong no-harm principle will be released, allowing for re-allocations of resources in order to increase efficiency. This, in turn, requires a move away from a purely subjective measurement of outcomes, as in utility maximization and happiness studies[6]. Moreover, a closer link between resource-use and the measurement of wellbeing also enables closer monitoring of how economic processes affect the environment, and how agreed environmental standards, for example in relation to global warming, may be reached most efficiently (van den Bergh et al., 2006). Since efficiency implies necessarily a relationship between means and ends and not just some absolute minimum, the strong no-harm principle cannot simply be dropped but needs to be replaced by another no-harm principle relating means and ends. Following my argument of a substantive relationship between efficiency and equity, I propose to replace the strong no-harm principle by a weak no-harm principle which recognizes that redistribution of resources can crowd in production, investment and productivity, up to a certain point E. After point E, more redistribution of resources is likely to generate net disincentives, whereas before E, there would be net incentives through the crowding in effect of resources. Up to E, it is also likely that disincentives for the rich may be actually rather limited due to their support for equity values in

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[6] This would bring us back to Smith's wellbeing concept that incorporates objective measures relating to minimum standards. Smith, in the *Wealth of Nations*, recognized two objectives for the economy: "first, to provide a plentiful revenue or subsistence for the people, or more properly to enable them to provide such a revenue or subsistence for themselves; and secondly, to supply the state or commonwealth with a revenue sufficient for the public services" (Adam Smith, (1981) [1776] Book IV. Introduction: 428). Moreover, he made a plea for sufficient wages: "… in order to bring up a family, the labour of the husband and wife together must, even in the lowest species of common labour, be able to earn something more than what is precisely necessary for their own maintenance"(ibid, Book I. VIII: 85-6).

society, either out of a belief in fairness or out of fear of social unrest (Henrich, et al., 2004 for evidence on such motives in 15 traditional societies, and Biancotti and D'Alessio, 2008, who find support for both motives in a study of 23 European countries). Hence, the weak normative principle implies a nonlinear dynamic relationship between efficiency and equity, precisely what is implied in the efficiency view shared in evolutionary economics literature (Hodgson, 1993; Nooteboom, 2002; Witt, 2003). Of course, it is important to note that not all forms of equity enhance efficiency – some social norms of equity go against efficiency as Philippe Platteau (2000) has shown. Taking this into account, the efficiency-equity relationship may be formulated as:

$$E = \alpha + \beta_1\, giniL + \beta_2\, gini\, L^2 + \beta_3\, gini\, H + \beta_3\, gini\, H^2 + \beta_4\, gini\, K + \beta_5\, giniK^2$$

In which E = a measure of efficiency (which may be total factor productivity, long run GDP growth, or a human development index for a long period of time), α = a constant, gini stands for the gini-coefficient of inequality for the distribution of three resources: L = land, H = human capital, and K = capital, which are all included in a standard and in quadratic form (see also Figure 1.). This quadratic form is a simplified form of a general nonlinear formulation as suggested by Banerjee and Duflo (2003), while it parallels the quadratic form of the inequality-growth equation presented by Cornia, Addison, and Kiiski (2004), which, however, relates growth to income inequality rather than to inequality in the allocation of production factors[7].

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[7] Due to lack of sufficient data for a relevant period of time, it appeared not possible to empirically lest this equation. For each of the dependent variables, some data does exist: for land distribution from the 1990 FAO agricultural surveys, for education from the World Bank Development Indicators for several decades, and for finance only very recent data from a dataset as part of the report *Finance for All?* (World Bank, 2008). The land and finance data are for a relatively small number of countries, which are for a large part not overlapping. Moreover there is no older finance data available which would be needed for a medium or long term growth estimation with production factors.

Figure 1. The relationship between equity and efficiency.
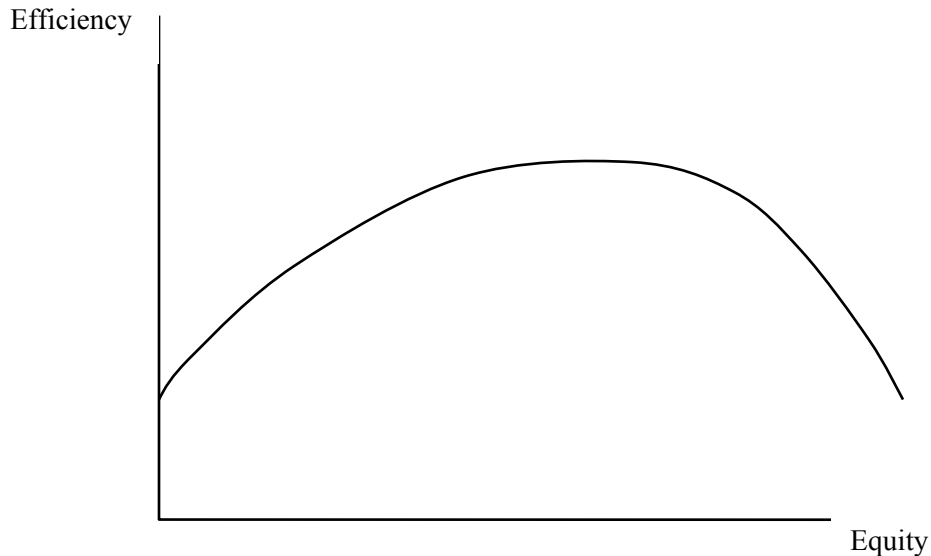
Efficiency

Equity

Finally, it is important to emphasize that both equity and efficiency refer to the allocation of resources, not to the distribution of income. Equity, hence, is not a matter of income taxation or income support, but the reflection of institutions that guide the allocation of resources – land, capital, labour – in the economy towards a dynamic, relative optimum of an inverse-U efficiency-equity relationship. Hence, the endogenous relationship between equity and efficiency based on the weak no-harm principle is quite different from the trade-off of equity and efficiency in the Paretian criterion, where equity implies a redistribution of the gains from a Pareto improvement, hence, exogenously derived. Or, in terms of the Kaldor-Hicks compensation, a redistribution of gains in order to make a Pareto improvement politically feasible. Instead, an evolutionary efficiency criterion is an endogenous efficiency measure, reflecting a nonlinear dynamic relationship between efficiency and equity in the allocation of resources, in which the most efficient allocation reflects a relatively equal allocation of resources, where the crowding in effect of production, investment and productivity is equal to the combined disincentive effect of reduced property rights and lower economies of scale for the rich. Such an evolutionary efficiency criterion, which is genuinely endogenous, shifts the attention away from equilibrium analysis in hypothetically perfect markets towards a process analysis in real-world, imperfect and highly dynamic markets.

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