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ADAM SMITH AND THE
WELFARE COST OF OPTIMISM

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Abstract

It is argued that there is a source of welfare losses which, though pervasive, has been largely overlooked. Competition allocates resources to the highest bidders. Their expectations tend to have an optimistic bias. Biased expectations, however, may cause efficiency losses. Adam Smith, in advocating interest ceilings, seems to have had this sort of market failure in mind. Frank Knight's theory of profits and the recent literature on the "winner's curse" in auction markets are also relevant. The argument of the paper is made explicit in a rudimentary model, first for three representative agents and then for many agents.

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ADAM SMITH AND THE WELFARE COST OF OPTIMISM

by

Jürg Niehans

(Preliminary; not to be quoted. Comments and criticism welcome)

It is a fact of life that forecasting abilities differ. Even if expectations are unbiased in the aggregate, there are always optimists, pessimists and realists. Efficiency seems to require that productive resources are controlled by those with good forecasting ability. This is not, however, how competitive asset markets work. Where resources go to the highest bidder, the optimists will end up controlling most of them while the pessimists are left with cash and low-risk financial assets. Adam Smith seems to have regarded this as a source of efficiency losses. The nature of this loss is the subject of this note, which may thus be regarded either as presenting an ancient idea in modern garb or a novel idea in ancient garb.

1. Adam Smith on Usury

It is well known that Adam Smith, though he opposed legal prohibitions of interest, was in favor of legal ceilings. He argued that the ceiling rate "ought always to be somewhat above the lowest market price, or the price which is commonly paid for the use of money by those who can give the most undoubted security" (1805 II, 101 [bk. 2, ch. 4]). At least on the surface, this is in striking contrast to Smith's general (though qualified) belief in the efficient working of competitive markets and his deep-seated scepticism about government regulation. It seems that Smith must have found in the credit market a source of market failure. The question is what this source might have been.

It must at once be noted that this source had nothing to do with the protection of weak or ignorant borrowers against exploitation by the lender. Distribution and equity did not enter into Smith's argument. This argument, while brief, was entirely in terms of efficiency. It deserves to be quoted in full (105 II 101-2):

"If the legal rate in Great Britain, for example, was fixed so high as eight or ten per cent., the greater part of the money which was to be lent, would be lent to prodigals and projectors, who alone would be willing to give this high interest. Sober people, who will give for the use of money no more than a part of what they are likely to make by the use of it, would not venture into the competition. A great part of the capital of the country would thus be kept out of the hands which were most likely to make a profitable and advantageous use of it, and thrown into those which were most likely to waste and destroy it. Where the legal rate of interest, on the contrary, is fixed but a very little above the lowest market rate, sober people are universally preferred, as borrowers, to prodigals and projectors. The person who lends money gets nearly as much interest from the former as he dares to take from the latter, and his money is much safer in the hands of one set of people, than in those of the other. A great part of the capital of the country is thus thrown into the hands in which it is most likely to be employed with advantage."

In summary, a ceiling on interest rates, so Smith believed, can improve the allocation of capital and thereby raise the efficiency of the economy.

Subsequent economic theory has almost universally rejected this argument. Jeremy Bentham criticized it in his *Defence of Usury*, written in 1787, three years before Adam Smith's death (Bentham 1952, Letter XIII). His main argument was that precisely those "projectors" are often the innovators on whom economic development depends. It received the emphatic blessings of John Stuart Mill (1858 II, 514-9 [V, 10/2]), who described Smith as

"rather hasty" on this point. Toward the end of the 19th century, Smith's despised projectors had been transformed into romantic knights in shining armor, whose innovations are the driving force of capitalism. It is enough in this context to mention Karl Marx, Alfred Marshall (1925, ch. XVII) and Joseph Schumpeter (1912). It remained for John Maynard Keynes in his *General Theory* to find virtue in Smith's argument that the market rate of interest may have a tendency to rise too high, though Smith's alleged reason, namely the "imprudence" of investors, was hardly in the spirit of Keynes (Keynes 1936, 351-5).

Modern theory has indeed found cases in which a legal interest ceiling will increase net national output (Stiglitz and Weiss 1981, 408). In principle, Smith seems to be vindicated. However, those cases tend to occur in the rather narrow context of credit rationing by banks, based on moral hazard and adverse selection. In the present note the question of credit rationing and legal interest ceilings will not be further pursued. The spotlight will instead be turned on the question whether, in an environment of continuous change, the diversity of expectations in itself, as Smith seems to have believed, could be a source of welfare losses. It will be argued that such a market failure can indeed be identified. It emerges, in particular, if three conditions or postulates are satisfied:

- (I) Expectations, though perhaps unbiased in the aggregate, differ between individuals, some being "optimists" while others are "pessimists".
- (II) Resources tend to be allocated to optimistic individuals.
- (III) Output from given resources depends, among other things, on forecasting ability, being relatively high for "realists" with correct expectations, but lower for both optimists and pessimists.

Neither of these postulates is found in Adam Smith in this pointed form, but for each there is evidence that it is close to his thinking.

With respect to Postulate I, it is one of Smith's recurring themes that human beings have a propensity to overestimate their prospects. In discussing incomes in different employments he mentions "the natural confidence which every man has more or less, not only in his own abilities, but in his own good fortune" (1805 I, 121 [I 10]) as one of the reasons for lower incomes. Even stronger is the reference to "the over-weening conceit which the greater part of men have of their own abilities" (122). "The chance of gain", so he adds more precisely, "is by every man more or less overvalued, and the chance of loss is by most men under-valued, and by scarce any man, who is in tolerable health and spirits, valued more than it is worth" (123). This theme is then elaborated over several pages.

This makes it clear that there are indeed individuals, some of them not in "tolerable health and spirits", who undervalue their prospects. There are many, on the other hand, who err on the side of optimism. Between them there must be a considerable number of "sober" people with a "prudent" and "dispassionate" judgment of their prospects. "It can seldom happen", so we read, "that the circumstances of a great nation can be much affected either by the prodigality or misconduct of individuals; the profusion or imprudence of some being always more than compensated by the frugality and good conduct of others". "The number of prudent and successful undertakings is every where much greater than that of injudicious and unsuccessful ones" (1805 II, 83 [II 3]).

Overall, Smith conveys the impression that expectations tend to be biased toward the optimistic side. The argument in this note, however, will make no use of this possible asymmetry. It will rather be assumed that expectations are unbiased, optimists being matched by pessimists. This assumption is made in order to eliminate the possible objection that the argument is based on irrational expectations. Expectations, in the aggregate, are assumed to be rational.

Postulate II regarding the allocation of resources to optimists is clearly implied in Smith's reasoning and probably regarded by him as obvious. It is the optimism of the projector's expectations that causes him to divert loanable funds away from the sober realists. The market, therefore, does not allocate resources to those with the most accurate, but to those with the most optimistic, expectations.

Postulate III, finally, regarding the inefficiency of optimists is supported by Smith's numerous references to the waste and loss caused by "imprudent" projects. The "prodigals and projectors" who overestimate their prospects are likely to "waste and destroy" their capital (1805 II, 101 [II 4]). "Every injudicious and unsuccessful project in agriculture, mines, fisheries, trade, or manufactures, tends ... to diminish the funds destined for the maintenance of productive labor" (1805 II, 82 [II 3]). It seems clear that with respect to such waste, optimism is not generally better than pessimism, nor is it generally worse. It is the imperfection of foresight which causes the losses.

It will be shown in the following sections that competitive markets, if the three postulates are granted, may indeed result in an inefficient allocation of resources. Specifically, there will turn out to be two sources of inefficiency. First, any resources allocated to investors with inferior judgment obviously result in a loss of output. Second, and less obviously, the invisible hand of competition can be shown to have the tendency to distort the allocation of resources in favor of investors with over-optimistic judgment.

2. From Frank Knight to the Winner's Curse

One might suspect that the distorting influence of imperfect foresight on the allocation of resources has been the subject of a large and ancient literature. As a matter of fact, even traces of such a literature are hard to find. It is true, of course, that optimism and pessimism have been widely discussed, but most of these discussions (as surveyed in Haberler 1952, ch. 6) related to successive phases of business cycles and not to allocation at a given time. The

only reference to the allocational effects of optimism and pessimism before the Second World War which I could discover is in Frank Knight's famous dissertation (Knight 1921). The central topic of this work is risk and uncertainty, and these play no explicit role in Smith's argument. In passing, however, Knight also touches on Smith's point, though without showing awareness of its ancestry. In the table of contents one reads that the "conditions which control the amount of the profit share" are "simply timidity vs. optimism of entrepreneurs, especially in estimating their own powers" (1921, XIII). More specifically, profits are negatively related to "optimism" and positively to "timidity". "The condition for large profits", the reader learns, is "a low general level of initiative as well as ability" (1921, 284; similarly 285). With a high enough degree of optimism, profits may easily become negative, and "this would be the natural result in a population combining low ability with high 'courage'" (1921, 284).

This inverse association of optimism and profits arises from the fact that profits are a residual, left over from output after factors have been paid. Optimism or "rashness" causes entrepreneurs to bid up factor prices, thus reducing profits, whereas "timidity" has the opposite effect. "Entrepreneurial income, being residual, is determined by the demand for these other services, which demand is a matter of the self-confidence of entrepreneurs as a class, rather than upon a demand for entrepreneur services in a direct sense" (1921, 283). In determining profits, therefore, "the main thing is the rashness or timidity of entrepreneurs ... as a class in bidding up the prices of productive services" (1921, 283). According to this argument, optimism distorts the allocation of resources in a positive sense while profits are reduced. Pessimism has the opposite effect. Nothing is said about possible repercussions of such distortions on welfare.

It might perhaps have been expected that Arthur Pigou would take up this point in his *Economics of Welfare*, but this was not the case. Instances of welfare losses through excessive optimism occasionally came up, however, in connection with innovations. It was

often observed that many innovators only succeeded after some predecessors, underestimating the difficulties, had failed. Keynes, in fact, drew attention to a curious remark by Bentham in which the landscape of economic development, in an allusion to legendary Marcus Curtius, is compared to a "plain, bestrewed with gulphs", into each of which a victim has to fall before it can close, thus becoming part of the level plain (Keynes 1936, 353). The inference is that optimism, by distorting the allocation of resources, may often cause welfare losses. There is no corresponding loss in the case of pessimism, simply because the pessimist does not dare to claim resources in the first place.

For a modern elaboration of such ideas one has to go to the theory of auctions. It concerns, in particular, Postulate II according to which resources tend to be allocated to the optimists. The problem concerns the case of "common value" auctions in which the value of the object is the same for all potential buyers, though their estimates of this value may differ. A jar full of pennies may be the simplest example (Thaler 1988, 191-2). It had been observed in various types of auctions of this approximate sort that the winners did not do very well and surprisingly often ended up with a loss. Instances include bonds, oil leases, corporate takeovers, new issues, publishing rights and failed banks. The same phenomenon was observed in experimental studies. In 1971, three petroleum engineers discovered that such losses might have systematic reasons (Capen, Clapp and Campbell 1971). Suppose each potential buyer bids the estimated value of the jar. The winner will then be the bidder with the highest estimate. Bidders with high estimates, however, are likely, on average, to have overestimated the value². It follows that winners tend to be disappointed. This was called the "winner's curse".

² A general statistical analysis of this proposition, not restricted to auctions, is provided in Harrison and March (1984).

In the meantime this "anomaly" (Thaler 1988) has generated a large literature and several surveys have made it widely known (McAfee and McMillan 1987; Thaler 1988; Milgrom 1989; Levis 1992). These studies made it clear that the winner's curse, too, is basically due to adverse selection, inasmuch as the auction tends to select bidders who have overestimated the value. To guard against this danger, rational bidders will not bid the full estimated value but somewhat less (as Adam Smith seemed to say, too). Though the curse can then be avoided, both empirical and experimental studies have suggested that the phenomenon may be widespread, but this is still being debated.

Most of this literature is restricted to the narrow field of auction markets and, in particular, of the optimal design of auctions. As a consequence, it is not directly relevant from the point of view of this paper. There seem to have been no efforts to widen the analysis from common-value auctions to general competitive markets and to investigate the implications for the allocation of resources³. The literature is indirectly relevant, however, by suggesting that the winner's curse may have a counterpart in competitive markets. It is true that such markets are largely governed by "private values", such as interpersonal differences in tastes and technology. The Walrasian system shows how a complete theory of general equilibrium can be constructed without introducing differences in expectations. It is also true, however, that in certain markets such differences play a dominant role. Security markets provide the prime examples, but markets for standardized commodities, real estate and foreign exchange are similar. To a smaller or larger extent, differences in estimates of the value of a product play a role in innumerable markets. In such cases, it may be conjectured, the allocation of goods, other things equal, will be biased in favor of the optimists. The question is whether this bias might produce a misallocation of resources.

³ Capen, Clapp and Campbell noted that sealed-bid auctions for oil leases can be taken as a paradigm for a wide class of competitive phenomena (1971, 641), but they did not pursue this hint.

3. Misallocation among Three Agents

This question will now be answered in terms of an explicit, though rudimentary, model. While crude in many respects, it is designed to bring out the essential points in the simplest possible way. It is not claimed that this model can be found in Adam Smith, but it is inspired by his thoughts on usury.

Suppose, first, there are three individuals, each representative of a large and equal-sized group of identical individuals. They are endowed with the same quantities of a homogeneous capital good called "land". Other factors and their incomes are disregarded. For each individual there is a "technical" production function relating the quantity of output ("wheat"), q , to the input of land, b . This function is characterized by diminishing marginal products. Land can be used in two ways. Either the owner can use it himself or he can rent it to another individual at the rate r , rent thus taking the place of Adam Smith's interest rate. In the first case he obtains the output according to the production function. In the second case he gets the market rent. Whenever a land owner finds that his marginal product exceeds the market rent, he will lease more land; in the opposite case he will rent out some of his land. In equilibrium, therefore, the marginal product equals the rental rate for all individuals.

In the absence of economic change, in a stationary economy, the three individuals are assumed to have identical production functions. The marginal products would then be equalized without any land changing hands. The allocation of resources would coincide with the allocation of endowments. The resulting perfect-foresight output may be called the "potential" output.

Unfortunately, the potential output cannot be realized. The reason is that the economy is subject to change, that this change is imperfectly foreseen, and that the forecasting errors cause losses in output. More specifically, the three individuals are characterized by different

forecasting abilities. The "realist" has correct foresight, but both the "optimist" and the "pessimist" have deficient judgment or "intuition" about the future. As a consequence, both obtain less output from given resources than the realist⁴. It will be assumed for simplicity that the shortfall is the same for the optimist and the pessimist. The three production functions can thus be written

$$f_R(b) > f_O(b) = f_P(b)$$

for all b^5 . These will be called the "actual" production functions⁶.

Suppose the optimist and the pessimist are self-critical in the sense that they are aware of the deficiency of their judgment and thus use their actual production functions. Since these are assumed to be the same for both, but inferior to the realist's, they will sell the same quantities of land to the realist. I shall call this the "self-critical" allocation. In symbolic terms, it is characterized by the conditions

$$f'_R(b_R) = f'_P(b_P) = f'_O(b_O) = r$$

⁴ It may be imagined that foresight relates to the weather. The realist is able to foresee it correctly. The optimist errs by expecting favorable weather all the time, thus incurring losses. The pessimist incurs similar losses, but by anticipating unfavorable weather all the time.

⁵ There is a certain family resemblance between this dual production function and Harvey Leibenstein's concept of X-(in)efficiency. In both cases, output from given inputs depends on an ability variable. The two approaches differ, however, in the identification of this variable. X-efficiency is supposed to depend on "effort", largely in the sense of "working hard" (Leibenstein 1980, X, 44-7, 95-6, 98-100, 108); foresight, judgment and expectations do not play a major role (Leibenstein 1987, ch. 14). From Adam Smith's point of view, on the other hand, the crucial ability concerns the realistic assessment of one's own entrepreneurship. Casual historicism seems to suggest that more resources may have been lost through illusionary expectations and faulty intuition than through lack of effort.

⁶ Note that expectations, though often erroneous, are here assumed to be held with certainty. Uncertainty thus plays no role in the argument of this paper. It might conceivably be introduced by replacing deviations of expected from actual output by deviations of subjective probabilities of certain states of nature from actual probabilities. The optimists may be assumed to overestimate the probabilities of favorable states, whereas the pessimists underestimate them. For an analysis of optimism and pessimism along these lines see Hey (1984). A model of this sort was suggested to me by Tobias R otheli.

with $b_R + b_P + b_O = \bar{B}$, where \bar{B} is the given aggregate quantity of land⁷. The self-critical allocation produces obviously less than the potential output (and at a lower rental rate), but it is the best that can be obtained with the limited entrepreneurial abilities.

The self-critical allocation is visualized, for linear marginal product curves, in Fig. 1 in a type of graph first used in 1854 by Hermann Heinrich Gossen. Land is measured along the horizontal axis and the rental rate is measured vertically. The three panels in the upper half relate, respectively, to the realist, the pessimist and the optimist. The downward-sloping lines represent their actual marginal products, and the broken vertical lines indicate their land endowments. In the lower half of the graph, the three marginal product curves are added horizontally. The resulting aggregate marginal-product curve can be confronted with the aggregate land endowment to determine the market rent and the individual land inputs.

The crucial point is that the self-critical allocation cannot be realized either. The reason is that some individuals have illusions about their entrepreneurial abilities. Instead of basing their decision on their actual production function, they base it on what may be called a "virtual" production function, describing what each individual expects to obtain from given resources. For the realist this is the same as the actual production function. It can be written $\Psi_R(b_R) \equiv f_R(b_R)$. The optimist, however, is under the illusion that he can obtain more than the realist, though actually, because of his faulty judgment, he is obtaining less. His virtual

⁷ There may easily be corner solutions in which one or even two individuals use no land at all. In this case, the marginal conditions will not generally hold. This familiar aspect is not further elaborated here.

production function, therefore, is $\psi_o(b_o) > f_R(b_o)$ for all b_o .⁸ The pessimist, finally, is caused by his lack of confidence to expect less from given resources than the realist. Whether he expects even less than he actually obtains can be left open. For simplicity it may be assumed that $\psi_p(b_p) \equiv f_p(b_p)$, though this is not essential for the argument.

The virtual production functions result in an "illusionary" allocation of resources. If the self-critical allocation is taken as a basis, the optimist, under the spell of his illusion, will lease land from both the realist and the pessimist. In the new equilibrium

$$\psi'_R(b_R) = \psi'_p(b_p) = \psi'_o(b_o) = r.$$

This illusionary equilibrium is represented in Fig. 2. It is constructed in the same way as Fig. 1 except that the order of the individuals is changed for graphical convenience. As a consequence of the reallocation of land, actual output necessarily declines. This simply follows from the fact that the self-critical allocation maximizes actual output and the illusionary allocation is different from it. It may also be observed that the illusions of the optimist are driving up the market rent, just as Adam Smith argued for the rate of interest.

4. Misallocation Among Many Agents

The preceding model was restricted to three agents. Some of its features can be brought into sharper focus by extending it to an arbitrary number of representative agents, $i = 1 \dots n$. With correct expectations, these would have identical technical production functions, $q_i = q(b_i)$, where q_i and b_i are, respectively, the output and the land input of agent i . Marginal

⁸ It might be objected that optimists will eventually learn from their disappointing experiences not to overestimate their forecasting ability. Perhaps both optimists and pessimists could even learn to improve it. This may be so if the same people are exposed to similar disturbances in an unchanging environment. However, if an ever-changing population is exposed to an ever-changing sequence of new experiences, it seems plausible to suppose that each new generation will have its realists, its optimists, and its pessimists. After all, the history of mankind has not made optimists extinct. As Barnum said of suckers: One is born every second. This feature could be formalized in a model of overlapping generations, in which each generation progresses from folly to wisdom.

products are again assumed to be positive and diminishing. Each agent is representative of a number of identical individuals. Their number is expressed as a relative frequency, p_i , in the total population, N .

If the technical production functions were relevant, every individual would, of course, operate the same quantity of land, \bar{B}/N . Most individuals, however, suffer from more or less deficient foresight. Their forecasting error is measured by the fraction, e_i , by which virtual output

$$v_i = (1 + e_i)q(b_i)$$

deviates from technical output. These fractions range generally between plus and minus infinity, but the following argument will assume a range between plus and minus one. The optimists have positive errors, the pessimists have negative errors, and the realists (if any) are error-free. To make the model consistent with rational expectations (in the aggregate), the mean error is assumed to be zero.

Forecasting errors are assumed to reduce actual output, both for optimists and for pessimists. This may be expressed by the actual production function

$$a_i = (1 - |e_i|)q(b_i).$$

Actual outputs reaches its maximum for the realists with $e_i = 0$, becoming zero at both $e_i = 1$ and $e_i = -1$. This is admittedly an arbitrary way to account for the consequences of faulty judgment, but it helps to focus attention on the essential points.

Suppose at the beginning of the year land is allocated in a competitive market on the basis of the actual production functions. This is the allocation that was called "self-critical". A representative agent then maximizes the excess of actual output over cost, namely

$$W_i = (1 - |e_i|)q(b_i) - rb_i,$$

which yields the first-order conditions

$$(1 - |e_i|)q'(b_i) = r.$$

In addition, allocated land must add to the endowment, $\sum_i p_i b_i = \bar{B}$. These equations, disregarding corner solutions, determine the self-critical allocation r^*, b_i^* .

This allocation is illustrated in figure 3. Suppose, for the moment, that in the relevant range relative frequencies are equal and can thus be disregarded. The technical marginal product as a function of land use is graphed in the NW quadrant. With given r^* , say 4, the technical and the actual marginal product, the latter expressed as a multiple of the former, are related by a rectangular hyperbola as depicted by the solid curve in the NE quadrant. The higher the absolute error, the higher must be the technical marginal product and the lower, therefore, must be the land input.

In the SE quadrant the actual marginal product, including the error, is related to the error itself. Marginal products between zero and one can be obtained by two values of the error, one positive and the other negative. Actual marginal products in excess of the technical marginal products are unattainable.

The solid dome-shaped curve in the SW quadrant, finally, relates the forecasting errors to land inputs. Agents with good forecasting ability will operate large parcels of land. Both optimists and pessimists will use less land and beyond a certain error they will use none at all, preferring to lease their endowment to others.

With equal relative frequencies, as so far assumed, total land use is represented by the shaded area "below" (to the right) of the dome-shaped curve. In the general case with unequal frequencies, aggregate land use is obtained by multiplying the land of each agent by its relative frequency.

The self-critical allocation is the best that can be achieved given the imperfection of forecasts. Each individual knows its entrepreneurial shortcomings and takes them into account when entering the land market. Unfortunately, the self-critical allocation cannot be realized. The reason is that the optimists are inherently unable to make proper allowance for their entrepreneurial deficiencies. Whereas they actually produce less than their technical output, this is caused precisely by their expectation to produce more⁹.

Land is actually allocated on the basis of the virtual production function. Agents thus maximize the excess of virtual output over cost,

$$V_i = (1 + e_i)q(b_i) - rb_i,$$

which yields the first-order conditions

$$(1 + e_i)q'(b_i) = r.$$

Together with the land constraint this results in the illusory allocation r^0, b_i^0 . Output under this allocation is less than under the self-critical allocation. Whereas the optimists initially buy land in the expectation that they will produce more than the technical output, it later turns out that they are actually producing less, which reveals the illusory allocation as inefficient. At the same time, r^0 will generally exceed r^* .

The illusory allocation is illustrated in figure 3 by the broken lines. In the NE quadrant, equilibrium now requires a higher rental rate, say 6. Land is now allocated on the basis of the virtual marginal product. For the pessimists this is the same as the actual product. The optimists, however, are convinced they can do better than the realists, though they will turn out to do worse. This illusion is expressed by the broken line in the SE quadrant. It

⁹ In the case of the pessimists I again assume, for simplicity, that the shortfall caused by their forecasting errors is as expected, but this is not essential.

results in the dashed land-use curve in the SW quadrant. Comparing the illusionary with the self-critical allocation, one finds that the pessimists, and even the realists, are using less land. The optimists, however, are using more. If the initial endowment is supposed to correspond to the self-critical allocation, optimists can be seen as "bidding away" land from the others.

These are crude models, to be sure, and they cry out for generalizations in many directions. They are the simplest, however, the author could find to give precision to the underlying idea. In summary, there are two types of welfare losses. Losses of the first type result from the fact that output under the self-critical allocation is inferior to the potential output. Their cause is trivial. If entrepreneurs, because of faulty judgment, extract less output from given resources than they might have, this obviously results in diminished welfare. The losses of the second type are less well understood. In fact, I am not aware that they have been explicitly analyzed before. They arise from the tendency of a competitive economy to allocate an excessive proportion of scarce resources to entrepreneurs with optimistic expectations at the expense of entrepreneurs with realistic forecasts. Both optimism and pessimism are harmful, but the optimists are doubly harmful because the invisible hand is shifting resources in their favor, whereas the harm done by pessimists is reduced by their diminished control of resources. This seems to be the welfare cost of optimism which Adam Smith must have had in mind when making his argument about usury. Whether, given the distortion, interest ceilings offer an effective and appropriate remedy is quite another question, which will not be taken up here. At the present stage of our understanding of these problems policy prescriptions would surely be premature.

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Figure 1
Self-Critical Allocation

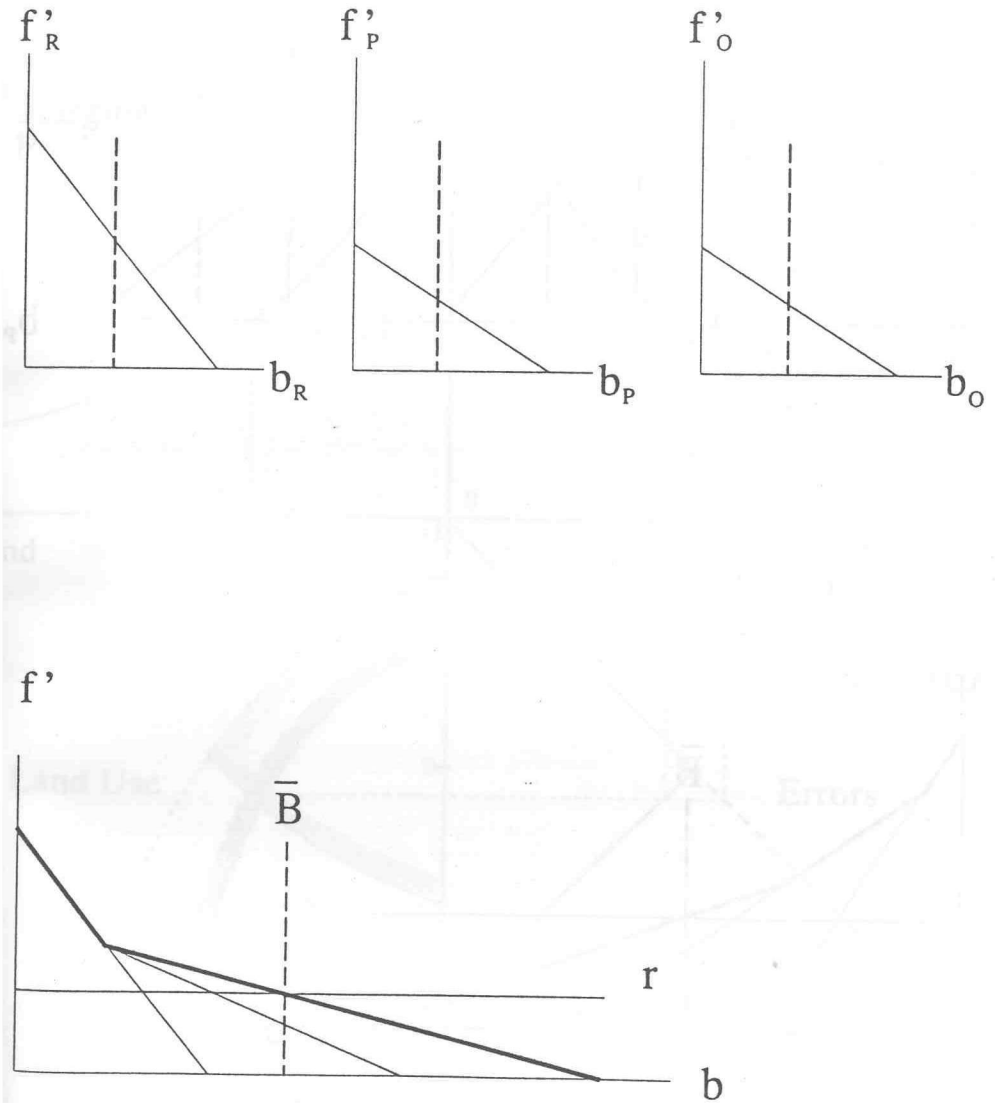


Figure 2
Illusionary allocation

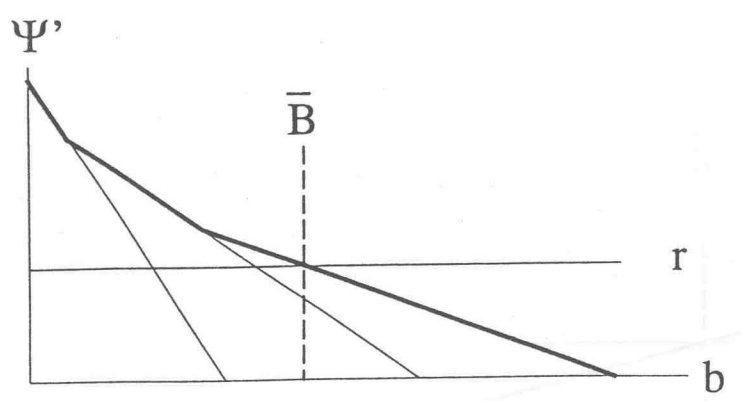
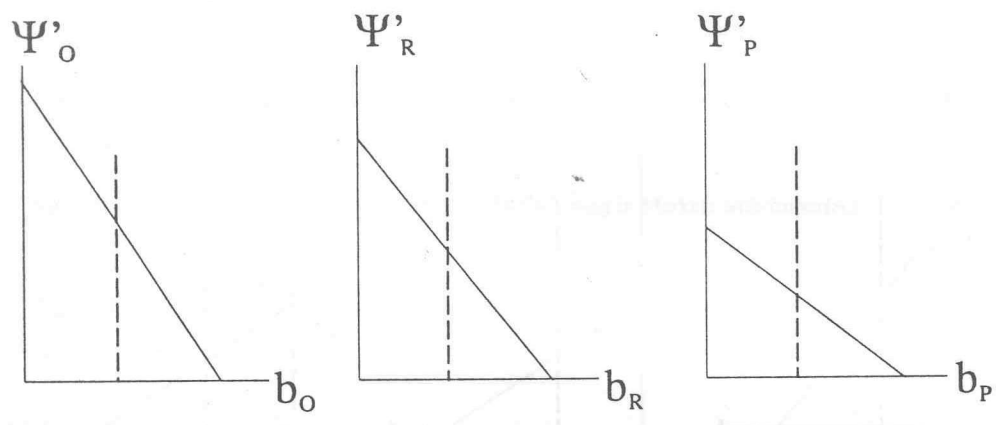
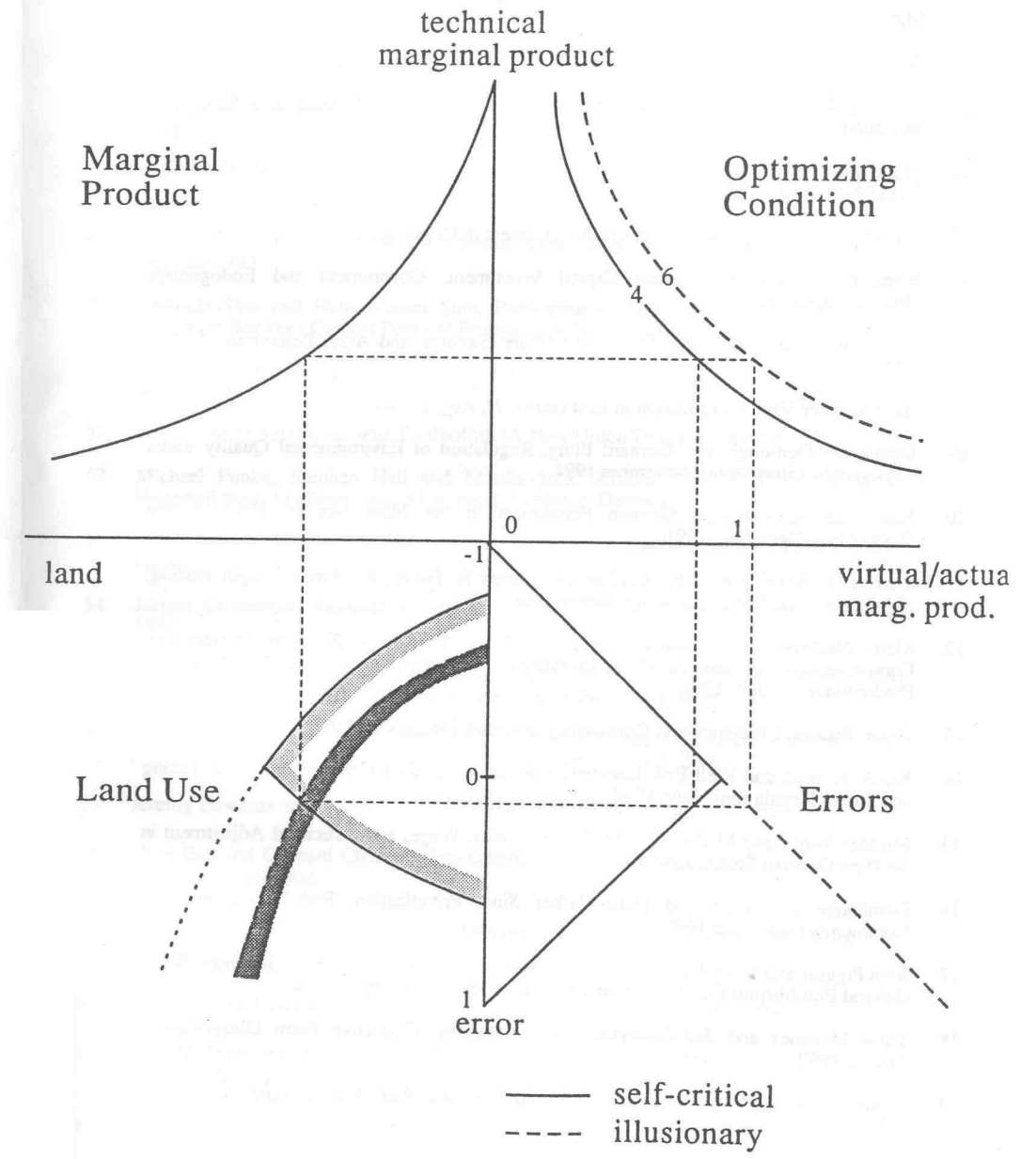


Figure 3
Many Agents



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