An Alternative Approach to the Theory of Employment: Self-Employment versus Wage Employment

Dragan Filipovich*

Abstract: This paper presents a simple model illustrating an alternative approach to modelling employment in which instead of distinguishing between households and firms as is conventional, I work with market-oriented household-producers (in contrast to the subsistence-oriented entities in the household-production literature), and in which the sole reason for trade is specialization due to (external) increasing returns. The model establishes a link between self-employment and the scale of production, and in the process suggests a theory of the "emergence" of labor markets in which wage employment (as opposed to self-employment) emerges as a rather precarious arrangement that needs to be supported by various institutional devices.

Resumen: Este trabajo presenta un modelo muy sencillo que ilustra un enfoque alternativo a la teoría del empleo. En el modelo se trabaja con hogares-productores que tienen la opción de participar en el mercado de trabajo como empleadores. Además, la única razón para participar en el mercado de trabajo es una probable especialización debida a retornos incrementales externos. El modelo establece un vínculo entre la escala de producción y la modalidad de empleo (autoempleo o empleo asalariado). De paso sugiere una teoría de la emergencia de mercados de trabajo en la que el empleo asalariado aparece como un arreglo un tanto precario cuya permanencia requiere algún tipo de soporte institucional.

Employment in Arrow-Debreu Theory

In A-D theory, labor is just a commodity like any other, and employment is just an exchange of labor for consumption goods. This exchange is not fundamentally different from, say, an exchange of

*El autor es miembro de la División de Economía del CIDE.

coconuts for bananas. Yet there is an important difference in the way this particular type of exchange is motivated: While there is nothing in the A-D model that would make an exchange of coconuts for bananas necessary, exchange of labor for consumption goods is unavoidable as long as production takes place.

I want to be careful here, even at the risk of stating the obvious: The crux of the matter is the distinction between households and firms. Households are endowed with factors but cannot produce, while firms produce but are not factor endowed, hence "employment" must result (as long as production takes place, of course). The problem lies in that it does not really matter: The equilibrium allocation of resources will be the same whether this distinction is drawn or not. However, if this distinction is not drawn, the possibility arises of production taking place without there being trade in labor.[1]

This line of argument leads me to think that the distinction between households and firms in the A-D model is an ad-hoc one; its only function being to lend plausibility to the model as a description of the actual economy.

Why is an alternative approach needed?

By themselves, these observations would not make a compelling case for an alternative approach to the question of employment. After all, all theories are abstractions. Such a case can only be made on the basis of the inability of A-D theory to explain important features of the actual employment picture.

I would briefly like to draw attention to the "global" picture, i.e., the broad pattern of employment across different countries. In particular, the contrast between the employment picture in the so-called developed economies and that prevailing in some of the least developed ones. What strikes me is that, while labor markets in developed nations are totally "covered" by institutional arrangements of all sorts (unemployment insurance, minimum wage legislation, unions, etc.), those in many least developed countries are practically free of them.[2] In the light

[1] I elaborate on these issues on P. 3-7.

[2] A caveat: Of course, one can find less developed economies with highly regulated labor markets; Mexico is a good example. On the other hand, even in those cases, the highly regulated segments of the market coexist with widespread 'informal' employment, i.e., employment that escapes the reach of regulators. The remarks in the text then apply to these informal arrangements.

of this, I would have expected labor markets in least developed nations to better approximate the A-D ideal. The remarkable fact is that this is not the case. Judging by the literature dealing with these issues, the employment picture in these areas is extremely complex. If anything, it would seem even further away from the A-D standard than that in developed nations. Bounded labor, widespread self-employment, "dual" labor markets, product sharing arrangements are some of the commonly observed features of employment in least developed countries that one could not possibly have expected to find in totally unregulated labor markets. In fact, the contrast is so stark that the question arises if it is legitimate to talk of a labor market at all under such conditions.

The conclusion is paradoxical: The view of employment implicit in A-D theory seems more relevant (or should I say, less irrelevant) for a world of unions, unemployment insurance, minimum wages, etc., than for what would seem its natural habitat, namely, a world without all this institutional overgrowth.

An Alternative Approach: A "Producers' Economy"

If the above description of the global employment picture is basically accurate, one can react in one of 2 ways: One is to presume that labor markets in developing areas are, for some reason, qualitatively different from those in developed economies, and set about developing the special theory of employment that seems called for. This would appear to be the orientation of most the literature dealing with factor markets in LDC's. Or else, one could take the view that basically the same theory should apply to both labor markets in LDC's and in developed nations. I take in this proposal the latter position.

This might seem a tall order. Surprisingly, it appears possible to go quite a way in this direction by what looks (at first, at least) like a pretty harmless modification of the basic Arrow-Debreu set up: One of the outstanding characteristics of employment in developing countries is widespread self-employment, so why not substitute for the households and firms of A-D theory a single type of agent, a household-producer, or, for short, a producer. This species of agent would have both, the option of employing factors (hence, of self-employment), and that of supplying factors to other agents. A further modification, which might also appear harmless at first, is to "endow" those producers with unrestricted production possibilities, by which I mean that each and every producer has access to the whole range of technologies available to society. In this case, I shall speak of "universal producers".[3]

Does this make any difference? In an A-D economy, the answer is yes and no.

The *negative part* of the answer hinges on the following proposition:

Proposition 1
In a production economy with a full set of competitive markets, the distinction between households and firms is inessential, i.e., it is of no consequence for the equilibrium allocation.

The proof is just a straightforward separation argument.

Note that this is linked to technology only in so far as, under increasing returns, a competitive equilibrium fails to exist. (More generally, and at a more intuitive level, increasing returns are taken to be incompatible with the existence of competitive markets.)

Nevertheless, the case of diminishing returns calls for 2 "qualifications":

The first concerns the number of potentially active units of production. In an A-D economy, with an infinite "supply" of firms and a diminishing returns technology (at all levels of production), the number of firms active in equilibrium goes towards infinity. The tendency in such an environment is to aim for the lowest possible scale of production, so as to avoid as far as possible the ranges of low marginal returns. If there is only a finite number of households to start with, substituting producers for firms implies taking the potential "supply" of firms to be finite. This clearly will affect the equilibrium allocation. Assuming an infinite number of households will not help here, for, as the number of households goes up, so does labor available. The only way out is to restrict from the beginning the "supply" of firms to equal the number of households. (By the way, these firms will have to be universal firms,[4] otherwise one needs correspondingly more firms to establish the equivalence).

The second "qualification" concerns the issue of ownership. In a diminishing returns economy, profits do not vanish, so one has to specify

[3] The fundamental difference between the treatment of household production here and in the household production literature (see, for example, Becker, 1960) is that in the latter the production within the household involves only the labor of the household and is consumed fully within the household.

[4] In this proposal I follow the convention of identifying plants and firms.

ownership appropriately to maintain the equivalence between the traditional scheme and a producers' set-up.

The *positive part* of the answer dwells on the fact that, in this modified setting, an equilibrium with positive production but no trade in labor is a possibility. More generally, the likelihood of inactive markets in equilibrium is considerably enhanced.

In this regard, technology plays a very important role.

The most extreme results obtain in the *constant returns case*:

Proposition 2
In a competitive economy of universal producers with only one factor of production and a constant returns technology, autarky[5] is always a potential equilibrium.[6]

The reasoning is straightforward: As there are constant returns and only one factor, each household can produce what it consumes.

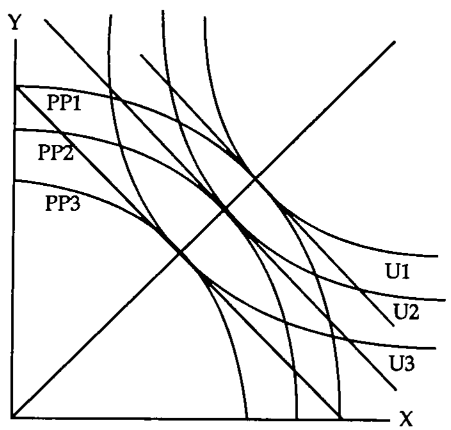
More generally, autarky results seem to require very stringent conditions. In particular, it would seem that one needs very strong restrictions on preferences. I give 2 examples of this type of statement:

Proposition 3
In an universal producers' economy where everyone has homothetic and identical preferences, everyone is endowed in identical proportions, and there is a constant returns technology, autarky is a potential equilibrium.

Proof
The constant returns technology plus the assumption of identical proportions imply that the individual production possibilities schedules are radial expansions of each other. Similarly, the assumptions that preferences are homothetic and identical imply that indifference curves within a household and across households are radial expansions of each other. Hence the following diagram applies:

[5] In all the propositions that follow read "autarky with production" where only "autarky" is written.

[6] I say potential because, strictly speaking, agents would be indifferent between exchange and autarky. This leaves room for equilibria where there is trade even tough no one is gaining anything from it.



It can be seen that pooling the households' resources and centralizing production will not lead to a different equilibrium allocation from the one that would have resulted if each household produced what it consumed.

The following weakened version of the previous proposition is immediate:

Proposition 4
In an universal producers' economy where everyone has homothetic and identical preferences, constant returns technologies that are Gorman aggregable across goods, and an inelastic supply of factors, autarky is a potential equilibrium.

Proof
The reasoning is similar to the one underlying the previous proposition, since it can be shown that Gorman aggregability of technologies and inelastic factor supplies imply the radial pattern mentioned before (see Gorman 1953).

Aiming for less extreme results, a reinterpretation of the factor price equalization result of international trade theory yields a proposition defining conditions under which factor markets in a producers' economy are superfluous:

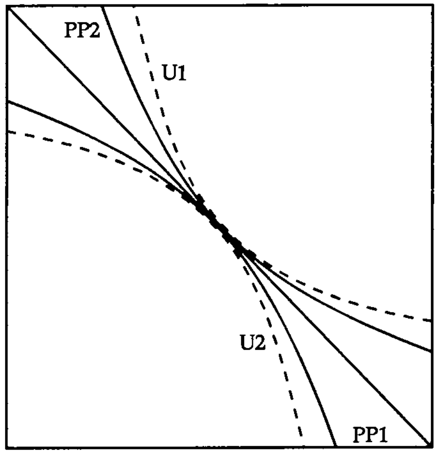
Proposition 5
In an universal producers' economy, with constant returns, inelastic factor supplies and identical homothetic preferences, factor endow-

ments distributions belonging to the set FPE,[7] and unrestricted trade in goods, trade in factors is unnecessary (despite positive production).

In the opposite direction, it would seem possible to make an even stronger statement:

Proposition 6
In an universal producers' economy with constant returns to scale and identical, homothetic preferences, there is no need for trade in goods so long as there is unimpeded trade in factors.

Proof
Since production scale is irrelevant and trade in factors equalizes factor proportions, production can evidently be decentralized. On the other hand, since preferences are identical and homothetic, every household will consume the different goods in the proportions in which they are produced. The following diagram illustrates the reasoning:



I deal very briefly with the *diminishing returns case*. It seems that much more stringent conditions are needed here to obtain autarky. In fact, the only autarky proposition I have been able to come up with under this technology is the following:

[7] $\{FPE = \{(V^1, \ldots, V^J) \mid \lambda_{ij} \geq 0,\ \Sigma_{j \in J} \lambda_{ij} = 1\ \ \forall\ i \in I\ \text{ s.t. }\ V^j = \Sigma_{i \in I} \lambda_{ij} V(i)\ \ \forall\ j \in J\}$

where V^j $N \times 1$ vector of factor endowments of agent $j \in J$
$V(i)$ $N \times 1$ vector of factors employed in the production of good $i \in I$

See Helpman and Krugman, chapter 1, p.13 for a proof.

Proposition 7
In an universal producers' economy, with identical technologies displaying diminishing returns, identical preferences and endowments, autarky is a potential equilibrium.

Proof
Since returns are diminishing and factor endowments are identical, efficiency requires that in any equilibrium production takes place at the smallest scale. Since preferences and endowments are identical, everyone will consume the same bundle, so, for markets to clear, it must be that they consume at the proportions they produce.

(Of course, an analogous proposition applies under constant returns).

The fact that the condition of this last statement coincides with a familiar one guaranteeing no trade in an exchange economy suggests that the underlying structure of the A-D production economy is much nearer to the pure exchange model than one would think from looking at the conventional set-up.[8] That set-up excludes not only the autarky case, but also all the other cases of inactive markets treated before, at least so long as there is positive production. The traditional A-D economy links rigidly production with exchange via the distinction between households and firms: It is not possible to have the former without the latter.

More fundamentally, the above considerations bring out the rather artificial way in which the A-D production economy hangs together: So, in an elementary case of the theory (the one factor case), and under otherwise conventional assumptions, the economy "disintegrates"; the labor and goods' markets "disappear" (quotations because it is far form obvious that an absence of trade can be equated with an absence of markets).

Now, one could take the view that these statements amount only to a bunch of more or less special cases. Indeed, some of the statements are pretty special (Prop. 3,4), but others are quite general (Prop. 5). Anyhow, the point I want to emphasize is that my case for viewing A-D production theory (as an employment theory) with skepticism, rests not on generality, but on the inability of the (inessentially modified) theory

[8] Note that the condition of Prop. 3 (identical endowment proportions and identical, homothetic preferences) also leads to autarky in an exchange economy.

to deal satisfactorily with one of its elementary cases (for the autarky result in the one factor case strikes me as very implausible).

The Role of Increasing Returns

The question is now: What forces could provide such an economy with cohesion? Or put in a slightly different way: Why do people get together to produce? I think the answer is increasing returns. (This is not so terribly obvious: Coase in his famous article on the nature of the firm asked a very similar question but gave a very different answer: transaction costs.) Increasing returns is, in my opinion, the premise on which an "organic" theory of employment can be built. In fact, of the whole economy, for increasing returns cannot only explain why producers should bundle up into "firms", but also provide —via specialization— an alternative rationale for trade in goods (by the way, this is the reason for my interest in universal producers).

The price of bringing increasing returns into the picture is having to give up perfect competition (except for a special case with which I deal in the example below). So, a third element of this alternative approach is some form of imperfect competition.

I claim that this approach amounts to a more fundamental way of looking at employment and so represents a good candidate for explaining the "global" employment picture. I will illustrate by means of a simple example the lines along which I feel such an explanation might run.

*An Example**
Assume an economy of 2 identical producers. Assume further that their overall labor supply is inelastic and that there is only one good. Under these conditions, producers are "net income" maximizers:

$$\max_{X_1, L_1, L_{1,1}, L_{1,2}, L_{2,1}} pX_1 - w\,(L_{2,1} - L_{1,2})$$

$$\text{s. t.} \qquad 1)\ F(L_1) = X_1$$

* This example is a modification of one in Helpman and Krugman (1985), chapter 3. The basic difference is that wage equalization is here a condition of equilibrium, while this is not the case in international trade.

$$L_1 = L_{1,1} + L_{2,1}$$

$$2) T_1 = L_{1,1} + L_{1,2}$$

$$3) L_{1,1}, L_{2,1}, L_{1,2} \geq 0$$

NOTATION:
The first subscript refers to the agent the magnitude is associated with. In the case of labor magnitudes, the second subscript refers to the agent acting as employer. So, e.g., $L_{1,2}$ denotes labor of agent 1 employed by agent 2. T represents labor endowment.

The technology is given by

$$X_1 = X_1^{1/2} L_1 \quad \text{(respectively, } X_2 = X_2^{1/2} L_2\text{)}$$

This technology embodies external economies of scale, a standard device to incorporate increasing returns in a competitive setting. The externality arises because the X_1 term on the RHS (resp., X_2) is taken as parametric by individual agents.[9]

The market clearing conditions are

$$L_1 + L_2 = T_1 + T_2 \text{ (Labor market clearing)}$$

$$X = w(T_1 + T_2)/p \text{ (Goods' market clearing)}$$

$$X = X_1 + X_2$$

By substituting the constraints of the producer's problem into its objective, and dividing through by p, one gets

$$\max_{L_{1,1}, L_{2,1}} F(L_{1,1} + L_{2,1}) + w/p\, [T_1 - (L_{1,1} + L_{2,1})]$$

[9] If taken literally, this is a little implausible: Why should a producer fail to recognize the effect of its own output on its own productivity? While answers to this question are conceivable, I would rather argue for a less literal interpretation: This is just one way of formally incorporating the notion of external economies. After all, the purpose here is not to explain why there are external economies.

$$\text{s.t.} \quad L_{1,1}, L_{2,1} \geq 0$$

This expression states that a universal producer aims to maximize his net income, that is, the total value of his production plus his labor minus the value of the labor he uses in production (his own and others').

With F.O.C's:

i) $pF' - w/p = 0$
ii) $pF' - w/p = 0$

I write pF' because the relevant marginal product here is $X_1^{1/2}$, not the true marginal product. This is important, for it lends this model a constant returns "semblance" in that the wages paid exactly exhaust the product. And this in turns accounts for the existence of a competitive equilibrium, despite the presence of increasing returns. Basically, it makes any level of production profits' maximizing (as profits are always zero). This checks the usual tendency of the individual firm to specialize and expand indefinitely in the presence of increasing returns with given prices, which is what breaks the competitive equilibrium. In this specific model, with only one good, the only tendency is for the individual firm to expand indefinitely.

Back to the F.O.C's: Since these conditions are the same, it is clear that the choice between $L_{1,1}$ and $L_{2,1}$ is indeterminate. Setting $p = 1$, the goods market clearing condition becomes

$$W(T_1 + T_2) = X = X_1 + X_2$$

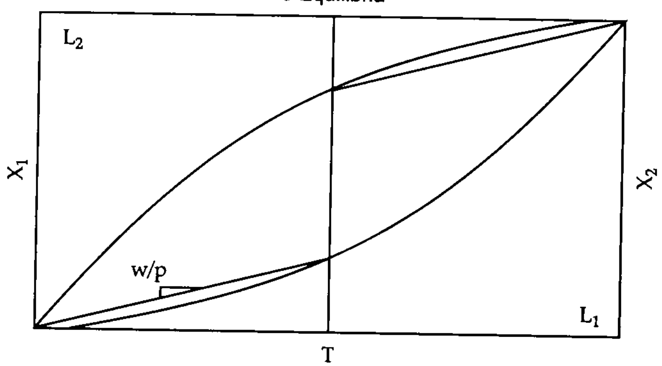
Expressing X_1, X_2 in terms of L_1, L_2, from technologies; w in terms of L_1, from technology and F.O.C's; and finally, L_2 in terms of L_1, from labor market clearing ($2L = L_1 + L_2$), one obtains a quadratic equation in L_1, with the (rather intuitive) solutions $L_1 = L$, and $L_1 = 2L$. The first one corresponds to (potential) autarky,[10] the second to an equilibrium with trade.

In fact, the model has 3 equilibria: $L_1 = L_2 = T$, $L_1 = 2T$ and $L_2 = 2T$.

[10] I say potential because, due to the indeterminacy mentioned, any convex combination $a\, L_{1,1} + (1 - a)\, L_{2,1} = L_1$ ($\Rightarrow (1 - a)L_{1,2} + aL_{2,2} = L_2$) is an equilibrium pattern of employment.

This can be neatly illustrated by the following diagram:

3 Equilibria



The "good" equilibria correspond to A and B, where one of the agents sells all his labor to another, in other words, these are equilibria with employment. The "bad" one is C, where there need not be trade in labor. In fact, there is no need for trade in goods either.[11] The distance between the 2 production functions is a measure of the loss due to non-specialization in this equilibrium. (That such an equilibrium exists follows from the symmetry of the set-up.)

The Role of Technology

I would like to briefly consider some variations on this, which show how sensitive the results are to the specification of technology. These variations also show that this type of models, even in very rudimentary versions as the ones used here, can produce relatively surprising results.

1. VARIATION
The technology is now:

$$X_1 = (X_1 + X_2)^{1/2} L_1$$

[11] Clearly, this autarky result hinges on the assumption of equal labor endowments. I stick to this assumption to emphasize the basic message: That there is a positive relationship between volume of employment (=trade in labor) and scale of production. Besides, it is very appealing intuitively: Why should people have different labor endowments? Symmetry in this respect seems natural.

$$X_2 = (X_1 + X_2)^{1/2} L_2$$

Net Income Max.: $w \geq (X_1 + X_2)^{1/2}$
Labor Mkt. Clearing: $2T = L_1 + L_2$
Goods Mkt. Clearing: $2Tw = X_1 + X_2$

It is easy to show that any levels of employment (L_1, L_2) satisfying labor market clearing represent an equilibrium.

To see this: Add both technologies; substitute from this into the expression for w to eliminate $X_1 + X_2$; substitute the conditions for maximization of net income into the same expression to eliminate w. The result is just the labor market clearing condition.

2. VARIATION
The technology is now:

$$X_1 = X_2^{1/2} L_1$$

$$X_2 = X_1^{1/2} L_2$$

Net Income Max.: $w \geq X_2^{1/2} \geq X_1^{1/2}$
(with equality if $X_1 \geq 0$, resp. $X_2 \geq 0$)

The other conditions are as before.

Here there is a unique equilibrium with production, namely the autarkic one (Concerning the autarkic character of this equilibrium, the same caveat as before applies).

To see this: If there is going to be production, it is evident that $w = X_2^{1/2} = X_1^{1/2}$. Expressing X_1 (resp. X_2) in terms of L_1, L_2 by substituting one technology into the other, and then substituting into the wage condition, one obtains $w = L_1^{1/3} L_2^{2/3} = L_2^{1/3} L_1^{2/3}$, which can only be satisfied if $L_1 = L_2 = T$.

What surprises me here is that, despite external increasing returns, there is an unique production equilibrium, and there need not be employment at that equilibrium.

3. VARIATION
The technology is now:

$$X_1 = X_1^{1/2} L_1$$

$$X_2 = A\,X_2^{1/2}\,L_2$$

$$A < 1$$

This technology is supposed to capture a technological disadvantage on the part of individual 2.

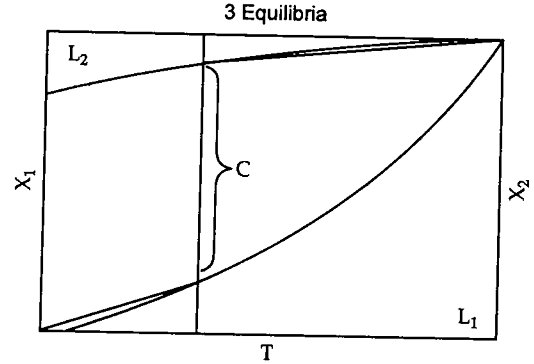
Net Income Max.: $w \geq X_1^{1/2} \geq A\,X_2^{1/2}$

Labor Mkt. Clearing: $2T = L_1 + L_2$

Goods' Mkt. Clearing: $2Tw = X_1 + X_2$

The equilibria of this economy are illustrated by the following diagram:

3 Equilibria



As usual, there are 2 full specialization equilibria, and one partial specialization one. As before, the equilibria can be Pareto ranked in the obvious way, where now C is the loss due to partial specialization (relative to the best equilibrium in which only the high productivity agent is active).

To check that there is always a partial specialization equilibrium, I solve for this case:[12]

[12] A more general proof brings out precisely the features of the model that guarantee existence here: Basically, 3 features are involved:

(1) a) $f(L) = 0$; b) $f'(L) = 0$ at $L = 0$
(2) $w = f(L_1)/L_1 = Af(L_2)/L_2$ ("as if constant returns" property)
(3) Continuity and strict positive monotonicity of $f(L)$

Using labor market clearing and net income maximization ((2) above), the proof proceeds as follows: Define $g(L) = f(L)/L$. (3) implies $g(L)$ is a continuous function. (1) b) implies it has range 0 to ∞. (1) a) and (3) imply $g'(L) = 0$, $g(0) = 0$. So, inverting, one gets $L = g^{-1}(w)$; $L = Ag^{-1}(w)$. Substituting into labor market clearing, one obtains $(A + 1)\,g^{-1}(w) = 2L$. Since $g^{-1}(w = 0) = 0$ (from $g(0) = 0$), $g^{-1\prime}(w) > 0$ (from $g'(L) > 0$), and g^{-1} is continuous (since g is), existence is guaranteed.

From $w = X_1^{1/2} = A\,X_2^{1/2}$ one obtains the labor demands $L_1^D = w$, $L_2^D = w/A$. Labor market clearing is then given by $2L = w + w/A$, from which one

$$w = (2A/A + 1)T$$

Substituting back into demands,

$$L_1 = (2A/A + 1)T$$

$$L_2 = (2/A + 1)T$$

Finally, note that the specialization occurs in the wrong direction: The less productive agent produces more. Also, as $A \rightarrow \infty$, the partial specialization equilibrium converges towards the second best full specialization equilibrium.

4. Variation

To get an idea of what role increasing returns play here, it helps to "invert" the technology so that diminishing returns obtain.

This new technology is given by

$$X_1 = (1/X_1)L_1 \quad \text{(resp. } X_2 = (1/X_2)L_{2)}$$

(where $1/X$ is still taken as given by the producer)

Net income maximization $w \geq 1/X_1 \geq 1/X_2$.

The other conditions are as before.

It is easy to check that now there is an unique autarky equilibrium, and that this equilibrium is Pareto Optimum.

Since $1/X \rightarrow \infty$ as $X \rightarrow 0$, net income maximization can never be satisfied at a corner. So the only possible equilibrium has $w = 1/X_1 = 1/X_2$. Substituting from this into the technology, and then substituting the result into the market clearing condition, one gets $w = 1/T^{1/2}$, which, when plugged back into labor demands, yields $L_1 = T$ (resp. $L_2 = T$). It is Pareto optimal since marginal products are equated.

What is somewhat surprising is that this change of technology affects not only the multiplicity of equilibria, but also leads to Pareto optimality. The way technology interacts here with the externality is not clear to me.[13]

A More General Formulation of the Model
I reformulate the system with the A-D convention of households and firms. It turns out that this encompasses the producers' situation as a special case.

Define m ..... number of potentially active firms
m^A .... number of active firms
n ...... number of households

Clearly, $0 \geq m^A \geq m$
The demand and labor supply relations of the households are (using symmetry):

1) $X^D = wT$
2) $L^S = T$

The supply and labor demand functions of active firms are:

3) $X^S = (w/p)^2$
4) $L^D = w/p$

Substituting demand and supplies into the market clearing conditions, one gets

5) $m^A\,(w/p) = n\,T$ Labor Market Clearing
6) $m^A(w/p)^2 = n\,wT$ Goods Market Clearing

[13] Actually, the existence of Pareto Optimal equilibria in a model with externalities is a bit surprising. I think this has to do with the unusual type of externality used here: In a sense, it is not an externality at all, for it affects only the agent who causes it.
Support for this intuition comes from considering the following technology:

$$X_1 = (1/X_2)L_1 \quad (\text{resp. } X_2 = (1/X_1)\,L_2)$$

Such an economy yields exactly the same unique equilibrium as before, but this is no longer Pareto Optimal ($L_1 = 2T$ seems to be the P.O. allocation).
Variation 2 shows though, that this cannot be the whole story: There, despite "true" externalities, the unique equilibrium is P.O. This again points to a peculiar interaction between technology and externalities.

By homogeneity of degree 0, one can set $p = 1$; and by Walras' Law, one can drop one of the market clearing conditions, say, labor market clearing. The system reduces to 3 independent equations, plus the restriction on active firms:

1') $X^S = w^2$
2') $L^D = w$
3') $m^A\,w^2 = n\,w\,T$
4') $0 \geq m^A \geq m$

From this, it is clear that the number of potentially active firms is indeterminate. Moreover, it cannot be made determinate in the usual way by imposing a zero profits condition (because profits here are always zero due to the "as if constant returns" behavior of firms).
Solving the system, one gets:

i) $w = (n/m^A)T$
ii) $L = (n/m^A)T$
iii) $X = [(n/m^A)T]^2$

This shows that, for any given m, there are m types of equilibria, namely, full specialization equilibria, and symmetric equilibria with 2 up to m active firms. Evidently, the higher m^A the lower the scale of individual and aggregate production, i.e., the worse the corresponding equilibrium. Moreover, the higher m, the worse for the economy, as only lower level equilibria are added as m increases.
Note that this economy is equivalent to an n-producers' one in the case where $n = m$. Note further that an increase in the number of producers (equivalent to a simultaneous increase in m and n), has very different implications from an increase in m alone: Because in the producers' set-up there is a fix positive link between the number of potential production units and the level of labor resources available, an increase in the number of producers in fact leads to better corner equilibria and no worse symmetric ones.
At this point, it is difficult to resist making some generalizations: That in a world of increasing returns, population growth is a good thing (ceteris paribus), while an increase in the number of production units (c.p.) is not. This would seem to be exactly the opposite of what happens under diminishing returns: Increases in population are bad (c.p), but increases in the number of production units are good (c.p.).

Interpretation of the Example

The example illustrates a connection between low levels of activity, low scale production and autarky, on the one hand; and high levels of activity, large-scale production and "wage-employment", on the other. I want to repeat that there need not be employment in the low level equilibrium, but there could be. One could identify the situation in LDC's with the low level equilibrium, and that in industrialized economies with the high level ones. So, in a way, the explanation for the prevalence of self-employment in those regions is the low overall level of economic activity. Moreover, in this type of model, the "institutional overgrowth" mentioned earlier might be seen as playing quite an unconventional role: Instead of "blocking" the functioning of the labor market, it sustains it. E.g., take minimum wages: If they are high enough, the only equilibria in the example are the high ones.

Of course, this example, being so rudimentary, is in many respects a rather weak illustration of the approach I tried to sketch verbally. There is no imperfect competition in it, and this is achieved at the expense of introducing an externality. This is an expense in that it makes it harder to see which results are due to the increasing returns feature and which to the externality. The discussion of Variation 3 above suggests the nature of the difficulties.

Further, the introduction of producers only serves to establish a (tenuous) link between level of activity and the level of wage employment. (This should not surprise, since this is an economy with a full set of competitive markets, and so Prop. 1 applies.) While I find this link by itself interesting enough, I would expect that, in more elaborate environments (more specifically, those where the distinction between households and firms is essential), the producers' assumption might have richer implications.

Concluding Remarks

What comes out of all this is a theory exploring the "emergence" of labor markets, rather than their "operation". A central theme is their precarious nature, and the need for their operation to be supported by institutional devices.

References

Becker, G. (1960), "A Theory of the Allocation of Time", *Economic Journal*, 75, pp. 493-517.

Gorman, W. M. (1953), "Community Preference Fields", *Econometrica*, 21, pp. 63-80.

Helpman, E. and Paul Krugman (1989), *Market Structure and Foreign Trade,* Cambridge, Mass., MIT, Press.

Weitzman M. (1982), "Increasing Returns and the Foundations of Unemployment Theory", *Economic Journal*, 92, pp. 787-804.