

# WORKING PAPERS IN ECONOMICS

**Cantillon on Real Wages and  
Employment: a rational reconstruction  
of the significance of land utilization**

by

**Tony Aspromourgos**

**No. 222**

**November 1995**

DEPARTMENT OF ECONOMICS



The University of Sydney  
Australia 2006

**Cantillon on Real Wages and  
Employment: a rational reconstruction  
of the significance of land utilization**

by

**Tony Aspromourgos**

**No. 222**

**November 1995**

**Abstract**

It is quite a fundamental proposition of Richard Cantillon's *Essai sur la Nature du Commerce en Général* (1755) that employment and population bear a negative relation to the level of real subsistence wages - a form of wages (or subsistence) fund doctrine. This paper presents a 'rational reconstruction' of Cantillon's system and the relation between real wages and employment within it. It seeks thereby to clarify the difficulties in the way of this doctrine operating in a market economy constructed along Cantillonian lines - as opposed to a Cantillonian command economy. These results are contrasted with a model of Cantillon by Hans Brems.

**National Library of Australia Card Number and ISBN 0 86758 902 7**

## **CONTENTS**

	<b>Page</b>
<b>1. A Rational Reconstruction</b>	<b>2</b>
<b>2. Cantillon in His Own Words</b>	<b>12</b>
<b>3. A (Partial) Resolution: the Significance of Land Utilization</b>	<b>17</b>
<b>4. Conclusion</b>	<b>26</b>
<b>References</b>	<b>28</b>
<b>Addendum</b>	<b>34</b>

**CANTILLON ON REAL WAGES AND EMPLOYMENT: a rational reconstruction of the significance of land utilization\***

It is probably a fair judgement to describe Richard Cantillon as the first writer in the history of economics to create a work which is recognizable, in modern terms, as an economic treatise - the first genuine 'Principles' of economics, even though it has a largely precapitalist character in terms of the kind of social economy it theorizes. The *Essai sur la Nature du Commerce en Général* (1755), apparently written in the late 1720s or early 1730s, is a remarkable watershed in the history of economic theory. It deserves to sit in the same company as Quesnay's *Tableau*, Turgot's *Réflexions*, Smith's *Wealth of Nations*, Ricardo's *Principles* and Marx's *Capital*. The *Essai* covers a comprehensive economic terrain, at least for the social economy of its time. The focus of this article is just one element of Cantillon's system - the relation between real wages and employment. However, as one would expect in a system of interconnected economic phenomena, the relation between real wages and employment in Cantillon's system is embedded in a wider set of causal relations.

With regard to the determination of the level of population and employment in a society, Cantillon systematically advanced a number of fundamental principles, one of which was the existence of an inverse relation between population and employment on the one hand and the rate of real wages per capita on the other - where the latter was conceived as a kind of subsistence level of consumption, though conventionally determined. We seek to clarify the causal economic logic, or process, underlying the determination of employment in Cantillon's system - and in particular, underlying his oft-stated view of the manner in which variations in real wages (customary subsistence) would influence

---

\* The author acknowledges useful comments by P.D. Groenewegen, A. Murphy and other participants in a conference at Rotterdam, February 1995, without thereby implicating them in the final product; and thanks Graham White for preparing Figures 1 to 3.

employment and population. Section 1 provides a 'rational reconstruction' of Cantillon on employment and real wages. By rational reconstruction is meant the application of formal models designed to accurately capture the *intentions* or ideas of an earlier author or text, while going beyond the actual analytical or formal *execution* of the writer. This is an interpretive method which may enable a clearer grasp of the logical coherence (or otherwise) and implications of a system - but runs the risk of losing contact with the text under examination. Section 2 therefore documents, in his own words, Cantillon's characteristic views on the determinants of population and employment. The purpose of all this is to demonstrate the extent to which Cantillon's principle concerning the relation between real wages and employment is valid - not in the sense that it is true, but in the sense that it follows logically from his analytical framework. Our inquiry in part is stimulated by Brems (1986: 40-49), who in a formal model designed to capture Cantillon's theoretical intentions, claims to show that this principle is an error on Cantillon's part, in the sense that it does *not* follow from his own economics. We shall comment further on this interpretation below. As a matter of fact, there *is* a problem in Cantillon's treatment of real wages and employment; but it lies elsewhere, and at a deeper level, than Brems supposes. Specifically, it is not clear how - in a market economy, as opposed to a 'command' economy - Cantillon's 'subsistence fund' approach to determination of population and employment can be reconciled with his further doctrine, that labour supply more or less passively adjusts to labour demand. Section 3 seeks to resolve this fundamental issue and thereby cast Cantillon's system in a clearer light. A brief conclusion follows.

### 1. A Rational Reconstruction

Cantillon's system may be accurately formalized, albeit in a simplified manner, along the following lines.

In the first instance, suppose there are two produced commodities, both consumer goods (1,2). There are no produced means of production, *except that labour is a kind of commodity in this system*. Commodity 1 is a necessity consumed by labour, with a given necessary consumption per worker per time period ( $c_1$ ). Commodity 2 is a luxury consumed by landowners and landowners alone. Workers are landless and landowners don't work. Functional income distribution resolves exclusively into wages and rents. There is no net saving out of wages or rents (and hence, no net investment). Each commodity is produced by means of fixed coefficients of labour input per unit of gross output produced per uniform time period ( $a_1, a_2$ ) and land input per unit of gross output produced per time period ( $b_1, b_2$ ). Constant returns to scale prevail and there is no choice of technique. Equilibrium money prices ( $P_1, P_2$ ) are equal to costs of production, with the (implicit) assumption that in equilibrium competition has generated a uniformity of prices for each of the two homogeneous commodities, a uniform money wage per time period for homogeneous labour ( $w$ ) and a uniform money rate of rents per time period for homogeneous land ( $n$ ):

$$P_1 = a_1 w + b_1 n \quad (1)$$

$$P_2 = a_2 w + b_2 n \quad (2)$$

Since workers receive a money wage equal to the value of their necessary consumption,

$$w = c_1 P_1 \quad (3)$$

and the equilibrium price equations may be rewritten:

$$P_1 = a_1 c_1 P_1 + b_1 n \quad (4)$$

$$P_2 = a_2 c_1 P_1 + b_2 n \quad (5)$$

These two equations in three variables ( $P_1, P_2, n$ ) enable a determination of the real rate of rents ( $n/P_1, n/P_2$ ) and relative commodity prices ( $P_1/P_2$ ).

From equation (4),

$$n/P_1 = (1 - a_1 c_1)/b_1 \quad (6)$$

From equation (5),

$$P_2/P_1 = a_2 c_1 + b_2 (n/P_1) \quad (7)$$

Substituting equation (6) into equation (7) and rearranging:

$$P_1/P_2 = b_1/a_2b_1c_1 + b_2(1-a_1c_1) \quad (8)$$

$$= b_1/[b_2 + b_1b_2c_1[(a_2/b_2) - (a_1/b_1)]] \quad (9)$$

From equations (6) and (9),

$$n/P_2 = (n/P_1)(P_1/P_2) \quad (10)$$

$$= (1-a_1c_1)/[b_2 + b_1b_2c_1[(a_2/b_2) - (a_1/b_1)]] \quad (11)$$

The economic meaningfulness of equations (6) to (11) requires that  $a_1c_1$  be less than unity, or

$$c_1 < 1/a_1 \quad (12)$$

This is equivalent to assuming that necessary labour consumption for the production of a unit of necessities is less than one unit, so that a positive surplus is available to be distributed as rents. Further, as the substitution of equation (3) into equations (1) and (2) indicates - generating equations (4) and (5) - in a sense labour input to the production process can be reduced to commodity input.

Turning from distribution and value to outputs and employment, the aggregate quantity of land available to the economic system (owned by the landowners) is given ( $N$ ). This is available to produce some aggregate quantities ( $X_1, X_2$ ) of the necessity and the luxury respectively, with the application of the available aggregate workforce ( $L$ ). Cantillon recognizes two constraints upon  $X_1, X_2$ . First and most obviously, output is constrained by the available quantity of land (*the land constraint*):

$$b_1X_1 + b_2X_2 \leq N \quad (13)$$

$$X_2 \leq (N/b_2) - (b_1/b_2)X_1 \quad (14)$$

In other words, production of  $X_1, X_2$  cannot utilize more land than is available. Second, whatever quantities  $X_1, X_2$  the system produces, there must be sufficient of the necessity produced to meet the subsistence consumption requirements of the total workforce employed in production of  $X_1, X_2$  (*the subsistence constraint*):

$$c_1(a_1X_1 + a_2X_2) \leq X_1 \quad (15)$$

$$X_2 \leq [(1-a_1c_1)/a_2c_1]X_1 \quad (16)$$

This obliges the landowners to keep the workforce alive. Inequality (16) is akin to an input-output (Leontief inverse) multiplier, which shows the 'induced' demand for the necessity arising from autonomous demand for the luxury. Consider the limiting case in which landowners do not consume the necessity. Then, the subsistence constraint becomes

$$X_2 = [(1-a_1c_1)/a_2c_1]X_1 \quad (17)$$

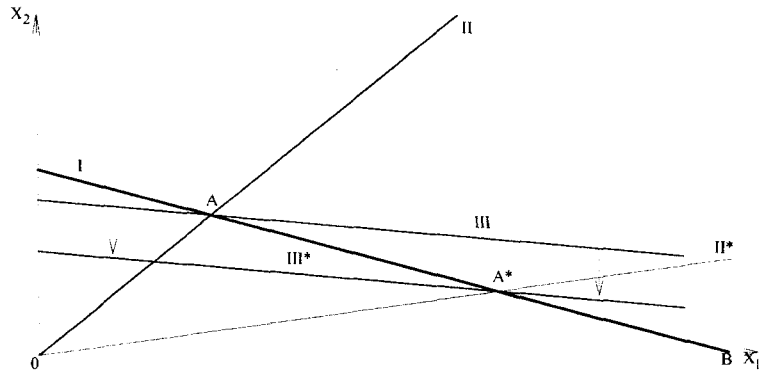
$$X_1 = [a_2c_1/(1-a_1c_1)]X_2 \quad (18)$$

where  $c_1a_2X_2$  is the necessary consumption of the labour *directly* required to produce  $X_2$ ; and  $[1/(1-a_1c_1)]$  accounts also for the necessary consumption requirements of the *indirect* labour required - due to the fact that while the  $a_2X_2$  labourers are producing the luxury, other labourers must be producing a surplus of the necessity to sustain them. The direct and indirect consumption requirement of labour, arising from production and consumption of one unit of the luxury, is  $[c_1a_2/(1-a_1c_1)]$ .

The manner in which these two principles act to constrain production and consumption possibilities can be more readily seen with the aid of a diagram (Figure 1). Function I is the land constraint, showing the feasible set of outputs  $X_1, X_2$  which the available quantity of land allows. The subsistence constraint says that output also must lie on or to the right of function II, ensuring that the workforce producing  $X_1, X_2$  is sustained. (Points on function II show, for any given level of the luxury consumed by the landowners, the quantity of the necessity required for the associated direct and indirect workforce.) Up to this point therefore, it can be concluded that Cantillon's principles constrain the system's outputs to the region OAB, including its boundaries. If the system were on the line segment OA, landowners are consuming only the luxury and available land ( $N$ ) is not being fully utilized in production of  $X_1, X_2$  (except at A). If the system were on AB, landowners are consuming both commodities (except at A) and  $N$  is fully utilized for those purposes. If the system were on OB, only the necessity is being produced and consumed. Within OAB landowners are consuming both commodities and land is not being fully

utilized in production of  $X_1, X_2$ . How much more determinate a theory of output as a whole can be found in Cantillon is taken up below.

FIGURE 1  
 $a_1/b_1 < a_2/b_2 (a_1/a_2 < b_1/b_2)$



What of the determinacy of aggregate employment? In Cantillon, labour (and indeed, population) is like a produced commodity: so far as subsistence (the 'input') is provided, labour/population (the 'output') is generated or sustained. This is a mechanism in which society's population size is regulated by the fund of subsistence goods made available via the landowners' willingness collectively to allocate land to that purpose. Elsewhere the present writer has presented an interpretation of the determination of population and employment in Cantillon's system (Aspromourgos 1989: esp. 360-63) - though without paying much attention to the relation between real wages and employment. That interpretation may briefly be restated.

In this interpretation, Cantillon's point of departure is the proposition that population ( $P$ ) is regulated by the proportion ( $k$ ) of society's available homogeneous land ( $N$ ) which is allocated to production of

necessities, by the collective outcome of the landowners' decisions concerning land use - together with the quantity of necessities produced per unit of land ( $1/b_1$ ) and the level of homogeneous subsistence consumption ( $c_1$ ):

$$P = (1/b_1)kN/c_1 \quad (19)$$

Population adjusts to the 'fund' of land available to produce subsistence ( $kN$ ), the land's productiveness in generating necessities ( $1/b_1$ ), and the level of necessary consumption per capita ( $c_1$ ). The proportion of land available for production of subsistence is supposed exogenously given, subject to certain qualifications indicated below. Furthermore, the workforce ( $L$ ) is assumed to be an exogenously given proportion ( $m$ ) of total population. Hence employment is given by

$$L = mP \quad (20)$$

$$= m(1/b_1)kN/c_1 \quad (21)$$

and employment is unambiguously a negative function of the real wage, which is supposed equal to  $c_1$ :

$$\partial L / \partial c_1 = -m(1/b_1)kN/c_1^2 \quad (22)$$

The fixed 'real wages fund' ( $mkN/b_1$ ) means that the relation between real wages and employment is a rectangular hyperbola.<sup>1</sup>

One qualification to the exogeneity of  $k$  may be noted. In the *Essai* Cantillon also presents a treatment of 'surplus labour', understood as society's total employment net of the quantity of employment ( $L_1$ ) required to produce the subsistence consumption of the total population. With  $a_1$  the labour input required to produce a unit of necessity output,

$$L_1 = a_1 c_1 P \quad (23)$$

Substituting equation (20) into equation (23):

$$L_1 = a_1 c_1 L / m \quad (24)$$

and surplus labour ( $L - L_1$ ) is positive on the supposition that

1. This makes clear, if it were not already, that this inverse relation between real wages and employment has no kinship with the marginalist treatment of labour demand and factor prices. The latter in any case requires multiple available methods of production and substitutability, both of which here are excluded by assumption.

$$a_1 c_1 < m \quad (25)$$

This assumption is perhaps most intuitively understood by noting that it is equivalent to requiring that the proportion of necessity output which is 'surplus'  $(1-a_1 c_1)$ ,<sup>2</sup> exceed the proportion of the population which is non-working  $(1-m)$ , so that surplus necessity output is not fully exhausted in meeting the subsistence of non-workers: some necessity output is left over to 'fund' employment in other, non-subsistence activities. Now, in general the values taken by  $a_1 c_1$  and  $m$  constrain the values which can be taken by  $k$ , if the economic system is to be viable. If some land  $[(1-k)N]$  is allocated to purposes other than production of necessities, then in general some labour also will have to be allocated to non-necessary purposes. Given the average labour-land ratio ( $q$ ) in non-necessary uses of land - and assuming that, *in some sense*, all land is 'employed' (more on this below) - the quantity of labour employed on surplus land ( $L_{2N}$ ) is given by

$$L_{2N} = q(1-k)N \quad (26)$$

The quantity of surplus labour available is given by

$$L - L_1 = (m - a_1 c_1)P \quad (27)$$

$$= (m - a_1 c_1)(kN/b_1 c_1) \quad (28)$$

Clearly, viable allocations of labour must satisfy

$$L - L_1 \geq L_{2N} \quad (29)$$

$$(m - a_1 c_1)(kN/b_1 c_1) \geq q(1-k)N \quad (30)$$

It best captures Cantillon's intention to interpret this as constraining the value of  $k$ , with all the other variables determined exogenously to this inequality:

$$q / \{q + [(m - a_1 c_1) / b_1 c_1]\} \leq k \leq 1 \quad (31)$$

where the term on the L.H.S. of the first inequality is necessarily positive and less than unity. Rather than exploring all aspects of this constraint, just two points may be noted. (1) The larger the quantity of surplus labour per head of population  $(m - a_1 c_1)$ , the greater the scope for the quantity of

2. The production of  $X_1$  units of necessity output requires  $a_1 X_1$  labour input whose own subsistence requirements are  $c_1 a_1 X_1$ ; so that the proportion of necessity output which is surplus to that sector, is

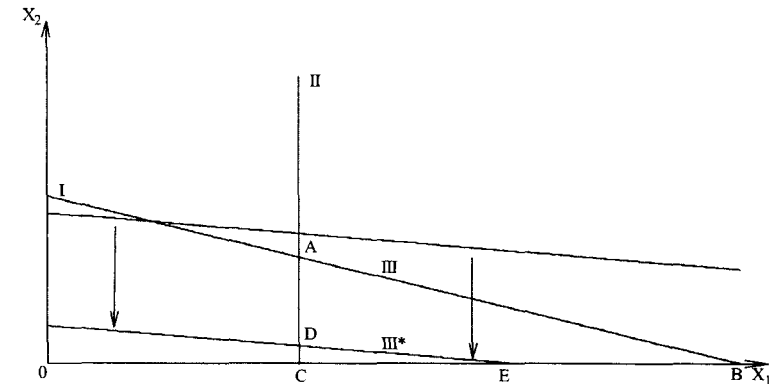
$$(X_1 - c_1 a_1 X_1) / X_1 = 1 - a_1 c_1.$$

land devoted to subsistence production ( $k$ ) to vary below unity. (2) If  $k$  exceeds the first term in inequality (31), then there is surplus labour over and above that employed on surplus land (e.g., available for employment in manufacture or transport).

Imposing this wages fund principle alters the character of the subsistence constraint, or at least makes its content more explicit and particular. Since population and the workforce are now determined, this constraint becomes

$$X_1 \geq (1/b_1) kN \quad (15A)$$

FIGURE 2



At least sufficient necessities must be produced to meet the subsistence requirements of the exogenously determined population. The diagrammatic representation of Cantillon's two principles also changes (Figure 2). While the land constraint is unaffected (I), the subsistence constraint becomes a given (minimum) quantity  $X_1$ , which must be produced, irrespective of the magnitude of  $X_2$  (II). The system's aggregate outputs  $X_1, X_2$  must lie in the region ABC. If on AC, no excess of  $X_1$  over total social subsistence is produced, and land is not fully utilized in production of  $X_1, X_2$  (except at A). If on AB, land is fully utilized in production of  $X_1, X_2$  and a social surplus



consisting of quantities of both the necessity and the luxury is produced (except at A). If on CB, only the necessity is produced, and land is not fully utilized in this purpose (except at B). Within ABC, landowners are consuming a social surplus of both commodities and land is not fully utilized in this production. To this construction may be added a third function (*the employment constraint*). Given the wages fund principle, the available workforce is determined and this imposes a third constraint upon the system's output of  $X_1, X_2$ :

$$a_1X_1 + a_2X_2 \leq m(1/b_1) kN/c_1 \quad (32)$$

$$X_2 \leq [m(1/b_1)kN/a_2c_1] - (a_1/a_2) X_1 \quad (33)$$

The labour allocated to production of  $X_1, X_2$  cannot exceed the available workforce, represented by function III in Figure 2.

Three further comments may be made upon the resulting complete construction. (i) Under our assumptions an economically meaningful feasible region for  $X_1, X_2$  always exists. This is so because so long as the proportion of land allocated to subsistence ( $k$ ) is less than unity, the intercept of II ( $kN/b_1$ ) is always to the left of the  $X_1$ -axis intercept of both I ( $N/b_1$ ) and III [ $(m/a_1c_1) (kN/b_1)$ , where  $m > a_1c_1$  - see ineq. 25]. The former relation simply means that surplus land is available by assumption; the latter relation, that surplus labour - in excess of that required to meet the subsistence consumption of nonworker population - is also available, and also by assumption. (ii) On the other hand, function I may be within or outside function III - and I may intersect III from above below.<sup>3</sup> To

3. With respect to  $X_1$ -axis intercepts, since  $k \leq 1$ , and  $a_1c_1 < m$ , then

$$k(N/b_1) \leq (N/b_1)$$

$$k(N/b_1) < (m/a_1c_1) k (N/b_1).$$

On the other hand, since  $(m/a_1c_1) k \gtrless 1$ , then

$$(m/a_1c_1) k (N/b_1) \gtrless (N/b_1)$$

With respect to slopes,

illustrate, in the simulation presented in Figure 2, the particular configuration of parameter values means that the workforce is *incapable* of being fully employed (efficiently) in production of  $X_1, X_2$ : to the right of II, the employment constraint is entirely outside the land constraint. If labour is not to be idle, it must be employed in some other activity. (iii) While in this construction, via determinacy of population and employment, the quantity of social subsistence output has become determinate, aggregate outputs as a whole are as much indeterminate as in our earlier analysis (ineqs. 13-16; Figure 1). Necessary output is determinate but *surplus* outputs remain indeterminate, though (for  $X_1, X_2$ ) constrained to ABC.

Finally, how is a rise in the real wage (necessary consumption per capita) to be interpreted in this model of Cantillon's system? Suppose the real wage is given initially, at the value associated with III and feasible region ABC in Figure 2. Then the real wage rises. The land constraint (I) is unaffected - and, so long as the landowners decline collectively to change (increase) the proportion of society's land devoted to production of subsistence ( $k$ ), the subsistence constraint (II) is also unaffected. Hence, population and employment must decline, with III shifting to III\* and the feasible region contracting to CDE. The landowners' surplus consumption possibilities are reduced - and even if they were initially consuming a necessity/luxury combination *within* CDE (and choose to maintain this combination after  $c_1$  rises), the labour available for other surplus purposes will have declined. (Note that the particular configuration of parameter values represented in Figure 2 means that at the higher real wage,  $c_1^*$ , III\* lies entirely inside I; so that, so long as  $k$  is unchanged, the stock of land is *incapable* of being fully employed in production of  $X_1, X_2$  - even if the total

$$a_1/a_2 \gtrless b_1/b_2$$

$$a_1/b_1 \gtrless a_2/b_2$$

The relation between slopes depends upon the relation between labour-land ratios in the production of  $X_1$  and  $X_2$  respectively.

workforce is so employed: some land must be idle, or otherwise employed, perhaps without labour.)

On the other hand, Brems's interpretation of Cantillon on real wages, mentioned at the beginning of this article, is different. His model in fact is Figure 1 (though he does not use this diagram), with two additional restrictions: landowners consume only the luxury; and land is fully employed in production of  $X_1$ ,  $X_2$ . The former restriction replaces ineq. (15) with eq. (18); the latter replaces ineq. (14) with

$$X_2 = (N/b_2) - (b_1/b_2)X_1 \quad (34)$$

Hence Cantillon's system is supposed to generate a *unique* equilibrium solution for aggregate outputs, given by the simultaneous solution of eqs. (18), (34). Diagrammatically, this is point A in Figure 1.<sup>4</sup> If the same rise in the real wage as is presented in Figure 2 is applied to Figure 1, function II pivots downward around the origin to II\* - and the supposed unique equilibrium shifts to A\*. The impact on employment may be illustrated diagrammatically by an *employment function* wherein all labour is employed in production of  $X_1$ ,  $X_2$ :

$$a_1X_1 + a_2X_2 = L \quad (35)$$

$$X_2 = (L/a_2) - (a_1/a_2)X_1 \quad (36)$$

This shows the  $X_1$ ,  $X_2$  combinations which can be produced with any given  $L$ ; or alternatively, as here, the employment associated with any particular  $X_1$ ,  $X_2$ . The relative positions of this function through points A and A\* in Figure 1 indicate that  $L$  indeed has fallen with a rise in  $c_1$  to  $c_1^*$ , in Brems's interpretation (III to III\*). But this result does not hold in general in his model, as will be seen in section 3 below. Before turning to resolve these matters, we present Cantillon in his own words.

## 2. Cantillon in His Own Words

4. See also the Appendix below. To facilitate comparison, symbols employed here and throughout are the same as those employed by Brems, in all possible cases. But Brems identifies population with employment, though in any case, adhering to Cantillon's doctrine that employment/population is endogenously determined.

The *Essai* opens with a portrayal of land ownership in any society as necessarily being limited to a relative few (E:3-7; also 31,45).<sup>5</sup> Cantillon's fundamental class categories are landowners, hired labourers and entrepreneurs - the latter genus having as a leading species, farmers (E:47-57). It is a recurring theme of the *Essai* that landowners constitute a uniquely 'independent' class, economically and socially. This independence is manifest in a variety of forms. For example, with respect to consumption propensities, landowners are

...the principal Agent in the changes which may occur in demand.

Labourers and Mechanicks who live from day to day change their mode of living only from necessity. If a few Farmers, Master Craftsmen or other Undertakers<sup>6</sup> in easy circumstances vary their expense and consumption they always take as their model the Lords and Owners of the Land. They imitate them in their Clothing, Meals, and mode of life (E:63; also 93,97,103).

For our purposes here, the most important dimension of this independence or autonomy is the capacity of the landowning class in large measure to freely determine the proportion of society's land devoted to production of subsistence for the population:

I ... lay it down as a principle that the Proprietors of Land alone are naturally independent in a State: that all the other Classes are dependent whether Undertakers or hired... (E:57; also 43,55). If a Lord or Owner who has let out all his lands to farm, take the fancy to change considerably his mode of living; if for instance he decreases the number of his domestic servants and increases the number of his Horses: not only will his Servants be forced to leave the Estate in question but also a proportionate number of Artisans and of Labourers who worked to maintain them. The portion of land which

5. Here and below Cantillon (1931 [1755]) is cited in the text as E, with quotations and relevant page numbers from the Higgs translation.

6. This term is Higgs's translation of *Entrepreneurs*.

was used to maintain these Inhabitants will be laid down to grass for the new Horses, and if all Landowners in a State did the like they would soon increase the number of Horses and diminish the number of Men (E:63-65; also 47).

Hence the landowners' consumption propensities, in regulating the proportion of land available for subsistence, regulates population and employment:

If the Proprietors of Land had at heart the increase of Population, if they encouraged the Peasants to marry young and bring up Children by promising to provide them with Subsistence, devoting their Land entirely to that purpose, they would doubtless increase the Population up to the point which the Land could support [eq. (19) above, with  $k=1$ ], according to the produce they allotted for each person whether an Acre and a Half or Four to Five Acres a head [ $b, c$ , in eq. (19)].

But if instead of that the Prince<sup>7</sup>, or the Proprietors of Land, cause the Land to be used for other purposes than the upkeep of the People [ $k < 1$  in eq. (19)]: if by the Prices they offer in the Market for produce and Merchandise they determine the Farmers to employ the Land for other purposes than the Maintenance of Man ... the People will necessarily diminish in number. Some will be forced to leave the country for lack of employment, others not seeing the necessary means of raising Children, will not marry or will only marry late ... (E:73).

The more Horses there are in a State the less food will remain for the People. The upkeep of Carriage horses, Hunters, or Chargers, often takes three or four Acres of Land.

...[And] when the Nobility and Proprietors of Land draw from Foreign Manufacturers their Cloths, Silks, Laces, etc. and pay for them by sending to the Foreigner their native produce they diminish

7. The monarch, in effect, is the leading landowner - as well as (ultimately) commanding the tax revenues.

extraordinarily the food of the People and increase that of Foreigners ... (E:75).

Also, the lower the quantity of land required to produce per capita subsistence ( $b, c$ ), the higher population:

The Increase of Population can be carried furthest in the Countries where the people are content to live the most poorly and to consume the least produce of the soil [ $c$ , lower]. In Countries where all the Peasants and Labourers are accustomed to eat Meat and drink Wine, Beer, etc. so many Inhabitants cannot be supported (E:83).

It is ... a question outside of my subject whether it is better to have a great multitude of Inhabitants, poor and badly provided, than a smaller number, much more at their ease: a million who consume the produce of 6 acres per head or 4 millions who live on the produce of an Acre and a half [ $b, c$ , lower] (E:85).<sup>8</sup>

These propositions and arguments by Cantillon add up to a clear statement that available subsistence output is regulated by the quantity (N) and quality (b,) of society's land, together with exogenously given landowners' consumption propensities manifest in the proportion of land left available for provision of the population's subsistence (k). These parameters then determine population and employment as negative functions of subsistence per capita (c). Cantillon's position is a clear form of wages (or subsistence) fund doctrine. The qualification to the exogeneity of k which was formally examined in the previous section (ineq. 31) is of course not understood by Cantillon in those formal terms; but he certainly grasped the underlying principle:

As for the use to which the Land should be put, *the first necessity is to employ part of it for the Maintenance and Food of those*

8. For further discussion by Cantillon of the relations between population (employment), land available to produce subsistence, and per capita subsistence consumption, see E:65-85, 91, 93-95, 225-35.

*who work upon it and make it productive*: the rest depends principally upon the Humour and Fashion of Living of the Prince, the Lords, and the Owner: if these are fond of drink, vines must be cultivated; if they are fond of silks, mulberry-trees must be planted and silkworms raised, *and moreover part of the Land must be employed to support those needed for these labours*; if they delight in horses, pasture is needed, and so on (E:7; emphasis added; also 33-35, 59-61).

This is as well a clear enough statement of what, in section 1 above, was called the subsistence constraint - with the indirect land (and implicitly, labour) requirements taken into account. Finally, given the determination of population, Cantillon treats the labour force as a given proportion of population ( $m$  in eq. 21 above), determined by demographic and socio-economic factors:

It may be assumed that a good third of the People of a State are too young or too old for daily work and that another sixth are Proprietors of Land, Sick, or Undertakers of different sorts who do not by the Labour of their hands, contribute to the different needs of Men. That makes half the People without work, or at least without the work in question (E:87).

However there remains a serious conceptual problem with regard to Cantillon's theory of employment. On the one hand, Cantillon proposes a mechanism running from land available to produce subsistence, to population and employment, as shown above. On the other, he also argues that labour supply adjusts to labour demand (similar to the adjustment of commodity supply to commodity demand in Cantillon):

*The Number of Labourers, Handicraftsmen and others, who work in a State is naturally proportioned to the Demand for them.*

If all the Labourers in a Village breed up several Sons to the same work there will be too many Labourers to cultivate the Lands belonging to the Village, and the surplus Adults must go to seek a

livelihood elsewhere, which they generally do in Cities: if some remain with their Fathers, as they will not all find sufficient employment they will live in great poverty and will not marry for lack of means to bring up children, or if they marry, the children who come will soon die of starvation with their Parents, as we see every day in France (E:23).

...[When labourers and handicraftsmen] have no work they quit the Villages, Towns or Cities where they live in such numbers that those who remain are always proportioned to the employment which suffices to maintain them; when there is a continuous increase of work there is gain to be made and enough others arrive to share in it (E:25; also 53).

The difficulty is that these two principles do not appear to be reconciled by Cantillon. The obstacles to doing so can be seen via a thought experiment. Suppose the system given by equations and inequalities (19) to (31) above is initially in equilibrium - such that output demands and supplies, employment and labour available, are in balance (at some point in region ABC of Figure 2) - and then is subjected to a rise in subsistence per capita.<sup>9</sup> With  $m$ ,  $b$ ,  $k$ ,  $N$  given, population and employment fall; but since the quantity of subsistence output produced is unchanged, so too is the quantity of labour devoted to subsistence production ( $L_s$ ). It follows that the quantity of labour available for use in the sum of all other activities ( $L - L_s$ ) falls. In the absence of labour unemployment (as implied by the above adjustment process of labour supply to labour demand) - or migration (E:163-65) - the scale and composition of non-subsistence production somehow has to adjust; which appears quite inconsistent with the apparent autonomy of landowners' demand for surplus outputs and labour.

### 3. A (Partial) Resolution: the Significance of Land Utilization

9. It may be noted here that for Cantillon subsistence is both customary (conventional) and multiple, differing for different categories of labour (E:33-43, 67-71, 77-85).

The tension, if not contradiction, which requires resolution is this:

How - at one and the same time - is employment to be determined by

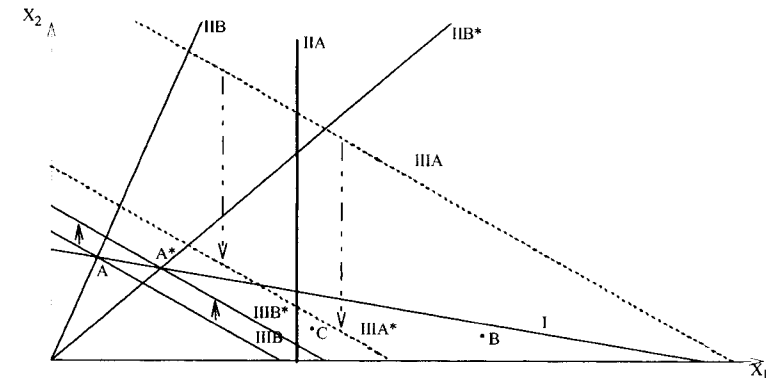
- the 'land fund' made available for provision of social subsistence (in effect,  $L$  determined by  $k$ , given  $b_1, c_1, m, N$ ); and
- by labour demand, in a manner similar to that in which commodity outputs are supposed to be determined by commodity demands?

Before presenting our own reconciliation, Brems's overall interpretation - and implicit resolution of this issue - may briefly be explained and made explicit.

Brems's model (validly) generates a result, that the relation between the real wage and aggregate employment is ambiguous, depending upon the relation between labour-land ratios in the production of the necessity and the luxury respectively ( $a_1/b_1, a_2/b_2$ ). If this model *were* true to Cantillon's intentions, it then would show that his wages fund doctrine and inverse relation between wages and employment do *not* follow from his economics. In the illustration of Brems's interpretation already discussed (section 1, Figure 1) a rise of  $c_1$  does lead to a fall in  $L$ . But this is only because that illustration assumes that the luxury is relatively labour-intensive ( $a_1/b_1 < a_2/b_2$ ). Diagrammatically, this is embodied in the fact that the employment function (III) is flatter than the land constraint; so that a shift along the land constraint, from  $A$  to  $A^*$ , must shift III towards the origin. In the instance of the Brems model illustrated in Figure 3 - with the *necessity* assumed labour-intensive ( $a_1/b_1 > a_2/b_2$ ) - a rise of  $c_1$  shifts the equilibrium similarly from  $A$  to  $A^*$  but employment *rises*. The fact that the employment function is steeper than the land constraint means that this shift must shift the former *away* from the origin (IIIB to IIIB\*). The economic logic behind this ambiguous relation between  $c_1$  and  $L$  can be stated fairly straightforwardly, in four steps. Recall that in Brems's conception of Cantillon's system,  $N$  is fully employed in production of  $X_1, X_2$ , labourers consume only the necessity, and landowners consume only the luxury - hence the unique equilibrium at the intersection of  $I$  and  $II$ . A rise

FIGURE 3

$$a_1/b_1 > a_2/b_2 \quad (a_1/a_2 > b_1/b_2)$$



of  $c_1$ , first, causes the real rate of rents ( $n/P_2$  in eq. 11 above) to fall. Second, with all land rented, the purchasing power of aggregate rents - and so, demand and output of the luxury - decline. Third, the composition of the equilibrium output of fully employed land shifts away from the luxury and in favour of the necessity (as is evident diagrammatically in both Figures 1 and 3). Will this reduce or increase employment? This is the fourth and quite intuitive step: if the luxury is labour-intensive,  $L$  will fall (Figure 1); if the necessity is labour-intensive,  $L$  will rise (Figure 3).<sup>10</sup> At this point it may simply be added that in Brems's interpretation, the proportion of land allocated to social subsistence ( $k$ ) is the *antithesis* of an exogenous variable under the control of the landowning class (subject to constraints). It is strictly endogenously determined:

10. The case of ( $a_1/b_1$ ) equals ( $a_2/b_2$ ) may be excluded on the basis that it is incompatible with the necessity and luxury being distinct commodities. Combining land and labour in the same proportions (and over the same time period) and producing qualitatively different commodities (also in general different in quantity) is an absurdity. Note also that in Brems's model, if it were allowed that labourers' subsistence included commodity 2 and landowners' consumption demand included commodity 1, the ambiguity would merely be compounded. In our model, since landowners are allowed to consume the necessity, as part of the surplus produced, this commodity is subsistence in one role and surplus in another.

$$k = b_1 X_1 / N \quad (37)$$

and  $X_1$  is fully determined by the four production coefficients and  $c_1$ . A rise of  $c_1$  necessarily increases equilibrium  $X_1$  and therefore increases  $k$  (though Brems does not make the  $k$  parameter explicit in his model.<sup>11</sup>)

All the formal constructions, in section 1 and here, have been merely groundwork for now addressing this fundamental issue of textual interpretation. Figure 3 also restates our interpretation of Cantillon: functions I, IIA and IIIA, with a feasible region for  $X_1, X_2$  bounded by the  $X_1$ -axis, I and IIA. To clarify the conditions under which labour supply adjusting to equality with labour demand, can be reconciled with the wages fund principle (and associated exogenous labour supply) in this framework, consider first Cantillon's characterization of a command economy. This arises in a remarkable passage in the *Essai* in which Cantillon, by way of a thought experiment, postulates the possible equivalence of distributive and allocative outcomes by command and by market exchange:

If the Owner of a large Estate (which I wish to consider here as if there were no other in the world) has it cultivated himself he will follow his Fancy in the use to which he will put it. ...

Let us now suppose that to avoid so much care and trouble he makes a bargain with the Overseers of the Labourers, gives them Farms ... and leaves to them the responsibility for maintaining in the usual manner all the Labourers they supervise ... [S]uppose further that the Owner ... fixes a common measure, like silver, to settle the price at which the Farmers will supply ... wool and ... [Master-Craftsmen] will supply ... cloth [and so on] ... We suppose then that after this change [to market exchange] all the people on this large Estate live just as they did before, and so all the portions

11. The proportion of available land allocated to subsistence has a slightly different meaning in Brems's construction and in our's: the former effectively draws no distinction between workforce and population (in our terms,  $m = 1$ , implicitly).

and Farms of this great Estate will be put to the same use as it formerly was (E:59-61).

In the case of one monolithic landowner in command of the entire economy, the reconciliation of Cantillon's two principles is not difficult. Under such conditions, with  $c_1$  given, the single landowner's decision to allocate land to social subsistence (determining  $k$ ), and the single landowner's decision to demand a particular surplus of  $X_1, X_2$ , plus land and labour devoted to other activities, are united in one and the same decision. The wages (or population) fund is *codetermined* with demand for  $(X_1 - c_1 P), X_2$ , and  $[N - (b_1 X_1 + b_2 X_2)]$ ,  $[L - (a_1 X_1 + a_2 X_2)]$  for *other* surplus uses. To illustrate, suppose the monolithic landowner has chosen point B in Figure 3. Then period after period, the following will occur. Landowner demands a surplus of (90, 30) units of  $(X_1, X_2)$ . This demand is given effect by allocating 360 units of available land ( $0.36 \times 1,000$ ) to production of social subsistence, the resulting 120 units of  $X_1$  being associated with reproduction of a population of 600 ( $120/0.2$ ) and workforce of 348 ( $0.58 \times 600$ ). Two hundred and ten labourers ( $1 \times 210$ ) and 630 units of land ( $3 \times 210$ ) are allocated to production of 210 units of  $X_1$  (120 subsistence, 90 surplus); 30 labourers ( $1 \times 30$ ) and 300 units of land ( $10 \times 30$ ), to production of 30 units of  $X_2$  surplus. The induced demand for subsistence by the workforce and larger population is satisfied, and there remain 108 workers and 70 units of land for other surplus activities. This third class of activities, 'other surplus activities' - when labour-utilizing, with or without direct land input - may generically be described as 'retainers' of the landowner; e.g., servants-in-waiting, gardeners, game-keepers, militia, and so on. When such activities are land-utilizing without labour input, they may generically be described as 'wilderness'. The latter may alternatively be named 'idleness'.<sup>12</sup>

12. In the context here, it would be merely semantic to enquire whether or not idleness is an activity. As long as there are at least two distinct activities within the third class, involving distinct labour-land ratios, there is always some combination of such activities which 'fully employs' available land and labour. To take a simple example, suppose one unit of wilderness output requires simply one unit of land so allocated; and one unit of servant output requires simply one labourer so allocated; and that these two are the only outputs in the third class. Then output of 70 units of wilderness and 108 servants will satisfy full 'employment' of all land and labour. Codeterminate with the landowner's

What then happens in the command case when real wages rise?

Even given the degrees of freedom open to the landowner in our formulation of Cantillon's system, what is certain is that the landowner's consumption possibilities are reduced. So long as  $k$  remains unchanged, the quantity of surplus labour available necessarily falls; if  $k$  rises in reaction, the quantity of surplus land available falls. It follows that the landowner must react in some manner to a rise of  $c_1$ . In the illustration in Figure 3, with a rise of  $c_1$  to  $c_1^*$ , the surplus of  $X_1, X_2$  associated with point B ceases to be feasible, so long as  $k$  is unchanged. The constraints have so tightened (to the area bounded by the  $X_1$ -axis, IIA and IIIA\*, given  $k$ ) that  $X_1, X_2$  must adjust. While a rise in  $k$  offers some measure of an alternative by restoring surplus labour - though at the cost of reducing surplus land available (*vide* Appendix below) - *Cantillon never explicitly entertains this possibility; indeed, he does not address the necessity for landowners to react to a higher  $c_1$  at all.* In this instance, Cantillon's notion of the landowners' autonomy may have blinded him to a significant issue arising out of his economics. The only escape from this particular textual difficulty seems to be to suppose that the third class of activities constitutes a kind of residual activity, concerning which landowners are more or less indifferent - and that rises of  $c_1$  do no more than reduce the residual labour in this sector. That is to say, rises of  $c_1$  are not so drastic as to render the initial  $X_1, X_2$  surplus nonviable; and therefore, may be met, with  $k$  unchanged, by reductions in 'retainers' - a kind of 'unlimited supplies of retainers' argument, a reduction in whose number can absorb the shock of a higher real wage. (For visual purposes the simulation in Figure 3 involves a huge rise of  $c_1$ .) But it must be stressed that Cantillon never puts such an argument: this is simply offered as an explicit (though speculative) rationale for making sense of what his text does not do.<sup>13</sup> Nevertheless, in

demand for a surplus of ( $X_1, X_2$ , wilderness, servants) of (90, 30, 70, 108), is an allocation of 36 percent ( $k$ ) of land to social subsistence.

13. On the other hand, Cantillon's characterization of the response of  $L$  to a change in  $k$  given  $c_1$ , is entirely unproblematic in the command economy case. If, for example, the

his discussion of the quantity of surplus labour available in France Cantillon certainly makes it appear to be a residual for which useful activities have to be found (E:87-95); for example:

If enough employment cannot be found to occupy the 25 [surplus] persons in a hundred upon work useful and profitable to the State, I see no objection to encouraging employment which serves only for amusement or ornament. ... How little soever the labour of a Man supplies ornament or even amusement in a State it is worth while to encourage it unless the Man can find a way to employ himself usefully (E:91-93).

This discussion has a definite undertone of the retainers of the landowning class being understood as residual 'employment' which establishes a tendency to full labour 'employment' (i.e., *underemployment*).

Whatever minor difficulties may exist for the wages fund principle and real wage changes in the command economy case, the difficulties seriously deepen when one considers the market exchange economy case.<sup>14</sup> Now, the reconciliation of the wages fund principle with balancing of supplies and demands, requires some mechanism for ensuring that the proportion of total land which is marketed for rent by the landowners *will* actually be demanded, under conditions of decentralized exchange. Cantillon offers no such account of land supply and demand equilibration in exchange, simultaneous with equilibration of commodity and labour demands and supplies. One can pose the issue in hypothetico-deductive form: *if*, following a rise of  $c_1$ ; (i)  $k$  can remain invariant; and (ii) demands and supplies, including for marketed land, can re-equilibrate; *then* the

---

landowner's consumption choice changes in favour of more surplus land (say, parkland) and less surplus labour, there would be a change such as B to C in Figure 3 (and IIIA to IIIA\*): the reduction in employment may be reinterpreted as due to a fall of  $k$  from 0.36 to 0.18, with  $c_1$  given at 0.2 rather than rising to 0.4. (The new IIA, not illustrated, is  $X_1 \geq 60$ .) Land remaining available after production of  $X_1, X_2$  of 130,30 rises to 310 units; labour remaining available falls to 14 labourers.

14. The extension of the command economy case to command with many landowners adds nothing, unless the multiple command economies engage in exchange with each other - in which case, one would be considering just a particular instance of a decentralized exchange economy.

