TRANSPORT COSTS AND THEIR IMPACT ON TRAIDING TROUGH SIMULATIONS IN A SPECIFIED DORNBRUCH-FISCHER -SAMUELSON MODEL - 1977

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Abstract: *We propose here a brief presentation of the Ricardian model with continuum of goods known as the Dormbusch-Fischer-Samuelson-1997, by the name of the ones who created it. Starting from this theoretical base we will create numerous examples which will be made by an informatic program and we will concentrate over the impact on transport costs at countries levels .We want to measure the transport impact over the countries specializations and over the range of good trades.*

Keywords: *ricardian model whith continuum of goods, transport costs, specialisation, trading, numerical simulation*

A bfrief presentation of the model:

The ricardian model with continuum goods, D.F.S., means an extention mof the classic comparative advantage model, which Paul A. Samuelson was appreciating it like „the most beautiful idea from economical science."

D.F.S model shows the existence of two countries, which we will simbolize for simplification whith I.T.(internal country) and E.C. (external country),gifted whith only one production element(work), whoes offert is dessignated by L and L*.

Every country is able to produce and wastea big number of goods, any good beeing individualised by a symbol that belongs to the brake [0,1] and asking for for a specifical work measure, obviously different between countryes. For example, for good z, a(z) means the unit requirement of label în I.C., and a*(z) means the unit requirement of label în E.C. We can define like this a report like A(z)=a*(z)/a(z) meaning measuring ratio în I.C. comparing whith E.C.

$$A(0) \geq A(z) \geq A(1) \text{ şi } \frac{d}{dz} A(z) < 0$$

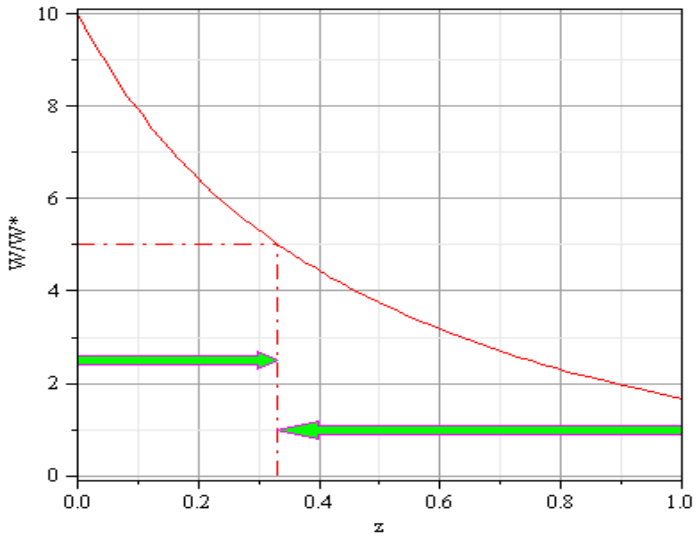
IN other order of meaning, using this dispose of goods în decreasing order, we make a hirachy based on comparative advantage of the I.C. We can diplay în graphic way the relationship between relative rate of wages or relative productivity and a specified good, showed by his index z, which can be found on A(z) curbe created by an infinity of goods, which will have a continuum and decreasing form.

The cost of production for a good z în I.C is Wa (z),W represent the wage în this country, în same time the same good will have a cost în E.C. W*a*(z),W*, beeing the wae în this country. Ny consequence the good z will be a little cheaper în beeing made în I.C., comparing E.C., if is fullfiled the inecuation:

Wa(z)<W*a*(z) or through modifications if W/W*<a*(z)/a(z) or A(z)>W/W*

This way, basing on A(z) curbe and rate of wage W/W* it can be stady the origin of specialisation of countryes for an infinity of goods. See figure 1.

Figura 1 Relatia dintre proportia salariala W/W*
si indicii bunurilor z



It will be a good(limit) z1 which the inecuation will become ecuation A(zl)=W/W* and wll generate all good shaving clues smaller than z1 to be made în I.C, and also,all the other goods whith clues bigger than z1 to be made în E.C.;see the arrows în fugure 1.

We presume that the measure of waste for purchasing a good has a constant wheigt în income,and by consequence we admit a wheigt b(z) from mondial income is spend on purchasing good z.

By consequence we are measuring the wheigt that is spend from mondial income for purchasing goods made în I.C., goods that will have smaller hierarchy of index than z1.The wheigt of modial income spent for all the goods made în I.C. will be:

$$G(zl)=b(1)+b(2)+b(3)\ldots\ldots\ldots+b(zl)=\int_0^{zl} b(z)\,dz$$

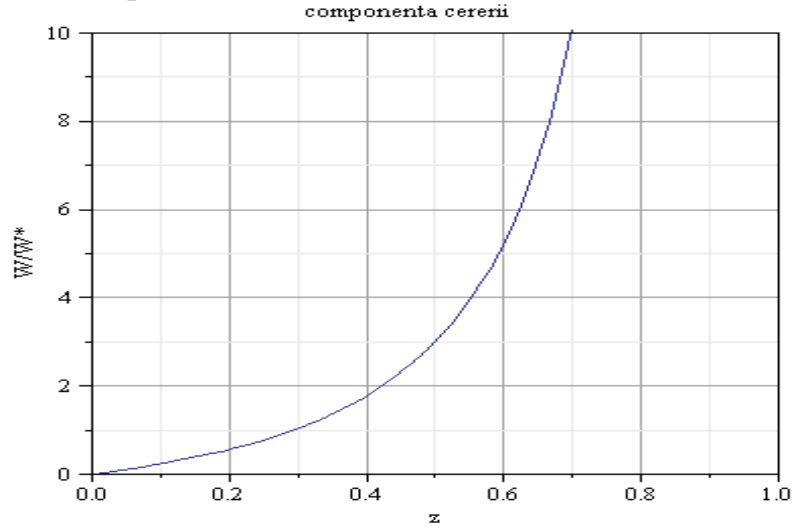
The total value of spending circumstance of goods purchase made în I. C. l will be G(z) multiplyed with mondial income, nut this is equal with the product between wage and the number of workers în this country,so we have: W L=G(zl) mindial income.

But mondial income were work is the only production factor is shown by the sum of income wages like this: mondial income = W L +W*L*

This way,prebvoius relation it retiped like : W L =G(zl)(W L+W*L*) sau prin rearanjari W/W*=B(zl)(L*/L), în care B(zl)=G(zl)/(1-G(zl)

This last relation shows that B(z1) will be bigger, when income will be smaller when z1 is rasing, în other meaning it will be a same way of modification between z1 and B(z).There will be more goods that I.C. will produce and waste and so E.C., as much as relative diment for work is bigger în I.C, which will be shown by a bigger rate of wage. We obtain a relationship between relativ rate of wage and indexes of goods, which grapich is shown în figure 2, showing the dimend composition în this model:

Figura 2 Relatia dintre salariul relativ si indicii bunurilor componenta cererii



From the turn of the two curbes it will apear a level of relative wage rate and a index of limit good,which will show the structure of goods made în I.C and E.C.

In terms of goods lines, the origin of specialisation is made for I.C. by A(z)>W/W*,when for E.C by A(z)<W/W*.

3) The introduction of transport costs

The introduction of transport costs în D>F>S model are achieved through the presumption that those are like „iceberg", meaning from a unit of good send just a fraction t(z) reaches effectively at his destination, the rest of it „melting" on his way. Also,we impose, the condition that the transport cost mesure is the same for all goods t(z)=t and it is independent of the goods flux between countryes.

In this situation, I.C. will produce and export these goods and the ecuation will be solved: $wa(z) \leq (1/t)w^*a^*(z)$ or that can be retiped like $w/w^* \leq A(z)/t$.

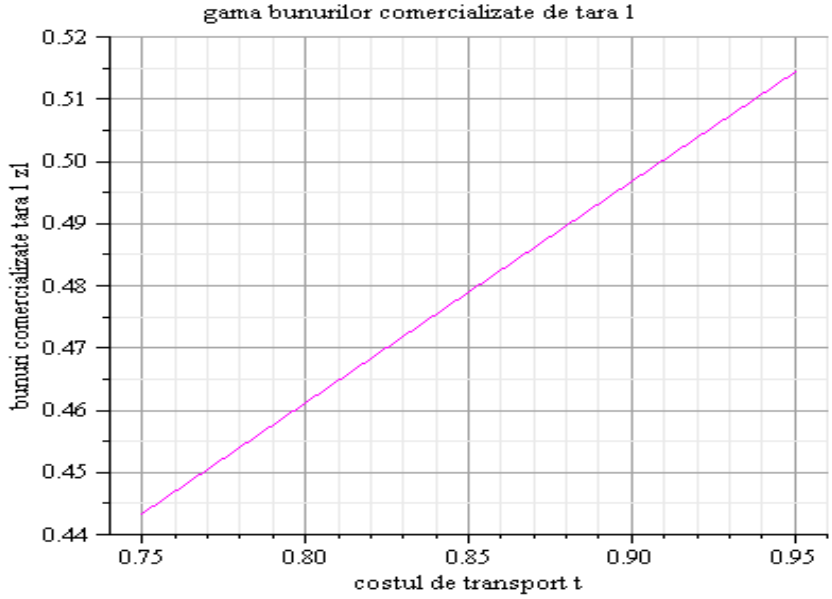
In mutual way, E.C. will make and export these goods which for the measure of unitary cost of work is smaller than the one of imported goods, respective when the inecuation will be solved: în figure three are reprezented A(z) curbes-interupted blue- adn A(z)/t-continuum red, depending on z and the relativ salary.

Figura 3 Impactul intoducerii costului de transport asupra bunurilor produse de tara interna

This way, for a relativ wage given, I.C. will produce and export all the goods sitated în the left side of A (z)/t curbe, arrow to right, both countryes will produce intermidiate goods, uncovered by arrows, and T.E.. will porduce and export the goods from the right side of A(z)/t, the arrow to left.

As the transport cost t is defined, as a fraction from a unit that reaches at destination, that means that the smaller the value of t is, the bigger the transport cost is, the good „melting" on his way, and figure 4 show the extension of comercialized goods.

Figura 4 Dependenta dintre costurile de transport si gama bunurilor comercializate de tara 1



4) Numerical simulation:

We can explain these function: : $A := \frac{c - d\,z1}{(e + f\,z1)\,t}$ $AA := \frac{(c - d\,z2)\,t}{e + f\,z2}$

$\lambda 1 := \int_{z1}^{1} b(z)\,dz$ $\lambda 2 := \int_{0}^{z2} b(z)\,dz$ $b(z) := 2 - 2\,z$

That keeps the properties given by the model which will permit the numerical simulations, for different mesures of the coefficients: c, d, e, f and of the parrameters L1, L2 and t.

This way, for c=10,d=5,e=1,f=2,L1=10, L2=10 and transport costs between 0.75 and 0.95 we obtain next origins of specialisations,see table nr 1.

Tabel Nr.1 Basic model

cost de transport	0.75	0.80	0.85	0.90	0.95
bunuri exportate de tara interna	0.44337	0.46117	0.47899	0.49671	0.51427
bunuri exportate de tara externa	0.79657	0.73479	0.67785	0.62528	0.57666

If we would record a growth on work ofert of I.C., presuptive L1=L2, all other measures remaining not changed we will obtain informations from table nr2.

Tabel Nr.2 A growth în work offert of I.C.

cost de transport	0.75	0.80	0.85	0.90	0.95
bunuri exportate de tara interna	0.41141	0.43058	0.44969	0.46864	0.48736
bunuri exportate de tara externa	0.76234	0.70230	0.64708	0.59622	0.54926

We can see smaller domains for commercialised goods by I.C., while the goods of E.C. are extending. If we would register a growth of work productivity,it would show a shorten of coefficient e and f,presumed to be e=0.75 şi f=1.5 în the condition of keeping to the other values constant, the informations beeing centralized în table three.

Tabel Nr.3:A growth of work productivity în I.C.

cost de transport	0.75	0.80	0.85	0.90	0.95
bunuri exportate de tara interna	0.49268	0.50837	0.52419	0.54003	0.55580
bunuri exportate de tara externa	0.84835	0.78421	0.72484	0.66983	0.61881

We can see the growth of exported goods by I.C. and a decrease of the exported goods domain by E.C. where work prouctivity is not modifies.

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