DISCUSSION PAPER SERIES

IZA DP No. 359

A Simple, Analytically Solvable Chamberlinian Agglomeration Model

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September 2001

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

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Discussion Paper No. 359
September 2001

IZA

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ABSTRACT

A Simple, Analytically Solvable Chamberlinian Agglomeration Model *

This paper presents a simple, analytically solvable Chamberlinian agglomeration model. As in the canonical core-periphery (CP) model, two agglomerative forces are at work. However, the present model exhibits a 'pitchfork bifurcation' rather than the 'tomahawk bifurcation' of the CP model.

JEL Classification: F12, F15, F22, R12

Keywords: Economic geography, agglomeration, human capital mobility

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* I would like to thank Andreas Haufler, Jörg Lingens and Jochen Michaelis for useful suggestions.

1. Introduction

The spatial aspects of the economy are at the heart of the 'new economic geography' which was launched with the seminal works by Krugman (1991), Krugman and Venables (1995) and Venables (1996). The analytical essence of the new economic geography is contained in the 'core-periphery (CP) model'.[1] This shows how the interactions among transport costs, increasing returns at the firm level, and supply and demand linkages shape and change the location of economic activity. In order to bring these interactions out clearly, this model is built around a set of simplifying assumptions which have become canonical (e.g. Chamberlinian monopolistic competition with Dixit-Stiglitz preferences, Cobb-Douglas upper-tier utility and iceberg transport costs). It has been perceived as a weakness that, these simplifications notwithstanding, only certain aspects of the CP model are analytically tractable. The model generally has to be solved by numerical simulation. This may be part of the reason why the analysis of the policy implications of the new economic geography, which would necessitate further complications of the model, is yet not fully developped. An analytically solvable case of the CP model has been worked out by Forslid (1999), however.[2] Due to its solvability, this model has proven useful for analyses in the field of capital and income tax competition (Andersson and Forslid, 1999; Baldwin and Krugman, 2000).

This paper presents an alternative model that can be solved analytically and is even simpler than the model of Forslid (1999). The gain in simplicity derives from the substitution of the Cobb-Douglas upper-tier utility with a quasi-linear function. With this modification, the two agglomerative forces contained in his model are still at work but the quasi-linear utility removes all income effects from the manufacturing sector, in which agglomerative forces appear. Moreover, the modified model has the surprising implication that, when transport costs are lowered, a different type of bifurcation arises. The CP model exhibits a 'tomahawk bifurcation'.[3] When transport costs are at a certain level (the sustain point), two stable fully agglomerative equilibria appear in addition to the initial symmetric equilibrium. At a still lower level of transport costs (the break point), the symmetric equilibrium becomes unstable. The model presented here exhibits a smooth 'pitchfork bifurcation'. At a certain level of transport costs, the initial symmetric equilibrium becomes unstable and two stable asymmetric

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[1] The core-periphery model is conveniently laid out in Fujita et. al (1999, Ch. 4 and Ch. 5) and elaborated on and critically assessed in Neary (2000) and Baldwin et.al. (2001).

[2] Solvable models departing from the CP model have also been provided by Baldwin (1999), who stresses factor accumulation and by Ottaviano and Thisse (1998), who work out a non-Chamberlinian setting.

[3] A simple introduction to bifurcations is provided in Fujita et. al. (1999, appx. to Ch. 3).

equilibria emerge which are increasingly asymmetric as transport costs are reduced further.[4] This feature may be a better description for some of the agglomerative processes that are initiated by economic integration (decreasing transport costs) than the 'catastrophic' emergence of complete agglomeration predicted by the CP model.

2. The Model

The model builds on Forslids adaptation of the CP model which achieves its solvability by assuming that the fixed cost in the manufacturing sector consists of a separate internationally mobile factor as in Flam and Helpman (1987). Here we combine this model with the assumption that the upper-tier utility is quasi-linear rather than Cobb-Douglas drawing on a widely used specification (e.g. Dixit, 1990, Ch.3).

The world is composed of two countries, home and foreign (denoted by an asterisk (*)), two factors of production, labor (L) and human capital (K), and two sectors, manufacturing (X) and agriculture (A). Labor is intersectorally mobile. Countries are assumed to have identical preferences, technology and trade costs. In the long-run, human capital is assumed to be mobile internationally, while labor is not. The agricultural good is homogeneous, traded without costs and produced perfectly competitively under constant returns with labor as the only input. This good is the numéraire and assumed to be produced in both countries after trade. The monopolistically competitive X sector employs both factors to produce differentiated goods with a linear cost function. Labor is the only variable input. Human capital enters only the fixed cost. One unit of it is needed (for R&D or headquarter services) to produce at all. Trade in X is inhibited by iceberg costs.

There are $L+K$ households, L laborers and K human capital owners each of whom supplies one unit of labor and human capital, respectively. Their wages are denoted by W and R, respectively. Each household's preferences are characterised by:[5]

$$U = a \ln C_X + C_A , \qquad C_X = \left(\int_0^N x_i^{\frac{s-1}{s}} + \int_N^{N^*} x_j^{\frac{s-1}{s}} \right)^{\frac{s}{s-1}} , \; a > 0 , \; s > 1 \tag{1}$$

[4] When production in the perfectly competitive outside sector takes place under decreasing rather than constant returns, a smooth pitchfork bifurcations is observed in the CP model, too (Fujita et. al., 1999, Ch. 14).

[5] Martin and Rogers (1995) and Pflüger (2001) use this preference specification in non-agglomeration contexts. A similar specification is used in Helpman and Krugman (1989, Ch. 7).

where C_X is the manufacturing aggregate, C_A is the consumption of the agricultural good, x_i (x_j) is the quantity consumed of a domestic variety i (foreign variety j), N and $N*$ are the number of varieties produced in home and foreign and s is the elasticity of substitution between manufacturing varieties. The budget constraint is given by

$$PC_X + C_A = Y, \qquad P = \left(NP_i^{1-s} + N*\left(tP_j\right)^{1-s}\right)^{\frac{1}{1-s}}, \qquad t > 1 \tag{2}$$

where Y denotes the household's income, P is the perfect CES-price index, P_i (P_j) is the price set by a domestic (foreign) firm. Iceberg transport costs are formalised by the constant t. These imply that only $1/t$ of a unit of a foreign variety arrives for consumption and that the consumer price of an imported variety is tP_j. Utility maximisation yields the demand functions and indirect utility, V:

$$C_X = aP^{-1}, \quad C_A = Y - a, \quad x_i = aP_i^{-s}P^{s-1}, \qquad x_j = a\left(tP_j\right)^{-s}P^{s-1} \tag{3}$$

$$V = -a\ lnP + Y + \left[a\left(ln\,a - 1\right)\right]. \tag{4}$$

Choosing units and letting L_A denote labour input, the production function of the agricultural good is $X_A = L_A$. Perfect competition ensures that this good is priced at marginal (which is also average) cost. Since this good is the numéraire, the wage rate is unity, $W = 1$.

Market clearing for domestic variety i is expressed by $X_i = (L+K)x_i + (L*+K*)tx_i^*$, where X_i is production and x_i^* is the demand of the foreign representative household. Part of demand is indirect, caused by transport losses. Each product type is supplied by a single firm. With $W = 1$ and the technology $L_i = cX_i$ ($c > 0$, a constant), the marginal cost is given by c. The fixed cost due to the requirement of one unit of human capital is given by R. Let the producer prices charged to domestic (foreign) households be denoted P_i (P_i^*). Profits of the representative firm in the home region, P_i, are then given by:

$$P_i = (P_i - c)(L+K)x_i + (P_i* - c)(L*+K*)tx_i^* - R \tag{5}$$

With the Chamberlinian large group assumption, profit maximising prices are constant markups on marginal costs:

$$P_i = P_i^* = cs/(s-1) \tag{6}$$

The compensation of human capital adjusts so as to ensure zero profit equilibrium. Using the market clearing condition, a relationship between firm scale X_i and fixed costs R obtains:

$$X_i = R(s-1)/c\,. \tag{7}$$

3. Short-Run Equilibrium

In the short-run, human capital is immobile between countries so that $N = K$ and $N^* = K^*$. With free trade in goods, and using (2), (3), (5), (6) and their foreign counterparts, the zero profit conditions in home and foreign are given by:

$$sR = \frac{a(L+K)}{K+fK^*} + \frac{fa(L^*+K^*)}{fK+K^*}; \qquad sR^* = \frac{fa(L+K)}{K+fK^*} + \frac{a(L^*+K^*)}{fK+K^*} \tag{8}$$

where $0 < f \equiv t^{1-s} < 1$. Human capital's compensation in home and foreign in the short-run equilibrium, R and R^*, can directly be read of (8). This is the simplification obtained by the quasi-linear upper tier utility which eliminates all income effects from the manufacturing sector. With a Cobb-Douglas, domestic and foreign incomes enter in the numerators of (8) which then have to be solved simultaneously. Once R is derived, the firm scale X_i follows directly from (7) and all other endogenous variables can be derived straightforwardly. The X sector employs $NcX_i = KR(s-1)$ units of labor (from (7) and $N = K$) which is assumed to be less than L in order to fulfill the assumption that both sectors are active after trade.

4. Long-Run Equilibrium

In the long run, human capital owners are internationally mobile and will move to the region where their indirect utility is higher. The utility differential, $V - V^* = a(\ln P/P^*) + (R - R^*)$, can easily be derived analytically for general trade costs in this model:

$$V - V^* = \frac{a}{1-s}\left\{\ln f + \ln\left[\frac{l + (1-l)/f}{l + (1-l)f}\right]\right\} + \frac{a(1-f)}{s}\left[\frac{\frac{L}{K+K^*} + l}{l + (1-l)f} - \frac{\frac{L^*}{K+K^*} + (1-l)}{lf + (1-l)}\right] \tag{9}$$

where $l \equiv K / K + K^*$. A long-run equilibrium in which both regions produce manufactures is given when $V - V^* = 0$. It is easily verified that $l = 1/2$ is always such an equilibrium with identical countries. However, this equilibrium is not necessarily stable because the model contains two agglomerative forces. There is a supply linkage in (9) as the region with the higher share of human capital has a larger manufacturing sector and therefore a lower price index. This is captured in the first term in (9) which is rising in l for all transport costs. There is also a demand linkage in (9) since increasing the share of human capital in one region implies a larger market. This raises the profitability of firms as expressed by the differential $(R - R^*)$ and thus attracts more human capital. The demand linkage is captured in the second term in (9). Around $l = 1/2$ this term is rising in l when transport costs are low. However, when they are high enough, this term is falling in l (the cut-off being at $t = (1/2)^{1/(1-s)}$ for $L = L^* = 2; K = K^* = 1$). This demonstrates that transport costs stabilise the symmetric equilibrium, i.e. tend to disperse production. With quasi-linear preferences, the utility differential (9) is the additive result of these two terms.

Fig. 1 about here

Fig. 1 depicts (9) for different levels of trade costs ($L = L^* = 2; K = K^* = 1; s = 6; a = 0.3$). For high trade costs, (9) is monotonically falling and the symmetric equilibrium is stable. It becomes unstable for lower trade costs and two stable asymmetric equilibria emerge which become increasingly asymmetric when trade costs are continuously reduced. For still lower trade costs, the utility differential slopes up monotonically implying that these asymmetric equilibria involve full specialisation in one of the countries. When trade costs are nil, difference doesn't matter in the model and human capital owners are indifferent where to locate. The model exhibits a 'pitchfork bifurcation'. Taking the derivative of (9) with respect to l at $l = 1/2$ yields the parameter criterion at which the symmetric equilibrium becomes unstable and the two arms of the fork appear: $f \equiv t^{1-s} = (s - 2)/(5s - 4)$ for $L = L^* = 2; K = K^* = 1$.

The bifurcation type encountered in geography models is determined by the curvature of the utility differential of the mobile factor (Fujita et.al., 1999, Ch.3). As exemplified by the dashed and thick lines in Fig. 1, this curve goes from convex to concave with quasi-linear preferences, leading to the smooth pitchfork bifurcation. Plotting the two terms separately clarifies that the demand linkage captured in $R - R^*$ is responsible for the convexity-concavity behaviour of (9). With the Cobb-

Douglas, two qualitatively identical linkages are at work. However, the utility differential goes from concave to convex, implying a tomahawk bifurcation. Arguably, the smooth pitchfork is a more convincing description of some of the concentration processes triggered by falling transport costs than the 'catastrophe' implied by the tomahawk bifurcation.

5. Conclusions

This paper presents a simple, analytically solvable Chamberlinian agglomeration model. The simplicity of the model derives from two assumptions which depart from the canonical CP model. First, the fixed cost in the manufacturing sector is assumed to consist of a separate internationally mobile factor (human capital). Second, and novel, preferences of households are characterised by a quasi-linear upper tier utility rather than a Cobb-Douglas. Like the CP model, the present model contains two agglomerative forces, a supply and a demand linkage. However, due to the alternative specification of preferences, the model exhibits a smooth 'pitchfork bifurcation' rather than the 'tomahawk bifurcation' of the CP model.

References

Andersson, Fr. and R. Forslid, 1999. Tax Competition and Economic Geography, CEPR Discussion Paper 2220.

Baldwin, R. E., 1999. Agglomeration and Endogenous Capital, European Economic Review 43, 253-280.

Baldwin, R. E. and P. Krugman, 2000. Agglomeration, Integration, and Tax Harmonization, CEPR Discussion Paper 2630.

Baldwin, R.E., Forslid, R., G. Ottaviano and Fr. Robert-Nicoud, 2001. The Core-Periphery Model: Key Features and Effects, manuscript, University of Geneva.

Dixit, A., 1990. Optimization in Economic Theory. Second Edition, Oxford University Press.

Flam, H. and E. Helpman, 1987. Industrial Policy Under Monopolistic Competition, Journal of International Economics 22, 79-102.

Forslid, R., 1999. Agglomeration with Human and Physical Capital: An Analytically Solvable Case, CEPR Discussion Paper 2102.

Fujita, M., P. Krugman and A.J. Venables, 1999. The Spatial Economy. Cities, Regions, and International Trade, MIT-Press, Cambridge, Mass.

Helpman, E. and P. R. Krugman, 1989. Trade Policy and Market Structure, The MIT-Press, Cambridge, Mass.

Krugman. P., 1991. Increasing Returns and Economic Geography, Journal of Political Economy 99, 483-499.

Krugman, P., and A. J. Venables, 1995. Globalization and the Inequality of Nations, Quarterly Journal of Economics 60, 857-880.

Martin, Ph. J. and C. A. Rogers, 1995. Trade Effects of Regional Aid, in: R. Baldwin, P. Haaparanta and J. Kiander (eds.), Expanding Membership of the European Union, Cambridge University Press, 166-188.

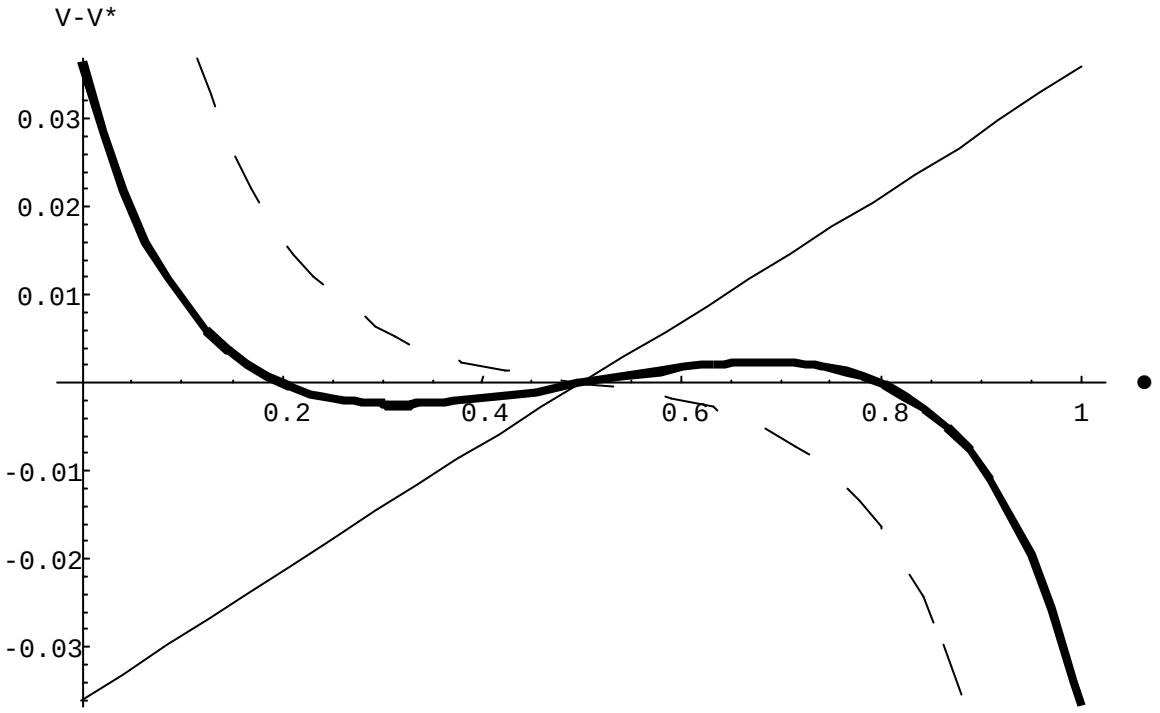
Neary, P. J., 2000. Of Hype and Hyperbolas: Introducing the New Economic Geography, manuscript, University College Dublin, August.

Ottaviano, G. and J.-F. Thisse, 1998. Agglomeration and Trade Revisited, CEPR Discussion Paper 1903.

Pflüger, M., 2001. Ecological Dumping Under Monopolistic Competition, Scandinavian Journal of Economics, forthcoming.

Venables, A.J., 1996. Equilibrium Location of Vertically Linked Industries, International Economic Review 37, 341-359.

Figure 1: International utility differential, human capital



Trade costs:

High:	Dashed Line:	$t = 1.5$
Intermediate:	Thick Line:	$t = 1.4$
Low:	Regular Line:	$t = 1.1$

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