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A note on the effects of market power distribution in Cordella and Gabszewicz's Ricardian model

Emanuele Bacchiega *

Dipartimento di Scienze Economiche, Alma Mater Studiorum - Università di Bologna, Piazza Scaravilli 2, 40126 Bologna, Italy

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ABSTRACT

We argue that it is the distribution of market power among agents, rather than the use of market power itself, that may force Ricardian economies into autarky. By applying Baldwin (1948) monopoly equilibrium concepts to the general equilibrium with imperfect competition model analyzed by Cordella and Gabszewicz (1997), we show that the monopoly equilibrium outcome Pareto dominates the oligopoly one. As a consequence, economic efficiency is higher when market power is concentrated in one agent than when it is evenly distributed among few agents.

1. Introduction

The Ricardian principle of comparative advantage is a cornerstone of classical trade theory. In the absence of any impediment to trade, competitive countries specialize in the production of the good for which they enjoy a comparative advantage. Consequently, competitive economies achieve productive efficiency and potential gains from trade are thoroughly exploited (see e.g. Jones and Neary, 1984, p. 11).

Cordella and Gabszewicz (1997) – CG henceforth – develop a linear Ricardian trade model where agents are endowed with market power, namely where "the economic units perceive the influence of their individual supply on the world equilibrium exchange rate of goods and make a strategic use of it" (CG, p. 334). CG use this model to address the question "whether, and the extent to which, the use of market power by economic agents on the world market would alter the prediction of the Ricardian theory" (p. 334). The answer they provide is positive: market power may drastically affect the Ricardian outcomes. Indeed, CG demonstrate that in a wide class of linear Ricardian economies where all the agents are endowed with market power, autarky, with all agents specialized according to comparative *disadvantage*, is *the only* outcome to be expected. Their result is striking since their model is built to generate the largest *ex-ante* incentives to trade. Accordingly, the outcome of oligopolistic competition is not Pareto efficient.

This note complements the answer provided by CG, by analyzing the case in which all the market power is concentrated in a monopolist. We use the "monopoly" and "discriminating monopoly" equilibrium concepts of Baldwin (1948) to argue that in the class of Ricardian economies identified by CG, monopoly equilibria always feature trade, and that the goods exchanged are produced according to comparative advantage. Consequently, the monopoly equilibrium outcome Pareto dominates the oligopoly one. Our results highlight the role of the distribution of market power, namely the share of agents that perceive their influence of their actions on the exchange rate of goods, on the trade versus autarky

* Tel.: +39 051 2098 486.
E-mail address: emanuele.bacchiega@unibo.it

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outcomes in Ricardian economies. In our example, when market power is concentrated in one agent, the equilibrium outcome features trade and is, therefore, more efficient than when market power is evenly distributed among (few) agents. From a policy point of view, our note suggests that to evenly reallocate market power from one agent to few others, with the objective to increase welfare may indeed have the opposite effect.

In the following, Section 2 presents the model. Section 3 characterizes the monopoly equilibria and discusses them with respect to the relevant literature and Section 4 briefly concludes.

2. The model

Our analysis builds on the two-country model of CG, in the particular case where in each country a single agent only exists. Each agent is endowed with one unit of labor. For future convenience, label one of them "agent *M*" and the other "agent *C*".[1] There are two consumption goods, 1 and 2, produced out of labor. Technologies are linear, the production frontier for agent i is defined as $\{y^i/a_1^i,(1-y^i)/a_2^i \mid y^i \in [0,1]\} \in \mathbb{R}_+^2$, where a_l^i is the labor input used by agent $i \in \{M,C\}$ to produce one unit of good $l \in \{1,2\}$ and y^i (res. $1-y^i$) is the quantity of labor agent i assigns to the production of good 1 (res. 2). A *production plan* for agent i is a vector describing the net output by agent i, namely $Y^i \equiv [y^i/a_1^i,(1-y^i)/a_2^i]$.[2] Similarly, a *consumption plan* $X^i \equiv [x_1^i,x_2^i]$ describes the quantities of goods 1 and 2 demanded for consumption by agent i. We consider the following three assumptions:

(1) Agent M has a comparative advantage in the production of good 1: $a_1^M/a_2^M < a_1^C/a_2^C$.
(2) Agent M has an absolute advantage in the production of good 1 and agent C in the production of good 2: $0 < a_1^M < a_1^C$ and $0 < a_2^C < a_2^M$.
(3) Each agent is only interested in the good for which he has a comparative *disadvantage*: $U^M(x_1,x_2) = x_2$, $U^C(x_1,x_2) = x_1$, where $U^i(\cdot)$ is the utility function of agent i, and x_1 and x_2 are the quantities of goods 1 and 2 consumed respectively.

Assumptions (1)–(3) guarantee the greatest incentives to trade. Indeed, at the unique competitive equilibrium of this model, each agent completely specializes according to comparative advantage, and the amounts produced are fully exchanged at the relative price $(\overset{*}{p_1/p_2}) = a_1^M/a_2^C$. This results in the competitive utility levels $1/a_2^C \equiv \overset{*}{U}{}^M$ and $1/a_1^M \equiv \overset{*}{U}{}^C$ for the M and C agents respectively, see Fig. 1(a).

The only *oligopoly equilibrium* (CG, p. 338) of our example is autarkic.[3] Each agent produces for self-consumption the good in which he has a comparative *disadvantage* only, and the potential gains from trade are unexploited, see Fig. 1(b).[4] The agents enjoy their autarkic utility levels, given by $1/a_2^M \equiv \hat{U}^M$ and $1/a_1^C \equiv \hat{U}^C$ for the M and C agent respectively. The intuition is as follows. For any quantity of good 1 offered by the agent M, the C agent has a strategic incentive to increase his utility by reducing the supply of good 2 and therefore increase the consumption of good 1. Symmetrically, the same holds for the M agent.[5]

3. Monopoly equilibrium

Baldwin (1948) analyzes the trade equilibrium conditions of a two-agent economy in the cases of (i) "monopoly", (ii) "discriminating monopoly" and (iii) "pure competition". We apply concepts (i) and (ii) to our model to find its monopoly equilibria. To avoid confusion with the general concept of monopoly equilibrium, we refer to Baldwin (1948) "monopoly" as "pure monopoly". In the rest of the paper let agent M be the monopolist and let the C agent behave competitively. In this case, the C agent may be seen as the aggregation of a large set of n "small" identical agents, all characterized by the same input requirements a_1^C and a_2^C, but endowed with $1/n$ units of labor only each. These assumptions guarantee that their optimal choices as for production and consumption would coincide, and, from the M agent standpoint, their aggregate behavior only would matter.

3.1. Pure monopoly

According to Baldwin (1948, p. 479) when one country "[…] behaves as a monopolist [it] sets the price, while the other country […] takes the price as given and reacts in such a way as to maximize utility". We formalize Baldwin (1948) pure monopoly equilibrium concept as follows.

[1] In Section 3, we will assume that the C agent behaves competitively. See the beginning of Section 3.

[2] We omit labor from the description of the production plan and restrict ourselves to efficient plans, i.e. lying on the production frontier of agent i.

[3] If both agents are endowed with market power, then the allocation of labor between the production of two commodities (y^i, $i = M,C$) is a *strategic* variable for them. For any pair $(y^M,y^C) \in [0,1]^2$ the *indirect utility* of agent i, $V^i(y^M,y^C)$, may be defined. An *oligopoly equilibrium* is, thus, a Nash equilibrium of the game that has $V^i(y^M,y^C)$ as payoff function for agent i. See CG (pp. 335–338) for more details.

[4] CG show that their results are robust to slight perturbations of the preferences so as to have strict monotonicity in both goods. In particular, they show that with utility functions such as $U^M(\cdot) = \varepsilon \log x_1 + x_2$ and $U^C(\cdot) = x_1 + \varepsilon \log x_2$, their results hold as long as ε is positive and arbitrarily small.

[5] This result is a special case of CG's Proposition 2, p. 343.