УДК: 51-77, 330.4
JEL F12, L13, D43

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Dixit-Stiglitz-Krugman Model with Investments in R&D

Abstract

We study a monopolistic competition model in the open economy case. The utility of consumers is additive separable. The producers can choose the technology (R&D) endogenously. We examine the local comparative statics of market equilibrium with respect to transport costs (of iceberg type). Early, we find the following preliminary result: increasing transport costs have opposite impacts on the mass of firms and productivity. In the present paper, we study the local comparative statics with respect to transport costs for the case of autarky (the very big transport costs). For the case of linear production costs, the known (and counter-intuitive!) result is that the social welfare increases near autarky. We generalize this result for the model with investments in R&D; this is the main result of the paper.

Keywords: Dixit-Stiglitz-Krugman Model, Market Equilibrium, Investments in R&D, Comparative Statics, Social Welfare, Autarky.

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Модель Диксита-Стиглица-Кругмана с инвестициями в НИОКР

Аннотация

Исследуется модель монополистической конкуренции в случае открытой экономики. Полезность производителей является аддитивно сепарабельной. Производители могут выбирать инвестиции в НИОКР эндогенно. Исследуется локальная сравнительная статика рыночного равновесия относительно транспортных издержек (типа «iceberg»). Ранее был получен следующий предварительный результат: возрастание транспортных издержек имеет противоположное влияние на массу фирм и инвестиции в НИОКР. В предлагаемой работе изучается локальная сравнительная статика относительно транспортных издержек в случае автаркии (очень больших транспортных издержек). Для случая линейных производственных издержек, известным (и контр-интуитивным!) результатом является следующий: общественная оптимальность возрастает вблизи автаркии. Этот результат обобщается для модели с инвестициями в НИОКР, что и является основным результатом работы.

Ключевые слова: модель Диксита-Стиглица-Кругмана, рыночное равновесие, инвестиции в НИОКР, сравнительная статика, общественное благосостояние, автаркия.

The monopolistic competition theory [13] began to develop rapidly after the famous works of Dixit and Stiglitz [15] and Krugman [17].

The model of monopolistic competition [4- 6, 10, 14, 15, 17, 18, 21] is based on the following assumptions:

- the manufacturers produce goods of the same nature, but not completely interchangeable (product diversity);
- each firm produces one type of product diversity and sets its price;
- the number (mass) of firms is large enough;
- the firms enter the market as long as their profits are positive.

Usually, the study is in the framework of linear production costs. The more economically adequate case, when marginal costs decrease when fixed costs ("investments in R&D") increase, is studied not enough. Some stylized facts for theory are, e.g., in [1, 12, 16].

In [11] we get the results for the model of a closed economy. In [7] we expand this analysis to the trade model. Usually, in monopolistic competition trade models, the study focuses in the comparative statics (with respect to transport costs) of equilibrium variables – individual consumption, the mass of firm, size of the firm, price, etc. The social welfare studies do not a lot.

In 2012, Arkolakis et al. (see [2]), by studying international trade in the USA, concluded: How large are the welfare gains from trade? A crude summary of our results is "So far, not much." Because of this famous work, there was a great interest in the theoretical study of the consequences of the "disappearance" of international trade. Some results about social welfare can be found in [3, 19, 20], where the linear productions costs are considered. In [9] (see also [8]), for the case of additively separable utility and under linear production costs, the following (counter-intuitive!) result has got: ***near autarky, the social welfare increases.*** The question arises: can investments in R&D help avoid this effect?

In this paper, we show that the answer is "***no***" – even if the producers can choose the investments in R&D to decrease the marginal costs, near autarky, the social welfare increases.

For policy-making, our topic may be interesting because of a new understanding of gains from trade: technological changes in response to trade liberalization. Furthermore, for modernization and active industrial policy practiced in some countries it can be interesting, which equilibrium outcome in various sectors may follow from some stimulating measures like tax reductions conditional on R&D.

The study was carried out within the framework of the state contract of the Sobolev Institute of Mathematics (project no. 0314-2019-0018) and within the framework of Laboratory of Empirical Industrial Organization, Economic Department of Novosibirsk State University. The work was supported in part by the Russian Foundation for Basic Research, project 19-010-00910.

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