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ORIGINAL

Analysis of Welfare-Improving Rules of Origin in Free Trade Agreements: The Case of Buyer Monopoly by Region's Final Goods Producers

Análisis de las normas de origen que mejoran el bienestar en los acuerdos de libre comercio: el caso del monopolio comprador por parte de los productores de bienes finales de la región

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ABSTRACT

This paper analyzes the effects of rules of origin in free trade agreements on economic welfare and the optimal level of rules of origin. In a situation where final goods producers monopolize intermediate goods produced in the region, a marginal increase in the level of the rules of origin reduces the monopoly power of final goods producers. It increases the economic welfare of the region. In this case, it is also possible to establish a free trade zone that does not reduce the economic welfare of countries outside the region and does not reduce the economic welfare of the world as a whole.

Keywords: Free Trade Zone; Rules of Origin; Economic Welfare; Buyer Monopoly.

RESUMEN

Este artículo analiza los efectos de las reglas de origen en los acuerdos de libre comercio sobre el bienestar económico y el nivel óptimo de reglas de origen. En una situación en la que los productores de bienes finales monopolizan los bienes intermedios producidos en la región, un aumento marginal en el nivel de las reglas de origen reduce el poder de monopolio de los productores de bienes finales. Aumenta el bienestar económico de la región. En este caso, también es posible establecer una zona de libre comercio que no reduzca el bienestar económico de los países fuera de la región y no reduzca el bienestar económico del mundo en su conjunto.

Palabras clave: Zona de Libre Comercio; Reglas de Origen; Bienestar Económico; Monopolio del Comprador.

INTRODUCTION

This paper analyzes the effects of rules of origin set in free trade agreements and the optimal level of rules of origin. Unlike a customs union, a free trade agreement allows each intra-regional country to set its external tariff. Therefore, rules of origin are established in order to prevent export circumvention by firms from extraterritorial countries while at the same time preventing competition among intra-regional countries to reduce tariffs.(1) Therefore, it is often pointed out that rules of origin may be used as a means of "hidden protectionism."

For final goods producers, one means to satisfy the rules of origin is to use intermediate goods produced

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in intra-regional countries. Therefore, previous studies have analyzed the effects of rules of origin on the intermediate goods market.[2,3,4] The central previous studies in this direction, which have analyzed the strategic behavior of firms in addition to the function of rules of origin as "hidden protectionism ."In addition to the function of rules of origin as "hidden protectionism," these studies have analyzed the strategic behavior of firms.[5] Show the importance of price discrimination in the regional final goods market and the effect of the existence of rules of origin on the economic welfare of countries in the region.

In contrast, this paper focuses on the effects of rules of origin on the economic welfare of intra-regional countries. In contrast, this paper shows that a marginal increase in the level of rules of origin by the governments of intra-regional countries forming free trade agreements leads to an increase in the economic welfare of intra-regional countries but has no effect on the economic welfare of extra-regional countries. This effect is different from the original effect of rules of origin, which is to prevent indirect exports. It also differs from the effect of "hidden protection measures" discussed in previous studies.

Apart from the previous studies mentioned above, analyses of the effects of the formation of free trade areas and customs unions on the economic welfare of countries in the region and the world as a whole included.[6,7,8,9,10,11,12,13,14,15] These previous studies discuss how to form a customs union or free trade agreement that enhances the economic welfare of intra-regional countries without reducing the economic welfare of extra-regional countries. However, these previous studies do not consider the existence of rules of origin.

This paper assumes a buyer monopoly by final goods-producing firms in the region for intermediate goods produced. To the author's knowledge, no previous study analyzes the effect of rules of origin based on the assumption of a buyer monopoly situation. In addition, as prior studies related to the analysis in this paper, there are studies[1,16] that analyzed the effect of local procurement rate regulations on economic welfare in a situation where the buyer monopolizes intermediate goods.[16] Analyzes the local procurement rate regulation under the situation of buyer duopoly between home and foreign final goods-producing firms and shows that the local procurement rate regulation in the home country may raise economic welfare by transferring profits of home final goods-producing firms to foreign final goods-producing firms and home intermediate goods industries.[16] Show that when there is a discontinuity in marginal expenditure on intermediate goods, local procurement rate regulations do not affect the demand for intermediate goods produced in the country where the regulation is imposed and may negatively affect domestic final goods producers.

In contrast, this paper analyzes rules of origin, and the disadvantage of final goods producers not complying with the rules of origin is that they are subject to extraterritorial tariffs. Final-goods-producing firms can produce in the intra-regional country regardless of whether or not they satisfy the rule of origin. The analysis situation differs from the local procurement rate regulation discussed in the previous studies. This paper shows that, although there is no discontinuity in the marginal expenditure on intermediate goods, there are cases in which an increase in the level of marginal rules of origin reduces the monopoly power of buyers of final goods-producing firms in the region, leading to an increase in demand for intermediate goods produced in the region and an increase in economic welfare in the region. The results are different from those of the previous studies.

The remainder of this paper is organized as follows. Section 2 sets up the methods. Section 3 development analyzes the establishment of rules of origin by the region's governments. Section 4 presents results and section 5 discussions included conclusions and future issues.

METHOD

The world consists of three countries: A, B, and C. Countries A and B are small, with A as the primary consumer and B as the sole producer in the region under a free trade agreement. Country C, an outsider, acts as a supplier of intermediate goods and a final goods producer using only its intermediate goods. The intermediate goods produced in regions (B) and outside (C) are assumed to be perfect substitutes. One unit of intermediate good is required to produce one unit of final good. Country B exerts buyer monopoly power over intermediate goods produced within the region, purchasing them at prices below those of external goods. Country C operates independently, producing final goods with external intermediate goods for markets outside the region. Therefore, there is a buyer monopoly for intermediate goods in the region. The production of intermediate goods takes place both in the intra-regional country and in a foreign country. The intermediate goods produced in the in-region country and those produced in the out-of-region country are assumed to be perfect substitutes. One unit of the intermediate good is required to produce one unit of the final good.

However, intermediate goods are assumed to be mixed. Therefore, it is assumed that the final good can be produced by mixing two intermediate goods and inputting one unit of the intermediate good as a total when producing one unit of the final good. The intra-regional country does not impose a tariff on the intermediate good but on the final good in the form of a metered tax. Let p represent the price of the final good in Country A, $p*$ the world price of the final good, and y and $y*$ the quantities of final goods produced domestically and externally, respectively. The demand-side dynamics are expressed as $p=a-(y+y*)$, where a represents the

maximum willingness to pay. This equation ensures that the pricing reflects market equilibrium rather than assuming fixed or zero profit conditions. The price of intermediate goods remains $q=q*$ under the assumption that the intra-regional country is small.

The quantity demanded of the final good produced in the in-region country is denoted by y. The quantity demanded of the final good produced in the out-of-region country is denoted by y*, and the inverse demand function for the final good is set as follows.

$$p = a - (y + y^*) \quad (1)$$

Let the number of intermediate goods procured by final goods-producing firms in the region from within the region be z, and the number of intermediate goods procured from outside the region be z*, y = z + z* in equilibrium since one unit of intermediate good is required in total to produce one unit of final good.

The profit of final goods-producing firms is expressed as follows:

$$\Pi = py - qz - q^*z^*$$

$$= p(z + z^*) - qz - q^*z^* \quad (2)$$

The intermediate goods market is assumed to be perfectly competitive. Therefore, the inverse supply curve for intermediate goods-producing firms in the intra-regional country is a marginal cost curve. Marginal costs are assumed to increase as the output of the intermediate good increases, and for simplicity, we assume the following:

$$q(z) = b + cz \quad (3)$$

The final goods producer in the intra-regional country is a monopoly buyer of intermediate goods in the intra-regional country. Therefore, final goods-producing firms in the intra-regional country determine the quantity of intermediate goods procured from the intra-regional country at the point where the marginal cost of procuring the intermediate good for the final goods-producing firm is equal to the marginal cost of the intermediate good produced in the extra-regional country. Under Assumption 1, the marginal cost of intermediate goods produced in the intra-regional country is lower than that of the outside intermediate good ($q*$). As a result, final goods producer B will exclusively use intra-regional intermediate goods until the marginal cost $MC(z)=b+2cz$ increases to $q*$. Beyond this point, the producer will shift entirely to outside intermediate goods as further usage of intra-regional goods becomes cost-ineffective. This transition point is determined by solving

$$b+2cz= q* \quad (4)$$

yielding z one as the equilibrium quantity of intra-regional intermediate goods procured.

Thus, the procurement behavior of producer B can be summarized as:

$z \leq z$ 1: 100 % intra-regional intermediate goods usage.

$z > z$ 1: 100 % external intermediate goods usage.

$$z_1 = \frac{q^* - b}{2c} \quad (5)$$

Then, q(z1) is the intermediate good procurement price for the final goods-producing firm. Let q(z1) be the procurement price of the intermediate good for the final good-producing firm. At this time, q (z1) can be obtained by substituting z1 expressed in equation (5) into (3). The intermediate goods procurement price q(z1) is:

$$b + cz_1 = b + c\frac{q^* - b}{2c}$$

$$= \frac{b+q^*}{2} \quad (6)$$

is the price of the intermediate good. We assume the following relationship holds for the intermediate goods procurement price q(z1) and q*.

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DEVELPOMENT

Assumption 1

When the final goods-producing firms in the intra-regional country exercise buyer monopoly power in procuring intermediate goods from the intra-regional country, the intermediate goods procurement price from the intra-regional country is q(z1) = b + q*/2. In this situation, q(z1) is lower than the intermediate goods price q* in the extra-regional country. That is, we assume that b < q*.

Under Assumption 1, in a situation where the final goods producer in the intra-regional country can act as a buyer monopoly for intermediate goods in the intra-regional country, it procures z1 units of intermediate goods from the intra-regional country and the rest from the extra-regional country. Since the intra-region country is a small country, the final good producer in the intra-region country supplies the final good at p = q*, where y1 is the output at p = q*, and y1 remains the same in the situation where the final good producer procures the intermediate good from the intra-region country as a buyer monopolist.

The economic welfare of a country in the region is expressed as the sum of consumer surplus in final goods markets, profits of final goods-producing firms in the country, and producer surplus in intermediate goods industries in the country. The consumer surplus in the final goods market is.

$$CS = \frac{(a - q^*)y_1}{2}$$

$$= \frac{(y)^2}{2} \qquad (7)$$

When final goods-producing firms in intra-regional countries exercise buyer monopoly power in the procurement of intermediate goods, profits are

$$\begin{aligned} \Pi &= py_1 - qz_1 - q^*z_1^* \\ &= q^*y_1 - qz_1 - q^*(y_1 - z_1) \\ &= (q^* - q)z_1 \end{aligned} \qquad (8)$$

The producer surplus in the intermediate goods industry is

$$PS = \frac{(q - b)z_1}{2}$$

$$= \frac{c(z)^2}{2} \qquad (9)$$

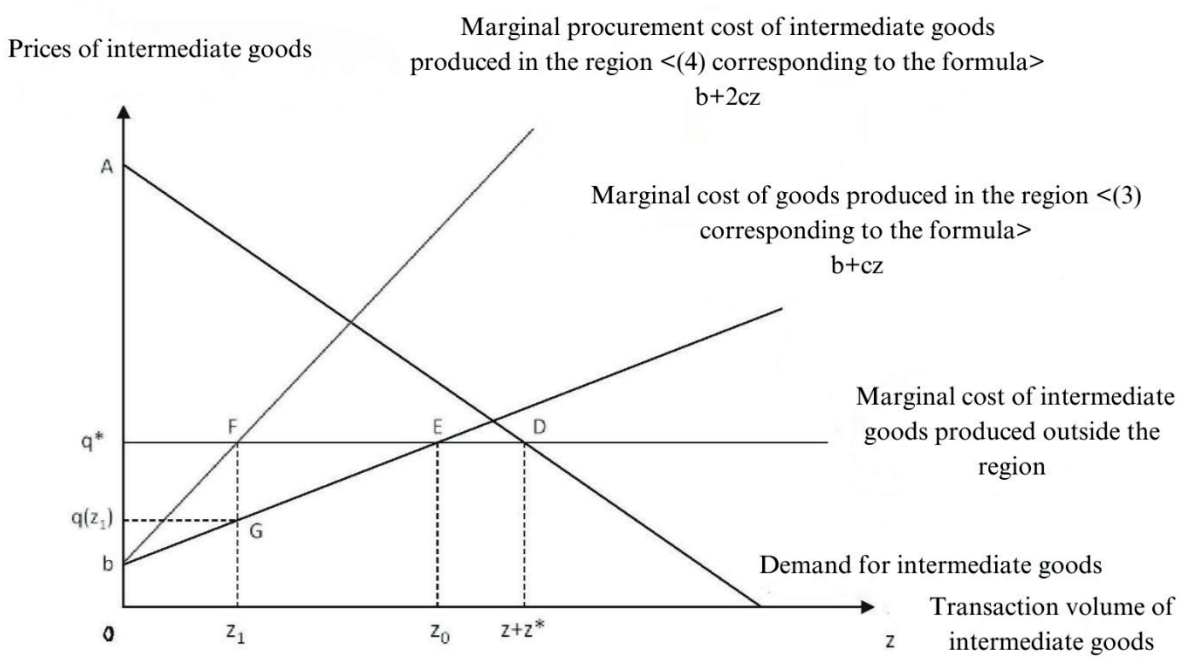

Figure 1. Demand analysis for intermediate goods

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The situation in the basic model presented in this section is depicted in figure 1. The figure represents the supply and demand dynamics within the region (Country B) and its interactions with external suppliers (Country C) in producing final goods. Figure 1 illustrates the equilibrium procurement behavior of final goods producer B under Assumption 1. The marginal cost curve of intra-regional intermediate goods ($MC(z)=b+2cz$) intersects with the constant marginal cost of outside intermediate goods ($q*$) at point $z1$. To the left of $z1$, producer B uses only intra-regional intermediate goods. Beyond $z1$, producer B exclusively uses outside intermediate goods. This transition ensures cost efficiency in intermediate goods procurement. In the analysis in this paper, it is assumed that the production of one unit of the final good requires one unit of the intermediate good, and the demand for the final good is assumed to be linear. Therefore, the inverse demand curve for intermediate goods is represented by a straight line descending to the right starting from point A. Since the marginal cost of intermediate goods produced outside the region is assumed to be constant, the situation is represented by a straight line parallel to the horizontal axis with q* as the starting point. Since the marginal cost of the intermediate good produced in the country is assumed to increase, the marginal cost curve of the intermediate good produced in the country is represented by a right ascending straight line starting from b. Since $b < q^*$ is assumed, an intersection point exists between the marginal cost curve of the intermediate good produced in the in-country country and that of the intermediate good produced in the out-country country, such as point E. The intersection of the marginal cost curves of intermediate goods produced in the in-country country and those produced in the out-of-country country exists. In this paper, final goods producers in the region are assumed to have a buyer monopoly on intermediate goods produced in the region. In this situation, the marginal procurement cost curve of the intermediate goods produced in the intra-regional country for the final goods-producing firms is represented by a straight line starting from point b and passing through point F. In a situation where final goods-producing firms in the region exercise buyer monopoly power, the intersection of the marginal procurement cost curve of the intermediate good produced in the region and the marginal cost curve of the intermediate good produced abroad determines the amount of intermediate good procured domestically in the region, which corresponds to point F. The intermediate goods procured by final goods-producing firms in the region from the region are z1 units, and in this situation, consumer surplus is represented by triangle ADq*, producer surplus in the intermediate goods industry in the region by triangle bGq (z1), and excess profits of final goods-producing firms in the region by rectangle q*FGq (z1).

For comparison, let us assume that final goods-producing firms in the region act as price takers in the procurement of intermediate goods and show the equilibrium when final goods-producing firms in the region purchase intermediate goods produced in the region to the point where the marginal cost of intermediate goods produced in the region equals the marginal cost q* of intermediate goods produced outside the region. The firm purchases the intermediate good produced in the in-country until the marginal cost of the intermediate good produced in the in-country equals the marginal cost of the intermediate good produced in the out-country q*. The quantity of the intermediate goods produced in the intra-regional country at that point is denoted by z0. In Figure 1, point E corresponds to z0. Compared to the case where final goods-producing firms in the intra-regional country are assumed to act as price takers in the procurement of intermediate goods, the exercise of buyer monopoly power by final goods-producing firms in the intra-regional country results in the dead weight represented by triangle EFG in figure 1.

RESUTLS

The procurement behavior of final goods producer B, as determined by assumption 1, influences the effectiveness of rules of origin. If the rule of origin is set such that the required proportion of intra-regional intermediate goods exceeds $z1/y1$, producer B will incur higher costs, as it must procure additional intra-regional goods beyond the cost-effective level. This highlights the importance of aligning rules of origin with equilibrium procurement behavior to balance economic welfare and compliance feasibility. Free trade agreements allow intra-regional countries to impose no tariffs on imports of goods produced in the intra-regional countries. However, tariffs are imposed on imported goods produced in extra-regional countries. In free trade agreements, rules of origin determine whether goods are produced in an intra-regional or extra-regional country. The origin rule set by the government of the intra-regional country in this paper is based on the extent to which intermediate goods produced in the intra-regional country are included among the intermediate goods included in the final goods. Suppose the percentage of intermediate goods produced in the intra-regional country is above a certain level. In that case, the final good is considered to have been produced in the intra-regional country and is imported tariff-free. Let ϕ denote the rule of origin set by the government of the domicile country, i.e., the content of domestically produced intermediate goods that should be included in the final good produced in the domicile country. If $\phi \leq z1/y1$, then the share of the rule of origin is lower than the intermediate goods procured from the intra-regional country when the intra-regional country's final goods-producing firm can exercise buyer monopoly power. Thus, the final goods producer in the intra-region country satisfies the origin rule without changing the ratio of intermediate goods it procures from the intra-region

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country. If z1/y1 ≤ ϕ ≤ z0/y1, then the ratio is higher than the ratio when the final goods-producing firms in the intra-region country procure intermediate goods from the intra-region country in the form of exercising buyer monopoly power. Therefore, if the ratio of intermediate goods produced in the intra-regional country remains unchanged, the origin rule cannot be satisfied. On the other hand, even if the ratio of intermediate goods produced in the intra-regional country is increased to satisfy the origin rule, the marginal cost of intermediate goods produced in the intra-regional country is lower than that of intermediate goods produced in the extra-regional country. Therefore, since it is not disadvantageous for final goods producers in the intra-regional country to satisfy the rule of origin, the ratio of intermediate goods produced in the intra-regional country is adjusted to satisfy the rule of origin3.

Since the economic welfare of a country in the region is expressed as the sum of consumer surplus in the final goods market, profits of final goods-producing firms, and producer surplus in the intermediate goods industry

$$\begin{aligned} W &= CS + \Pi + PS \\ &= \frac{y^2}{2} + p^* y - qz - q^* z^* + \frac{cz^2}{2} \\ &= \frac{y^2}{2} + p^* y - (b + cz)z - q^* z^* + \frac{cz^2}{2} \end{aligned} \tag{10}$$

This is the case for the intermediate goods industry in the intra-regional country. As we have seen in section 2, the exercise of buyer monopoly power by final goods-producing firms in the intra-regional countries in procuring intermediate goods has created a dead weight in the intermediate goods industry in the intra-regional countries. The question to be analyzed in this paper is whether a marginal change in the level of the rules of origin increases the content rate of intermediate goods in the region from the content rate of intermediate goods in the region when final goods-producing firms in the region exercise buyer monopoly power would be a policy that reduces the deadweight of the intermediate goods industry in the region and increases economic welfare. The effect of a marginal change in the level of rules of origin on economic welfare is expressed as follows.

$$\frac{\partial W}{\partial \emptyset} = -b\frac{dz}{d\emptyset} - cz\frac{dz}{d\emptyset} - q^*\frac{dz^*}{d\emptyset}$$

$$= -(b + cz)\frac{dz}{d\emptyset} - q^*\frac{dz^*}{d\emptyset}$$

Intermediate goods produced in the intra-regional country and those produced in the extra-regional country are assumed to be perfect substitutes. Thus, dz/dϕ = -dz*/dϕ. Therefore

$$\begin{aligned} \frac{\partial W}{\partial \emptyset} &= -(b + cz)\frac{dz}{d\emptyset} - q^*\frac{dz^*}{d\emptyset} \\ &= -(b + cz)\frac{dz}{d\emptyset} + q^*\frac{dz}{d\emptyset} \\ &= -\frac{\square}{did\emptyset} + q^*\frac{dz}{d\emptyset} \\ &= (q^* - q)\frac{dz}{d\emptyset} \end{aligned} \tag{11}$$

ϕ ≤ z1/y1 when final goods producers in the intra-region country procure intermediate goods from the intra-region country by exercising buyer monopoly power while satisfying the rule of origin. Let $\phi 1 \equiv z1/y1$ be the level of the rule of origin at this time, and z1 be the number of intermediate goods procured from the intra-regional country, then q1 = q(z1) and q*-q1 > 0 from assumption 1, so

$$\frac{\partial W}{\partial \emptyset}\Big|_{\emptyset=\emptyset_1} = (q^* - q_1)\frac{dz}{d\emptyset} > 0 \tag{12}$$

These point can be summarized as follows.

Proposition 1

Assumption 1 holds and further assumes that the situation in which final goods producers in the intra-regional country exercise buyer monopoly power to procure intermediate goods in the intra-regional country, i.e., the buyer monopoly equilibrium situation, satisfies the rules of origin set by the intra-regional country's

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government. In this situation, if the government of the intra-regional country raises the level of the rule of origin (ϕ) marginally above the rate of procurement of the intra-regional domestic intermediate good in the buyer monopoly equilibrium ($\phi 1$), the economic welfare of the intra-regional country will increase.

Proposition 1 shows that the government of an intra-regional country can increase its economic welfare by raising the level of its rules of origin marginally above the procurement rate of intra-regional domestic intermediate goods in a buyer monopoly equilibrium. Figure 1 shows that triangle EFG represents the deadweight of the intermediate goods industry in the region, and the marginal increase in the level of the rule of origin by the region's government corresponds to a shift to the right of the area corresponding to side FG in figure 1. Given this point, the optimal origin rule for the intra-regional government is the level at which the procurement of intermediate goods domestically produced in the region by final-goods-producing firms in the extra-regional country is at z0. Let $\phi 0 \equiv z0/y0$ be the level of the rule of origin at that time, q0 = q(z0), where z0 is the number of intermediate goods procured domestically in the region when final goods-producing firms in the region act as price takers in procuring intermediate goods, as discussed in the previous section. The marginal cost of the intermediate good produced in the intra-regional country is equal to that of the intermediate good produced in the extra-regional country, q*. Thus q0 = q(z0) = q*.

Since it is

$$\frac{\partial W}{\partial \emptyset} = (q^* - q)\frac{dz}{d\emptyset}$$

$$\frac{\partial W}{\partial \emptyset} I_{\emptyset=\emptyset_0} = (q^* - q_0)\frac{dz}{d\emptyset}$$
$$= (q^* - q^*)\frac{dz}{d\emptyset} = 0 \qquad (13)$$

The above can be summarized in the following propositions.

Proposition 2

The optimal level of the rule of origin for the intra-regional government is $\phi 0$, i.e., the rate of intra-regional domestic intermediate goods procurement, assuming that the final goods-producing firms in the intra-regional country act as price takers in procuring intermediate goods.

DISCUSSION

This paper analyzes the effects of marginal changes in the rules of origin set by the governments of the intra-regional countries that have concluded free trade agreements on the economic welfare of the intra-regional countries in the case where final goods-producing firms in the intra-regional countries can exercise buyer monopoly power over the intermediate goods industries in the intra-regional countries when they procure intermediate goods. In particular, we analyze a situation in which the intermediate goods of an intra-regional country can be procured at a lower price than those of an extra-regional country when the final goods-producing firms of the intra-regional country procure the intermediate goods by exercising buyer monopoly power over the intermediate goods industry of the extra-regional country and the intermediate goods meet the rules of origin set by the intra-regional country government. In such a situation, if the rule of origin set by the government of the intra-regional country is marginally raised, the intermediate goods produced in the intra-regional country can be procured at a lower price than the intermediate goods produced in the extra-regional country. The final goods-producing firms in the intra-regional country will act to satisfy the rule of origin. It leads to a higher procurement of intermediate goods to be produced in the intra-regional country, leading to an increase in the producer surplus of the intermediate goods industry in the intra-regional country. This will increase the economic welfare of the intra-regional country since it will reduce the deadweight that occurs before the marginal increase in the level of the rules of origin.

This paper does not consider the strategic behavior of firms. However, this paper shows that even in situations where there is no strategic behavior of firms or where extraterrestrial countries have no influence, there are cases where marginal changes in rules of origin raise the economic welfare of intra-regional countries and do not affect the economic welfare of extraterrestrial countries, thus not lowering the economic welfare of the entire world. In such cases, rules of origin are positioned as policy instruments that do not reduce the economic welfare of not only intra-regional countries but also the world as a whole, in contrast to the previously pointed out position of rules of origin as hidden protective instruments.

The analysis in this paper is only for one case of a buyer monopoly by a final goods producer in an intra-

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regional country. Therefore, it is one of the issues to be addressed in the future to clarify whether rules of origin function as policy instruments that do not reduce the economic welfare of not only the intra-regional countries but also the world as a whole, other than the case of buyer monopoly discussed in this paper. In this paper, the intra-regional countries were analyzed as small countries regardless of the formation of a free trade area. However, an analysis of cases in which the intra-regional countries are large is necessary. The analysis is also needed when the final goods market is an oligopoly and final goods-producing firms take strategic actions. It is also necessary to clarify how firm behavior, trade patterns, and economic welfare change before and after the conclusion of a free trade agreement.

This research does, however, have many things that could be improved. One disadvantage of using the questionnaires, a popular method, is that there needed to be more responses in survey-based research, which was a setback. Therefore, the findings cannot be generalized. Additional gathering is necessary to expand the study's impact. However, the literature offers several strategies that might be investigated, along with the potential to include additional factors that we will look at in further research in this domain. Apart from these, the study uses a single cross-sectional design. However, in these kinds of research, where newer theories are tested to replace the older ones, would be more appropriate. These issues can be dealt with in future research. Also, researchers may perform different forms of systematic literature reviews on the topics covered in this research.

Notes

1. This paper analyzes the situation after the conclusion of the free trade agreement.
2. This paper does not deal with the level or change of externality tariffs. Therefore, to simplify the analysis, we normalize the externality tariffs on final goods as $t = 0$.
3. When $z0/y1 < \varphi$, if a final goods producer in an intra-regional country tries to procure intermediate goods while satisfying the rules of origin, it will use intermediate goods with higher prices than those produced in the extra-regional country. Therefore, whether or not to produce while satisfying the rule of origin is a balance between the level of extraterrestrial tariffs. However, this paper does not consider this situation at this time.

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AUTHORSHIP CONTRIBUTION

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Formal analysis: Syed Khusro Chishty.
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