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R&D Promotion Policies of Developing Countries and Fairness in International Trade Relations

Jai S. Mah

Abstract: Research and development (R&D) promotion policies are critical for economic development in the sense that they contribute to technical progress. Although it is true that policy space is restricted under the World Trade Organization (WTO) system, there are still some R&D promotion policy measures made available to developing countries. It is thus necessary for developing countries to utilize such available measures. In addition to explaining the R&D promotion measures available under the current WTO regulations, I provide suggestions for modifying the Uruguay Round Subsidies Code with respect to the R&D promotion policies of developing countries from the viewpoint of "distributional fairness" in international trade relations.

Keywords: development, fairness, R&D policies, WTO

JEL Classification Codes: F63, O32

Several developing economies have recorded very high economic growth rates for the past five decades. Research and development (R&D) promotion policies have critically achieved technical progress that, with the development of advanced technologies and industrial restructuring within economies, has enhanced value-added industries. For instance, since the 1990s, the northeast Asian dynamic economies, such as South Korea and Taiwan, have actively pursued R&D promotion policies. The experiences of rapid economic growth through R&D promotion policies, development of advanced technologies, and technology intensive industries, all appear to be consistent with the explanation of endogenous economic growth theory (Jones 1995). Observing the benefits of R&D activities in economic development, many governments — particularly, of developed countries — have provided huge subsidies for the promotion of such activities.

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Currently, under the World Trade Organization (WTO) system, there are restrictions or prohibitions on the developing countries' use of subsidies provided to selected industries or firms. R&D subsidies are also governed by the Uruguay Round Agreement on Subsidies and Countervailing Measures. Accordingly, despite the need of industrial restructuring of more value-added industries, the policy space is quite limited for developing countries to provide subsidies to R&D activities. Although two decades have passed since the settlement of the Uruguay Round, the huge gap in economic development levels between developed and developing countries has not been narrowed down. Therefore, one may doubt the "fairness" of the WTO system with regard to the R&D subsidies of its members, irrespective of apparent differences in economic development levels, although there is no consensus on the definition of "fairness" in the global trading system (Suranovic 2000).

I begin this paper with explaining the WTO regulations relating to R&D promotion measures, considering the important role of R&D activities in economic progress of developing countries. I then focus on R&D subsidies in developing countries in particular, and evaluate the WTO regulations from the viewpoint of fairness within international trade relations. I further review the WTO members' positions regarding R&D subsidies in the current Doha Development Agenda (DDA) negotiations. I also suggest methods that developing countries may use to promote R&D activities under the WTO system. Finally, from the viewpoint of "distributional fairness" within international trade relations, I suggest ways of modifying the current WTO regulations for the purpose of R&D promotions and developments of high value-added industries in developing countries. Despite the necessity of such work, there have been few academic studies focusing on the special and differential treatment (SDT) of developing countries with respect to R&D promotion policies in the global trading system. Therefore, with the current paper, I try to fill this gap.

The structure of the paper is as follows: Section two explains the current WTO regulations governing R&D promotion policies of developing countries. Section three analyzes the concept of fairness in international trade relations and the SDT of developing countries relating to R&D promotion policies in the WTO system. Section four explains the negotiations on R&D subsidies in the current DDA and suggests ways of modifying the current WTO regulations to promote R&D activities of developing countries from the viewpoint of distributional fairness within international trade relations. Section five provides my conclusions.

Regulations Affecting R&D Promotion Policies

Subsidies may affect production costs and market prices, resulting in distortions in resource allocation and a reduction in subsidizing a country's economic welfare. In an open economy, they create a difference between foreign and domestic prices and may distort international competition. On the other hand, subsidies may correct market failures and contribute to improvement of economic welfare. That is, in the presence of domestic economic distortions, such as externalities, a subsidy directly targeting them may be the most efficient policy response (Zampetti 1995, 6).

The global trading system has regulated certain types of subsidies. Article 6 of the General Agreement on Tariffs and Trade (GATT), governing goods trade, has allowed the impositions of countervailing duties (CVDs) to offset the adverse effects of subsidized imports for producers in importing countries on the condition that such subsidized imports cause material injuries to domestic producers. R&D subsidies were not mentioned at all in the initial stage of forging the global trading system. For instance, the Havana Charter, which was expected to be the basis of the International Trade Organization in 1948,[1] did not mention anything about subsidies. In the late 1940s, impositions of R&D subsidies were not well-recognized even among developed countries.

With the proliferation of various types of non-tariff barriers (NTB), the Tokyo Round negotiations resulted in the establishment of six NTB Codes including the Subsidies Code of 1979. Article 11 of the Tokyo Round Subsidies Code in the GATT recognized that "subsidies other than export subsidies are widely used as important instruments for the promotion of social and economic policy objectives." One of six such objectives stipulated in Article 11.(1).(d) of the Tokyo Round Subsidies Code was "to encourage research and development programmes, especially in the field of high-technology industries." In this manner, it acknowledged the beneficial effect of R&D subsidy arising from the positive spillovers of R&D activities of firms. Consequently, Article 11.(3) of the authorized "government financing of research and development programmes" cautions only that governments should "weigh, as far as practicable ... possible adverse effects on trade (Article 11.(2))." Meanwhile, the signatories of the GATT were allowed to countervail foreign R&D subsidies that harmed their domestic industries (Kleinfeld and Kaye 1994, 47).

The laissez-faire climate prevailing at the start of the Uruguay Round negotiations facilitated the discussion on the prohibition of certain subsidies and regulation of others to some extent (Zampetti 1995, 17). The WTO system, governing international trade relations as a result of the Uruguay Round negotiations, has regulated subsidies with the Agreement on Agriculture, the Subsidies Code, and the General Agreement on Trade in Services (GATS). Of those Agreements, the Subsidies Code covers subsidies being provided for manufactured goods in the WTO system. The Uruguay Round Subsidies Code includes the definition of subsidy and the explanation of the types of subsidies, among others.[2] The Uruguay Round Subsidies Code defines subsidy as a financial contribution by a government or any public body and a benefit to be thereby conferred. Specific subsidy is defined as one benefitting certain selected companies, industries, or regions as opposed to one being made available to any domestic company. It is regulated by the WTO because it may distort international trade by giving domestic producers a competitive advantage over foreign companies.

[1] Section C on subsidies and Article 34 titled, "Anti-Dumping and Countervailing Duties" of Havana Charter, i.e., Interim Commission for the International Trade Organization (1948).

[2] Refer to Hoda and Ahuja (2005, 1009-1030) for a survey of the Uruguay Round Subsidies Code.

Article 8 of the Uruguay Round Subsidies Code is concerned with the non-actionable subsidy. Regarding a non-actionable subsidy, even if an imported product is subsidized by the government of an exporting country and satisfies all the other conditions, the government of the importing country is not allowed to impose CVDs. The non-actionable subsidies comprises non-specific subsidies and three types of specific subsidies. The latter reflects the externality or equity aspect and includes subsidies relating to R&D, regional development, and environmental protection. Of those three types of specific subsidies, regarded as non-actionable subsidies, R&D subsidies draw a particular attention in the sense that they may lead to improvement of technology levels and to economic growth in the long run. Despite the benefits of R&D subsidies in a national economy, firms spending R&D expenditures are not likely to be rewarded for social benefits in the market. Therefore, a government's subsidization of R&D activities can be justified in the sense of improving national welfare (Benitah 2001, 265-266).

Article 8(a) of the Subsidies Code considers such a positive externality property of R&D subsidies explicitly. It stipulated the following R&D subsidies as non-actionable: assistance for research activities conducted by firms or by higher education or research institutes on a contract basis with firms if (i) the assistance covers not more than 75 percent of the industrial research costs or 50 percent of the pre-competitive development activity costs; and (ii) provided that such assistance is limited to costs of personnel; (iii) costs of instruments, equipment, land, and buildings used exclusively and permanently for the research activity; (iv) consultancy costs used for the research activity, including bought-in research and technical knowledge, patents; (v) additional overhead costs; and (vi) other running costs, such as those of materials.

Article 8(a) clarified the definitions of "industrial research" and "pre-competitive development activity." The former means "planned search or critical investigation aimed at discovery of new knowledge, with the objective that such knowledge may be useful in developing new products, processes or services, or in bringing about a significant improvement to existing products, processes or services."[3] The latter is defined as the translation of industrial research findings into a plan, blueprint, or design for new, modified, or improved products, processes, or services that are unsuitable for commercial use.[4] R&D subsidies provided to fundamental research activities independently conducted by higher education or research institutes are beyond the coverage of the Uruguay Round Subsidies Code.[5]

Together with subsidies related to regional development and environmental protection, R&D subsidies (as explained above) were regarded as non-actionable subsidies until 1999. Although Article 31 of the Uruguay Round Subsidies Code, entitled "Provisional Application," stipulated that the provisions of Article 8 "shall apply for a period of five years, beginning from the date of entry into force of the

[3] Footnote 28 of the Uruguay Round Subsidies Code.
[4] Footnote 29 of the Uruguay Round Subsidies Code.
[5] Footnote 26 of the Uruguay Round Subsidies Code.

WTO Agreement," the Committee on Subsidies and Countervailing Measures of the WTO should have reviewed "the operation of those provisions, with a view to determining whether to extend their application, either as presently drafted or in a modified form, for a further period." In 1999, the WTO members' views continued to diverge considerably over whether Article 8 provisions should be extended, either in their current form or with some modifications. Since there was no consensus to extend them, they were terminated at the end of 1999.[6]

Currently, although the subsidies provided to fundamental research activities independently, not on a contract basis with firms, are not regulated by the WTO, contracts with firms being provided with other R&D types to universities or research institutes are regarded as specific subsidies. Thus, if exported outputs are produced by firms who receive such R&D subsidies from the government, they may be subject to the imposition of CVDs.

R&D subsidies provided by the government have actually played a significant role in industrial restructuring toward more value-added or technology intensive industries, as being witnessed in some countries, such as South Korea and Taiwan, both exhibiting very rapid economic growth rates since the 1960s. For instance, the South Korean government laid the foundation for R&D promotion since the 1960s. The government established research institutes, academic institutions specializing in science and engineering, and science parks, as well as provided tax incentives to firms that paved the way for other firms to innovate in R&D. During the 1980s, the Korean government established nation-wide research institutes to achieve well-balanced development and tried linking them to universities and private companies, expecting a greater synergy in industrial development. It also constructed nation-wide science parks promoting cooperation between academia, public research institutes, and private companies. Through such active R&D promotion policies, the technology level of South Korea has become comparable to that of other major developed countries (Jung and Mah 2013).

Despite the active provision of R&D subsidies to promote technology intensive industries until the 1980s and 1990s, under the WTO system many governments have tried to restrict R&D subsidies targeting selected firms or industries. For instance, during the 1980s, the Taiwanese government selected eight strategic industries as the targets of an R&D promotion policy and began to offer direct R&D subsidies to companies in designated areas. It also gave tax incentives to manufacturers allocating a portion of their revenues to R&D and provided half of the initial investment for newly established semiconductor firms. Subject to the WTO regulations, the Taiwanese government switched its R&D policy attention from encouragement of targeted industries to function-oriented subsidization in the 2000s. That is, it began to emphasize the development of science parks and the funding of research personnel (Mah 2015; National Science Council 2007, 2, 9-10). Since the 2000s, Korea also withdrew some of the tax incentive programs targeting R&D activities in certain industries (Jung and Mah 2013).

[6] WTO document, G/SCM/M/24, para.20, 26 April 2000.

Since the original GATT was actually an agreement among developed countries, it did not reflect the interests of developing countries (Wolfe 2004, 586). The contracting parties were treated as equals and its basic principle has been "non-discrimination." Most-favored-nation (MFN) treatment provision, which is one of the mainstays of the non-discrimination principle, can be said to reflect "procedural fairness," pursuing legitimacy of process, applied to international trade relations. Although there was no provision of SDT for developing economies due to the pressure of developing countries, in the late 1950s, GATT Article 18 was modified to deal with government assistance to economic development, and only developing countries were allowed to derogate from obligations (Pangetsu 2000, 1286). Part IV on Trade and Development was included in the GATT, and introduced the basis for developing countries to seek flexibility in GATT rules by considering their development needs. Although much of the expressions of Part IV only suggested good intentions instead of binding obligations, the addition was unprecedented in the sense that it introduced the principle of "non-reciprocity" in favor of developing countries (Pangetsu 2000, 1288).

With the inclusion of Part IV of the GATT, for the first time, developing countries succeeded in introducing a concept of fairness into the GATT by recognizing the importance of equity of outcomes rather than just legitimacy of process as a general principle (Narlikar 2006, 1016-1017). Part IV recognizes that the rapid economic growth of developing countries would be facilitated by diversifying the economic structure and avoiding excessive dependence on the export of primary products. Thus, it acknowledges the importance of industrial restructuring in developing countries.

The traditional approach to SDT of developing countries in the global trading system has comprised trade preferences, limited reciprocity in trade negotiations, and temporary exemption from certain rules, conditional upon the economic development level (Hoekman 2005, 407). For instance, institutionalizing the concept of non-reciprocity further, the United Nations Committee on Trade and Development (UNCTAD) decided to establish a non-reciprocal system of preferences and the GATT introduced the Generalized System of Preferences (GSP). Excluding the GSP, the GATT considers fair trade basically as a matter of process and legitimacy, rather than of outcomes and equity (Narlikar 2006, 1017). The Tokyo Round, ending in 1979, mentioned the SDT of the least developed countries for the first time in the global trading system, and thus introduced the two-tier concept of developing economies — i.e., developing countries in general and least developed countries (Pangetsu 2000, 1288-1289).

Up until the settlement of the Uruguay Round, the contracting parties of the 1947 GATT could decide whether to sign the NTB Codes or not. Most developing countries did not sign the Tokyo Round NTB Codes. With the settlement of the Uruguay Round, all countries were obliged to abide by all Agreements regardless of the economic development level (Senona 2008, 1045). The current Uruguay Round Subsidies Code recognizes that subsidies may play an important role in the economic progress of developing countries. There are a few SDT provisions in the current

Uruguay Round Subsidies Code that favor developing countries.[7] Meanwhile, the currently applied Uruguay Round Subsidies Code does not have any provision of SDT for developing countries with respect to R&D subsidies.[8]

Fairness in International Trade Relations

Most developed countries emphasize R&D activities and allocate a significant proportion of their budgets to R&D promotion. The average R&D expenditure/GDP ratio of the Organization for Economic Cooperation and Development (OECD) members reached 2.3 percent in 2008 (OECD 2011). Meanwhile, developing countries have allocated only limited funds to R&D activities. Even if they understand the importance of R&D in economic development, many of them lack sufficient financial resources. Since R&D activities may lead to improvement of productivity and economic growth, such a significant difference in R&D activities is likely to lead to divergence between developed and developing countries.

The current Uruguay Round Subsidies Code, which is concerned with the industrial policy of promoting certain industries, has a few SDT provisions supporting developing countries. Meanwhile, there is no provision relating to SDT of R&D subsidies provided by developing countries. Considering the huge gap of economic development between developed and developing countries, one may doubt whether the WTO system, particularly the Uruguay Round Subsidies Code, is fair. Since, due to the extremely conflicting views, it is very difficult (if not impossible) to arrive at a consensus on what fair international trade relation truly is, it is necessary to start by reflecting on the concept of fairness.

Since the contribution of John Rawls in the 1970s, the issue of justice or fairness became a popular debate. Considering the "original position" under the "veil of ignorance," Rawls (1971, 302) suggests that the social contract of society would agree on starting with principles, such as "the difference principle," that states: "Social and economic inequalities are to be arranged so that they are ... to the greatest benefit of the least advantaged." This "principle of justice is lexically prior to the principle of efficiency and to that of maximizing the sum of advantages" (Rawls 1971, 302). In this manner, Rawls argues that rational people would adopt a "least worst," or the "maximin" rule, and he defends the superiority of the maximin principle over the utilitarianism of economics (Zajac 1995, 85).

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[7] Developing countries include least developed countries, which consist of the countries categorized by the United Nations as the least developed and developing countries with a GNP per capita of less than US$1,000 per annum. (For a list of least developed countries, as designated by the United Nations, refer to www.unohrlls.org/UserFile.) As of December 12, 2013, there were 48 least developed countries according to the United Nations criterion. Total population of the least developed countries had reached 832 million as of 2010.

[8] Due to the acceptance of the single undertaking principle, the Uruguay Round Agreements of the WTO providing SDT focused on three categories: (a) extended transition period or other limits regarding the implementation of the Agreements to allow time to adapt the national legislation and institutions; (b) some exceptions, exemption, or flexibilities in favor of the least developed countries; and (c) provisions for technical assistance and capacity building (Senona (2008, 1045).

John C. Harsanyi (1975) compares two schools of thought regarding the decision rule that is used by a rational person under uncertainty — i.e., the maximin principle and the utilitarianism pursuing expected utility maximization. He criticizes the former in the sense that it leads to serious paradoxes because it often suggests unacceptable practical decisions. Harsanyi contemplates two possibilities: enjoying a well-paid job with a very low probability of death and a low-paid job with no probability of death. The maximin principle says that one must evaluate every policy available to him/her in terms of the worst possibility that could occur to him/her. Since being alive is preferred to death, if one follows the maximin principle, he/she must choose the low-paid job. Harsanyi (1975, 595) then argues that it is extremely irrational to make one's behavior wholly dependent on some highly unlikely, unfavorable contingencies regardless of how little probability one assigns to them.

Harsanyi's criticism of the maximin principle is right in the situation he considers — i.e., a very low probability of death and a very high probability of being alive. However, in the global trading system, consisting of developed and developing countries, it is not plausible. A relatively small number of people on earth are born in developed countries and a much larger share of them are born in developing countries. Therefore, in the original position under the veil of ignorance, it would be rational for one to accept the maximin principle in a situation where the probability of belonging to a miserable situation is very high. That is, in the original position of facing uncertainty, pursuing maximization of the interest of developing countries can be supported as fairness in international trade relations. Based on Rawls's theory of justice — the difference principle in particular — Frank J. Garcia (2007, 466) suggests an international difference principle, saying: "International social and economic inequalities are just only if they result in compensating benefits for all states, and in particular for the least advantaged states."

In the global trading system, Steven M. Suranovic (2000, 286-287) summarizes all arguments on fairness in two broadly defined categories: equality fairness and reciprocity fairness. The former includes "non-discrimination fairness" and "distributional fairness." Suranovic (2000, 287) regards non-discrimination fairness and distributional fairness as belonging to equality fairness as the most important principles of fairness. Recognizing that people are fundamentally the same in important aspects is the basis of equality fairness. For "equality fairness," a major issue is to define the "equalisandum" — i.e., the thing to be equalized. When equality is used to assess actions that are taken, one can refer to it as "non-discrimination fairness." When it is applied to final outcomes, one can consider it as "distributional fairness" (Suranovic 2000, 287-288). The former states that any action performed by one person should be equally allowed to every other person. The basic principles of the WTO — i.e., most-favored-nation (MFN) treatment and national treatment — can be regarded as "non-discrimination fairness" in regard to international trade relations (Mah 2010).

An extreme form of "distributional fairness" in the world economy would be the so-called global egalitarianism, which is based on the belief that all equals should enjoy the same level of wellbeing, income, and wealth. According to this principle,

inequalities across countries are unjust and rich people from affluent countries should distribute part of their wealth to poor people in less well-off countries (Fabre 2007, 142).

A less stringent application of global egalitarianism is that more attention should be paid to the underprivileged who subsist on income below international poverty lines (Brock 2007). From the viewpoint of distributional fairness applied to international trade policy, if protection of a certain sector could save jobs, trade protection may be regarded as fair trade in these circumstances since it can prevent the worsening of income inequality (Suranovic 2000, 290-291). SDT of developing countries can be said to pursue "distributional fairness" in the global trading system and may be justified from the viewpoint of social justice, according to Rawls's maximin principle from the original position.

Robert H. Wade (2003) compares "non-discrimination fairness" with "distributional fairness" from the viewpoint of morality in international relations. The "non-discrimination fairness" is based on the principle of jungle morality expressed by reciprocity. The WTO Agreements based on "non-discrimination fairness" reflects relative bargaining strengths, with the strongest performing the best. The "distributional fairness" is based on the "all-men-are-brothers" morality of non-reciprocity between developed and developing countries. Accordingly, the strong have a duty to restrain themselves in order to help the weaker ones.

Pursuing "distributional fairness" in international trade relations can be considered as one similar to fairness explained by George A. Akerlof and Janet L. Yellen (1990). Akerlof and Yellen (1990) consider two groups of workers in the labor market. They represent the fair wage group according to a weighted average by the reference group and the market clearing wage. That is, workers belonging to the low-paid group may regard their fair wage as an average of the wage of the high-paid group in the same firm and the market clearing wage. Akerlof and Yellen's (1990) analysis on fairness in the labor market can be applied to the global trading system. I can account for two groups: rich, developed countries and poor, developing countries. If one follows Akerlof and Yellen's (1990) interpretation, the group of poor, developing countries may regard "fairness in international trade" as an average of the outcomes following procedural justice and those following global egalitarianism which targets equal outcomes.

R&D Subsidies and Special and Differential Treatment of Developing Countries

WTO Members' Views on Fairness and R&D Subsidies

The policy space has been quite limited in the Uruguay Round Subsidies Code. Many developing countries have not recognized the costs arising from the shrinking policy space, while some of them have demanded that the new round of negotiations under the WTO system should address the needs of the poorest countries (Gallagher 2008, 74).

The Seattle Ministerial Conference of the WTO system in 1999 attracted much attention in the sense that it might be the start of new multilateral trade negotiations. During the Seattle Ministerial Conference, Malaysia expressed willingness to continue participating in evolving rules that are "fair and equitable." Although no member defined what constitutes "fair and equitable" in international trade relations in any clear terms, India's government stated: "We are committed to a strengthened, rule-based, non-discriminatory multilateral trading system which is *fair and equitable*. The central theme of any negotiations should be to focus on all-round *development capable of eradicating poverty*." India also emphasized that "[e]conomic integration cannot advance if the interests of the poor are left behind."[9] That is, India regarded fair trade as a regime contributing to advancing the interests of the poor. In this sense, it can be interpreted that India understood the concept of fairness from the viewpoint of Rawls's maximin principle.

The Indian government opined that "the Uruguay Round Agreements have not served all the membership well. There are critical gaps that need to be urgently addressed" and "[t]he special and differential treatment clauses have remained virtually inoperative. ... Even in areas, where developing countries began to acquire trade competitiveness, anti-dumping or subsidy investigations have been initiated in increasing numbers."[10] Although we can find SDT provisions in some Agreements of the WTO, according to the government of India, they have not actually benefitted developing countries significantly.

The government of Malaysia complained about the limited space for industrial policy necessary for economic development of developing countries, saying: "Our experience shows that there are deficiencies in the Anti-Dumping and Subsidies Agreement that need to be rectified. The Anti-Dumping Agreement, for instance, does not make a distinction between dominant suppliers or small and new exporters from developing countries. The Subsidies Agreement limits the ability of developing countries to pursue developmental objectives by disallowing the foregoing of revenue as a form of incentive."[11]

Complaints on the huge gap between developing and developed countries and the impotence of the Uruguay Round results in relieving the difficulties of the former became one of the reasons of serious disharmony in negotiations among members and a debacle during the WTO Ministerial Conference held in Seattle in 1999. Concerns about the need for economic development of developing countries expressed during the conference negotiations led to the start of the DDA negotiations in 2001.

Regarding R&D subsidies, most developed countries and a limited number of high-income developing countries expressed their support for the extension of Article 8 of the Subsidies Code during the DDA negotiations. The problem is that Article 8-related subsidies, including R&D subsidies, have mostly been utilized by developed

[9] WTO document, WT/MIN(99)/ST/28, para.12, 1 December 1999, emphasis added.
[10] WTO document, WT/MIN(99)/ST/16, 30 November 1999.
[11] WTO document, WT/MIN(99)/ST/28, para.2, 1 December 1999.

countries. Therefore, during the DDA negotiations, most low- and middle-income developing and (a limited number of) developed countries opposed the extension of Article 8 of the Subsidies Code (Rios Herran and Poretti 2008, 551-552).

For instance, Pakistan stated that Article 8, containing R&D subsidies, only included subsidies of interest to developed countries that disturbed the balance of the Subsidies Code. In regard to extending Article 8 provisions, Brazil, India, Malaysia, Pakistan, and Thailand stated that they would not favor any extension of the provisions unless they were changed to accommodate the concerns of developing countries. A few developed countries, including New Zealand, did not support the extension of Article 8 because they had made little or no use of the subsidies concerned. Meanwhile, many other developed and upper middle-income developing countries, such as Chile, the Czech Republic, the European Commission (EC), Israel, Korea, Poland, Switzerland, and Turkey favored an extension of Article 8. Canada expressed the opinion that the loss of Article 8 provisions would be a regressive step, and also supported an extension.[12]

Since the 2000s, little progress has been made in DDA negotiations with respect to R&D subsidies (Gallagher 2008, 77-78). No official proposal has been submitted by WTO members for the past decade, despite the crucial role of R&D policies in economic development. The Ninth WTO Ministerial Conference announced the adoption of the Bali Package in early December 2013. Meanwhile, the Ministerial Declaration does not mention R&D policies at all.

Ways of Pursuing R&D Policies Under Current WTO Regulations

One can consider the direction of R&D policies of developing countries that are pursuing economic development in the following manner. First and foremost, it is critical for policymakers to recognize the importance of R&D policies and R&D subsidies in economic development. Such Asian dynamic economies as South Korea, Taiwan (since the early 1980s), and China (since the early 1990s) began to emphasize the role of R&D activities and technology intensive industries in economic development, and to pursue R&D promotion policies actively (Jung and Mah 2013; Kim and Mah 2009).

Some social scientists like David Held and Anthony McGrew (1999, 187-188) argue that virtually all policy options, except human capital policies like education and training, are prohibited by WTO regulations. Linda Weiss (2005, 724) argues that the measures permitted by the WTO system are friendly to developed countries and enable them to align their national economic development goals with support for industry, technology, and export. Although the Uruguay Round took a large bite out of development policy made available to developing countries, many options still remain under the WTO. In addition to investment in human capital, providing marketing support for corporations and improving public infrastructure are crucial

[12] WTO document, G/SCM/M/24, para.20-53, 26 April 2000.

elements of late industrialization which are allowed to the WTO members (Gallagher 2008, 73).

WTO members are also allowed value-added tax exemptions regarding R&D activities and transactions in technology intensive products. In addition, they can provide general infrastructure, such as railways, highways and ports, and electricity generation to R&D-related facilities since they are not regarded as subsidies (Adamantopoulos 2008, 436). Export incentives, such as duty drawbacks,[13] and export insurances, not exceeding certain threshold levels, can be provided to exporters of technology intensive products (Mah 2010).

As long as R&D subsidy aims at the "enlargement of general scientific and technical knowledge not linked to industrial or commercial objectives," it is non-actionable under the Subsidies Code (Kleinfeld and Kaye 1994, 47). That is, R&D subsidies provided to universities or research institutes with non-commercial purposes are not regulated by the Uruguay Round Subsidies Code. Therefore, a government can establish and maintain academic institutions educating scientists and technicians who will undertake R&D activities. A government can also subsidize science parks and research institutes performing basic and applied research on certain industries that cannot be directly commercialized since government funding of "fundamental research" (i.e., non-commercial and non-industrial research), independently conducted by educational and research institutes, falls outside of the parameters of the Uruguay Round Subsidies Code.

One condition for the efficient operation of R&D promotion policies would be the enhancement of administrative capacity. The ability of policymakers to understand the current economic situation and the prospects for future industrial structure of an economy would be important. In the absence of a policymakers' insight, it would be difficult to plan and implement R&D promotion schemes and industrial policy that would become the basis of production and export of value-added manufactured products. To build such capacities, it would be helpful for developing countries to allow key government officials to obtain appropriate graduate education — including in economics, science, and technology — a measure that is necessary for efficient policymaking.

Financial sources for strengthening the R&D policymaking capacity and educating young cadres in developing countries may be drawn from the Official Development Assistance (ODA) funds. Governments of developed countries and/or international organizations, such as the World Bank or regional development banks, may increase training programs and seminars to train government officials or administrative staff in developing countries. Partial provisions of ODA are needed to promote the establishment and maintenance of science- and engineering-related academic and research institutes. In addition, many developed countries could invite students from developing countries in lieu of their ODA programs, as it is necessary

[13] It is defined as remission of import duties for exporters with respect to imported raw materials and intermediate goods that are used in the production of an exported product (Mah 2007).

for them to provide more chances of training for students coming from developing countries and majoring in science and engineering.

In order to improve the capacity of producing value-added, technology intensive products, it is necessary to enhance the overall education level of people, especially tertiary levels of education. As a developing country enters the next stage of economic development, it loses its comparative advantage in labor intensive products which rely on cheap and abundant labor. For comparative advantages, more focus should be placed on capital- and technology intensive products. For instance, although South Korea and Taiwan had a comparative advantage in labor intensive products, such as garment and shoe production in the early stage of economic development, both began to develop technology intensive industries during the 1980s, including information technology (Amsden 2003; Mah 2007). The majority of products exported by these economies now are technology intensive products. The development, production, and export of such commodities require an ample supply of workers with solid educational backgrounds in science and engineering or graduate school education.

Regarding subsidies, developing countries may also benefit from the provision of *de minimis* values of subsidy in the Uruguay Round Subsidies Code. That is, the CVD investigation of a product imported from a developed or developing country should be terminated if the level of subsidies provided for the concerned product does not exceed 1.0 or 2.0 percent, respectively, of its value, or the subsidized imports share less than 4.0 percent of the total imports of the product for the importing country. The SDT is diluted by the so-called cumulation provision in the Uruguay Round Subsidies Code. That is, even if the imports from a developing country share less than 4.0 percent of the total imports of a given product in the importing country, should such imports collectively account for more than 9.0 percent of the total imports of the concerned product in the importing member, then the government of the importing country can investigate the CVD.

Although the additional 1.0 percent relating to *de minimis* values of subsidy may appear minimal, a subsidy of up to 2.0 percent of the value of products allowed for developing countries is not a trivial amount in the sense that the average profit in the manufacturing sector does not exceed several percent in most industries. Therefore, provision of R&D subsidy to certain selected firms and industries of up to 2.0 percent of the value of a product may be quite helpful for the concerned firms and industries. That is, even if developing economies provide R&D subsidies up to the stipulated *de minimis* level, such products exported to the rest of the world would not be subjected to CVDs by the importing countries. In addition, even if the amount of R&D subsidies exceeds the threshold level, they will not be regulated by the WTO system if the outputs produced are not exported.

It is true that the current WTO system prohibits export subsidies and regulates the provision of specific subsidies by allowing importing countries to impose CVDs. Meanwhile, the least developed countries can provide R&D subsidies to promote exports of non-traditional, more technology intensive products as long as their share falls short of the export competitiveness threshold level. This scenario is currently the most common situation in the least developed countries. Although they may be

subjected to an imposition of CVDs, the share of imports from small developing economies in particular would most likely be insignificant. It would also be generally very difficult for investigating authorities to prove the existence of material injury arising from subsidized import to countries' domestic producers (Mah 2010). Therefore, R&D subsidies provided to firms in developing countries — small developing countries, in particular — are not likely to be subjected to the imposition of CVDs by importing countries.

R&D subsidies may be provided to foreign invested enterprises (FIEs). Many developing countries have maintained export processing zones or special economic zones to attract FIEs. The government may provide various incentives — including tax incentives, streamlined administrative procedures, and infrastructure — to attract foreign direct investment. For instance, Kaoshiung Export Processing Zone of Taiwan, Shenzhen Special Economic Zone in China, and Free Trade Zones of South Korea, have provided very attractive incentives to FIEs that bring in advanced technologies or transfer advanced technologies from abroad.

Modifying WTO Regulations of R&D Subsidies in View of Distributional Fairness

Although one can find some policy space regarding R&D promotion under the current WTO system, there is no SDT provision specific to R&D subsidy. From the viewpoint of distributional fairness in international trade relations, non-reciprocity between developed and developing countries (i.e., SDT of the latter) is to be emphasized by modifying current WTO regulations regarding R&D subsidies.

During the DDA negotiations process, WTO members split in their opinion of SDT. The US has been adamant in not considering SDT.[14] India has led the developing countries' opinions and proposed many concrete ways of modifying current regulations in light of fairness to favor developing countries. Anwarul Hoda and Rajeev Ahuja (2005, 1031-1058) assess the Uruguay Round Subsidies Code from India's perspective and explain the country's experience while implementing it. Meanwhile, India's proposals did not include any concrete ideas of modifying R&D subsidy provisions of the Uruguay Round Subsidies Code.

Although discussions and negotiations on SDT in the global trading system have mostly been focused on market access, most small and low-income developing countries — including Sub-Saharan Africa — today accept that the crucial problem in economic development after the Uruguay Round is not the lack of market access opportunities, but the lack of domestic supply capacities due to low import tariff rates in the current WTO system (Blackhurst, Lyakurwa and Oyejide 2000; Hoekman 2005, 419). Therefore, it would be appropriate for WTO members to consider ways of increasing the production capacities of developing countries. From the viewpoint of

[14] WTO document, TN/RL/W/27, "Communication from the United States," 22 October 2002, p. 4.

long-term economic development, it is necessary to enhance R&D policy measures in a way that is more advantageous to developing countries.

The Uruguay Round Subsidies Code stipulates the "development needs" of developing countries.[15] To promote R&D activities in developing countries, it is necessary for the WTO system to introduce changes in the current Uruguay Round Subsidies Code, which is related to industrial policy. R&D activities have positive spillovers. Compared with resource allocation without government intervention, from the viewpoint of national welfare, it may be better for a government to provide R&D subsidies. Without it, there would be under-production of R&D compared with the optimal level of production, and thus leaving R&D activities to markets cannot be supported theoretically. Therefore, it may be suggested that R&D subsidies provided by developing countries be treated as non-actionable.[16]

Alternatively, one can suggest a somewhat less drastic SDT measure of R&D subsidies. R&D subsidies not exceeding a certain threshold level were categorized as non-actionable until the end of 1999, whereas they are currently actionable. There has been no serious negotiation ongoing for reviving it. As an SDT measure of developing countries, the WTO system may consider extending Article 8(1) of the Subsidies Code only to developing countries. Meanwhile, R&D subsidies provided conditionally upon export may remain prohibited regardless of the economic development level. One can also think of a mixture of the above ideas by following a two-tier approach distinguishing between developing and least developed countries. According to this method, the WTO system may extend Article 8(1) to developing countries with certain conditions and allow all R&D subsidies provided in the least developed countries to be non-actionable without specified threshold levels.

Socially beneficial R&D subsidies may also deserve attention. R&D subsidies may lead to innovation. Richard Adkisson (2004, 464-465) emphasizes that the existence of strong intellectual property rights is moving innovation in a direction that may not be best for society, and the social problem becomes one of "steering" innovation rather than stimulating it. Similarly, SDT of developing countries may be related to steering R&D in the direction of "socially beneficial" R&D activities.[17]

The other way of introducing SDT with respect to R&D subsidies is to technically modify some of the articles of the Uruguay Round Subsidies Code. For instance, Article 27(10)(a) of the current Uruguay Round Subsidies Code stipulates the *de minimis* level of a 2.0 percent subsidy applied to developing countries. It is worth noting India's proposal for modifying the *de minimis* level-related provision. That is, India considered the *de minimis* level of subsidization and the negligible volume of subsidized imports to be inadequate for ensuring that developing countries secure a share of international trade. Consequently, India proposed that developing

[15] Article 27(2) of the Uruguay Round Subsidies Code.

[16] During the DDA negotiations, Cuba and Venezuela actually proposed it (WTO document, TN/RL/W/131, "Communication from Cuba and Venezuela," 11 July 2003, p. 1).

[17] I am indebted to the editor who pointed out the relevance of Adkisson's (2004) idea regarding intellectual property rights and innovation to my paper.

countries' export subsidies should be made non-actionable unless they exceed 5.0 percent *ad valorem*.[18] India's proposal may be regarded as granting too much subsidies to developing countries even if the products concerned show a positive externality property. Therefore, India's proposal may be modified to state that developing countries' R&D subsidies should be made non-actionable unless they exceed from 2.0 to 5.0 percent *ad valorem*.

Another way of modifying the technical aspect of the current Uruguay Round Subsidies Code is related to the so-called cumulation provision in the Code, which allows importing country to assess import volume cumulatively in investigating material injury. As stipulated in Article 15(3) of the Uruguay Round Subsidies Code, cumulation has become a common practice in investigating the CVD cases (Durling 2008, 607). To control the abuse of CVDs against developing countries, it may be necessary to eliminate the cumulation provision in general. However, since the idea of eliminating the cumulation provision is likely to meet the objections of the active users of CVDs, one may suggest its elimination with respect to R&D subsidies that have the property of positive externalities as compared to most other types of subsidies. In that case, the harm to the active users of CVDs can be minimized.

Conclusions

R&D policies are critical in economic development in the sense that they contribute to technical progress. For instance, the northeast Asian dynamic economies' emphasis on R&D activities has led to remarkable performances in the high value-added, technology intensive industries. Meanwhile, policy space for developing countries became quite limited as a result of the Uruguay Round Subsidies Code. Due to the single undertaking principle of the WTO system, developing countries have been generally treated as developed countries. It can be justified by "non-discrimination fairness." The WTO system has been based on the "non-discrimination" principle regardless of the different levels of economic development of its members. Therefore, the economic development strategy has been more complicated for developing countries than in previous times (Wade 2003, 635-636).

Without greater balance between developed and developing countries, the future of the global trading system will be in peril (Wolfe 2004, 580), which became evident in the debacle of the Seattle Ministerial Conference of the WTO in 1999. It is understood today that it is the lack of production capacity, not the lack of market access, which serves as a critical impediment to the long-term economic development of developing countries. Therefore, developing countries, among others, should be aware of the role of strengthening their capacity to produce more high value-added products, in particular, by actively implementing R&D promotion policies.

Although it is true that the policy space now is more limited than ever before in the WTO system, there are still some R&D promotion policy measures available to developing countries. It is necessary for developing countries to utilize such available

[18] WTO document, TN/RL/W/4, "Submission by India," 25 April 2002, pp. 1-2.

measures, which include the will of policymakers to establish infrastructure, such as science parks, state-run research institutes, as well as science- and technology-related academic institutions. Government may also support non-commercialized R&D activities. Developing countries can provide subsidies of up to 2.0 percent of the value of a product. In addition to utilizing the relevant provisions of the WTO regulations, this paper provided suggestions for modifying the current Uruguay Round Subsidies Code in the WTO system in favor of R&D promotion policies for developing countries in view of distributional fairness in international trade relations.

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