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Preserving Policy Space for Sustainable Development

The Subsidies Agreement at the WTO

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Abstract

This paper examines subsidy use for correcting distortions in the global economy and to spur sustainable development. We show that the Agreement on Subsidies and Countervailing Measures (SCM) created significant policy space for nations to address technological, poverty and environmental problems—all crucial issues for sustainable development. Until its expiration in 2000, Article 8 of the SCM provided cover for "green-light" subsidies towards research and development, regional development and environmental protection. While some nations took advantage of these provisions, their full potential was not realized before the Article expired. That developed and developing nations have continued to use such subsidies under a tacit agreement not to challenge them under the SCM, reinforces their legitimacy and rationality. The Doha Declaration provides the opportunity to negotiate reinstatement and expansion of these subsidies. We show that preserving this policy space makes more economic sense now more than ever, especially when subsidies are used to correct the many distortions in the global trading system.

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Introduction

In the face of increasing poverty, inequality and environmental degradation across the world, the global community has re-asserted the need for sustainable development through the Millennium Development Goals and at the World Summit on Sustainable Development. At the same time, most of the world's nations have also embarked on a new round of global trade negotiations—the Doha Round under the World Trade Organization (WTO). Citing that they gained very little from the Uruguay Round, developing countries agreed to enter a new round of trade negotiations on the condition that development would be the centerpiece.

There are growing concerns that this promise will not be fulfilled. A major concern is that additional commitments will not give developing nations the "policy space" to use the same instruments and tools many industrialized nations used to reach their current levels of development (Gallagher 2005). This, particularly given that the estimated benefits of the Doha Round for developing countries are very limited. How then, might developing countries' benefits be maximized in the context of WTO negotiations? This paper addresses the need to preserve nations' subsidy use to correct distortions in the global economy and to spur innovation for sustainable development.

We show that the Agreement on Subsidies and Countervailing Measures (SCM) created a significant amount of policy space for nations to address technological, poverty and environmental problems—all crucial issues for sustainable development. Article 8 of the SCM provided cover for non-actionable (green-light) subsidies toward research and development, regional development and environmental protection. Some nations took advantage of these provisions, but their full potential had not yet been realized when Article 8 expired in 2000. Developed nations have continued to use these subsidies with a tacit agreement not to challenge them under the SCM and have reinforced their legitimacy and rationality. The Doha Declaration provides the opportunity to negotiate reinstatement and expansion of these subsidies. We show that preserving this policy space makes more economic sense now than ever, especially when subsidies are used to correct the many distortions in the global trading system.

Policy space for these subsidies is needed for both developed and developing countries. As we will argue, developed countries must cut subsidies for highly polluting fossil fuel activities and increase them on renewable energy alternatives and energy efficiency. Developing countries need this window to develop globally-competitive industries in a sustainable manner. The window for regional development knits the two together and provides space for developed countries to finance developing-country activities.

The paper has five parts. This first section introduces the topic by placing the WTO negotiations in the context of sustainable development. The second part outlines the origins of the Article 8 subsidies in the General Agreement on Tariffs and Trade (GATT) and WTO and shows how subsidies used in developing countries will be lost if action isn't taken during the current round of negotiations. Part three shows that from an economic perspective, the use of green-light subsidies makes sense and can be an important tool towards sustainable development. Part four shows how certain countries are using Article 8 exceptions in the name of sustainable development, and how more countries could realize their potential. The final part of the paper summarizes our argument and discusses opportunities and barriers of preserving policy space for sustainable innovation in the Doha Round.

The context

The world community faces the enormous challenge of increasing the well-being of more than half of its inhabitants without jeopardizing how the natural environment functions—the challenge of sustainable development. Increased international trade and investment supposedly offers an opportunity to meet that challenge, however there is increasing concern globalization is at odds with sustainable development.

Although the last decades of the 20th century saw an unprecedented level of international trade and investment, poverty and inequality remain key characteristics of the global economy in the 21st century. The World Bank defines a person in poverty as someone who earns less than US$2 per day (1999 purchasing power parity) and extreme poverty as one earning less than US$1. Based on this definition, almost three billion people—about half of the world's population—are poor. Close to half of the poor—1.4 billion people—live in extreme poverty (Cline 2004).

The world's ecosystems are no better. According to the recent Millennium Ecosystem Assessment report conducted by 1,300 experts from 95 countries, "60 per cent of the ecosystem services that support life on Earth—such as fresh water, capture fisheries, air and water regulation, and the regulation of regional climate, natural hazards and pests—are being degraded or used unsustainably" (UNDP 2005). Chemicals used in agriculture are already the largest source of surface water pollution in many developing countries. What's more, 1.12 billion people in the world lack access to sufficient clean water. At the same time, global atmospheric concentration of greenhouse gases is multiplying as developed countries maintain or accelerate fossil fuel use. For example, China, India and Mexico are already the 2nd, 6th and 15th largest contributors to global CO_2 emissions respectively. Such degradation is proving to be costly in economic terms. The World Bank and other international agencies estimate that the costs of environmental degradation in many countries can range from six to 10 per cent of Gross Domestic Product (GDP) on an annual basis.

The Uruguay Round of world trade negotiations was completed in 1994 and culminated in the establishment of the WTO in 1995. It is estimated that annual gains from the Uruguay Round were approximately US$200 billion. However, it has also been estimated that 70 per cent of those gains have gone to developed countries and most of the rest to a handful of developing countries. In the first six years following the Uruguay Round, it is estimated that the 48 least developed countries (LDCs) were worse off by US$600 million per year (Stiglitz and Charlton 2004). When the developed world proposed another round of global trade talks in 2001 in Doha, Qatar, the developing countries accepted on condition that development form a core part of the negotiations.

The world community has made development a priority through the Millennium Development Goals and the global commitment to sustainable development signed at the World Summit on Sustainable Development. At the same time, most of the world's nations have also embarked on a new round of global trade negotiations—the Doha Round of the WTO. The Doha Declaration makes explicit reference to sustainable development:

> "We strongly reaffirm our commitment to sustainable development, as stated in the Preamble to the Marrakesh Agreement. We are convinced that the aims of upholding and safeguarding an open and non-discriminatory multilateral trading system, and acting for the protection of the environment and the promotion of sustainable development can and must be mutually supportive" (WTO 2001).

The technological, environmental and regional distortions plaguing today's global economy demand customized, imaginative and adaptive solutions. This can only be achieved if local innovation systems can be preserved and expanded. Informed and responsible government policies are needed to enhance three pillars of sustainable development:

- **Economic:** growth of endogenous productive capacities, especially knowledge-creation through research, development and education;
- **Social:** distributing the benefits of economic growth so they may help improve living standards and reduce poverty and inequality; and
- **Environmental:** improvement in the environmental performance of firms, households and governments.

Many experiences worldwide have shown that, if the proper coordination exists among governments, individuals, communities and the private sector, targeted and disciplined subsidies can foster sustainable innovation. If we consider the world trading system as a policy regime *in the making* and want it to foster long-term, sustainable economic and social change, it should be designed to preserve and encourage policy instruments for countering global market distortions. It must recognize the technological, environmental and regional impacts that these distortions can have in developing countries.

Innovation for sustainable development will require an extensive and coordinated effort across many policy regimes, including the WTO. Estimates of benefits to developing-countries from "likely" outcomes of the Doha Round are surprisingly small, ranging from US$4 billion to US$16 billion or .08 to .14 per cent of GDP. More than half of those benefits go to just five developing countries (Ackerman 2005). It is important that negotiations preserve policy space for nations to establish effective sustainable development policies. One small window of opportunity for developing countries is the preservation of Article 8 green-light subsidies in the SCM.

The evolution of "green-light" subsidies in the world trading system

The Uruguay Round established grounds for the use of "non-actionable" subsidies to support research and development, regional development and environmental protection—also called green-light subsidies. After a short presentation on subsidy use under the GATT and the SCM, we outline the political economy of the green-light subsidies and show how they are in danger of being lost.

A. Subsidies in the GATT

Although subsidies are a priority in the current round of WTO negotiations, they were not a major topic during the world trading system's first 50 years. Previous subsidy disciplines for goods in trade agreements were ill-defined and often not used. Surprisingly, subsidies did not even have a legal definition until the Uruguay Round and the birth of the WTO. The green-light Article 8 subsidies were a result of Uruguay Round negotiations.

The forerunner to the SCM and the green-light subsidies was the Tokyo Round Subsidies Code of 1973. The Code divided regulated subsidies into primary and non-primary export categories and prohibited

the latter. Reference to non-export subsidies in the Subsidies Code is similar to the green-light notion of non-actionable subsidies. Article 8 (General Provisions) recognizes that subsidies "promote important social and economic objectives." It asks that signatories "seek to avoid causing" various injuries to other members and that export subsidies on non-primary products "shall not" be granted by signatories. An illustrative list of products was developed from the 1960 GATT list, and export subsidies on certain primary products were permitted. It was this division between primary and non-primary exports that drew criticism from many developing countries and caused their refusal to become signatories.

Article 11 of the Tokyo Code lists non-export subsidies that may be important tools for achieving development objectives. It does "not intend to restrict the right of signatories to use such subsidies to achieve these and other policy objectives which they consider desirable." The development objectives where subsidies could be used included: eliminating industrial disadvantages in some regions; sustaining employment; promoting research and development; and redeploying industry to avoid environmental problems.

B. Negotiation in the Uruguay Round

Green-light subsidies emerged after a hard-fought series of negotiations at the Uruguay Round. In 1987, a working group was established to design a subsidies agreement for the WTO. The group began by outlining basic definitions for countervailable subsidies, domestic industries and other contentious terms.[2] Early papers pointed out that the working group was unable to issue further guidelines because they could not reach consensus on definitions for input subsidies, export restrictions, and research and development.[3] Some countries were retaliating against policies that the implementing country did not consider to be a subsidy.[4]

During the negotiations, developed countries unanimously called for strengthened disciplinary action on distorting subsidies. The U.S. and Canada pointed out the high number of unresolved subsidies disputes. The U.S. also complained the distinction between prohibited and non-prohibited subsidies in the Code had no basis in sound economic policy.[5]

While most industrial countries supported special treatment for developing countries, the U.S. did not. Instead, the U.S. declared that no subsidies should be non-actionable, suggesting countries be prohibited from using export subsidies.[6] The U.S. also called for a close examination of subsidy-like effects of industrial targeting. Other parties, such as Switzerland, Japan and the EU, thought there were some cases where subsidies should be non-actionable. The EU mentioned regional subsidies, and Switzerland pointed to structural adjustment, environmental aid, cultural promotion, employment adjustment and public transportation.[7] Japan pointed to research and development, structural adjustment and regional development.[8]

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2 Note by the Secretariat, Subsidies and Countervailing Measures, April 28, 1987 (mtn.gng/ng10/w/4).

3 Note by the Secretariat, Problems in the Area of Subsidies and Countervailing Measures, March 17, 1987 (mtn.gng/ng10/w/3).

4 Note by the Secretariat, Subsidies and Countervailing Measures, April 28, 1987 (mtn.gng/ng10/w/4).

5 Communication from the United States, March 16, 1987 (mtn.gng/ng10/w/1).

6 Elements of the Framework for Negotiations, Submission by the United States, November 22, 1989 (mtn.gng/ng10/w29).

7 Elements of the Negotiating Framework, Communication from Switzerland, September 13, 1989 (mtn.gng.ng10/w/26).

8 Communication from Japan, August 12, 1987 (mtn.gng/ng10/w/8).

Developing countries' contribution to the debate focused on delineating non-actionable subsidies and limiting countervailing duty investigations. Bangladesh, on behalf of the LDCs, reminded the committee that subsidies are an integral part of economic development programs.[9] Some non-actionable subsidies suggested by developing countries in the course of the debate were generally available subsidies, such as research and development, regional assistance and pollution prohibition assistance.

India proposed a major test for non-actionability be whether the subsidy causes or eliminates an existing market distortion (a subject we return to in the next section). Egypt pointed out that natural resource subsidies were actionable under the code, but should not be.[10] Colombia suggested a non-actionable subsidy might be defined as one where the effective rate of protection was zero.[11] Korea argued subsidy language should include a public interest clause, allowing the interests of consumers and downstream industries be taken into account.[12] Like India, Brazil argued the agreement should not condemn subsidies overall, but should allow retaliation only against those subsidies that disrupt trade flows.[13] Brazil, Korea and India argued subsidies often serve a purpose; they can function as compensatory payments, promote socially beneficial levels of output or address market imperfections. Korea also pointed out the importance of industrial targeting.

In general, developing countries did not accuse industrial countries of misusing subsidies, and instead focused their energy on preserving their own. Colombia did point out there was too much emphasis on an "effects-oriented" approach to determining actionability, which had led to greater attention on countries using export subsidies than on industrial countries using "sophisticated domestic subsidies." The developing countries were also concerned with countervailing duties under the code. Both Egypt and Brazil pointed out that investigations into code violations unnecessarily disrupted investment and trade. Brazil went on to note that many investigations were carried out on insufficient grounds, and that there should be some limit.

C. Green-light subsidies in the SCM

The SCM was established in the Uruguay Round and signed under the Single Undertaking. The agreement loosely defines subsidies as government outlays directly affecting goods production. The agreement laid out three important mechanisms for addressing subsidies in the context of international trade. It prohibited the use of some types of subsidies, outlined the retaliatory mechanisms for nations countering subsidies, and outlined how nations could use WTO dispute settlement procedure mechanisms to withdraw a harmful subsidy by another nation. Under the agreement, a nation could also charge a countervailing duty on subsidized imports that hurt domestic producers.

The agreement clearly defined a subsidy and introduced the concept of a "specific" subsidy. Specific subsidies are supports made solely to an enterprise, industry, or a group of enterprises. The agreement only applies to specific subsidies when they take the form of domestic or export subsidies. This criteria is found in Article 2 of the agreement and should be stressed: the SCM targets only *specific* and *conditioned* subsidies channelled to trade activities that harm other trade parties. In particular, the SCM

9 Proposals on Behalf of the Least Developed Countries, Communication from Bangladesh, November 13, 1989 (mtn.gng/ng10/w/28).

10 Communication from Egypt, November 30, 1987 (mtn.gng/ng10/w/14).

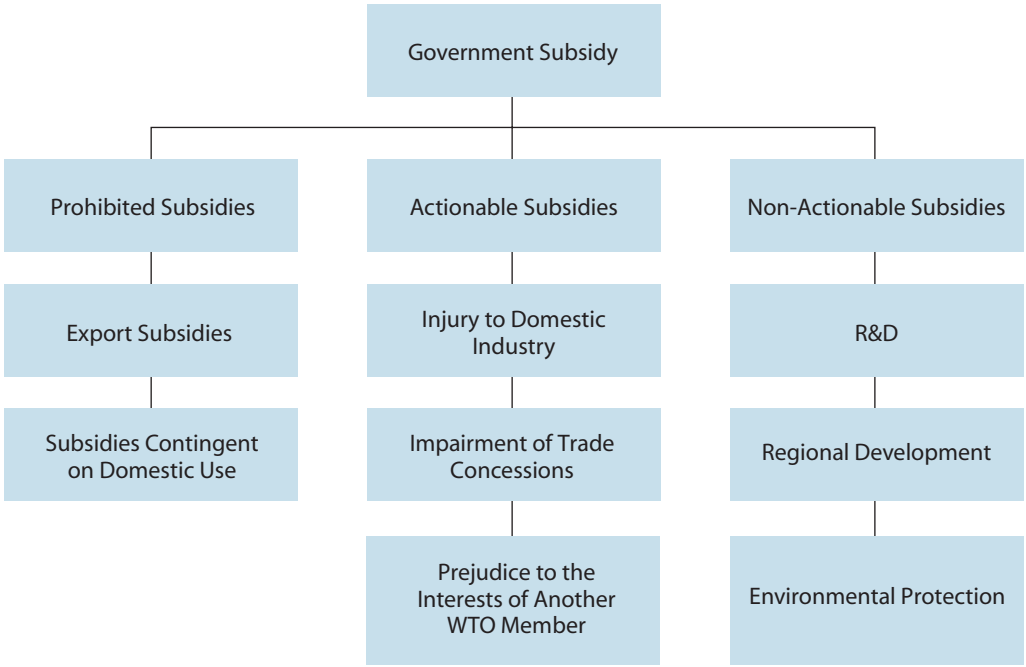
11 Communication from Colombia, November 9, 1987 (mtn.gng/ng10/w/13).

12 Communication from the Republic of Korea, June 1, 1987 (mtn.gng/ng10/w/5).

13 Communication from Brazil, November 10, 1988 (mtn.gng/ng10/w/24).

covers any kind of governmental support that either limits benefit-access to determined firms or sectors, or conditions benefits to performance criteria. Non-discriminatory, horizontal support is not actually considered a subsidy. The agreement acts fundamentally upon the *selective* function of policy.

Figure 1: Agreement on Subsidies and Countervailing Measures



Source: Authors' configuration based on http://www.wto.org

The crafters of the agreement differentiated between subsidies justified on market failure grounds from those that do not (Hoekman and Kostecki 2001). As shown in Figure 1, the SCM separates subsidies into three categories: prohibited, actionable and non-actionable. The SCM covers agricultural goods as well as industrial products, except when the subsidies are exempt under the Agriculture Agreement's "peace clause." Non-actionable subsidies are justified because they are used to correct market failures. Non-actionable subsidies included those used for research and development, regional inequality and environmental protection. This window existed for five years, ending on December 31, 1999, and was not extended. The possibility of reinstating these subsidies is on the Doha agenda.

Article 8 of the SCM outlined the three types of permitted green-light subsidies: assistance for research and development, assistance to disadvantaged regions and assistance to promote the adaptation of existing facilities to new environmental regulations.[14] The specific language in the agreement is as follows (with short summary below):

- **Research and Development:** "assistance for research activities conducted by firms or by higher education and research establishments on a contract basis with firms." These subsidies were limited to the cost of personnel, equipment and overhead activity used *exclusively* in research. Government subsidy for research was only permitted up to development of the first non-commercial prototype

14 Less than 75 per cent of industrial research or less than 50 per cent of the costs of pre-competitive development activity.

- **Regional Development:** "assistance to disadvantaged regions within the territory of a Member given pursuant to a general framework of regional development." These subsidies were only permitted if they were part of a general regional development policy. The subsidies had to be available to, and generally used by, all industries within eligible regions. Eligible regions were based on income or per capita GDP not more than 85 per cent of average, or on at least 110 per cent of the country's average unemployment over a three-year period.

- **Environmental Protection:** "assistance to promote adaptation of existing facilities to new environmental requirements imposed by law and/or regulations which result in greater constraints and financial burden on firms." These subsidies were allowed if they promoted the adaptation of facilities operating for at least two years to new, regulated environmental requirements. In addition, they were limited to 20 per cent of the adaptation cost and could not cover costs of replacing and operating the assisted investment, which had to be fully borne by the firm.

D. Disputes in the WTO and the way ahead

We analyzed WTO panel disputes from 1995 to 2000 and found that although the creation of a "window" for specific non-actionable subsidies was contentious at first, virtually none regarding Article 8 subsidies have been brought by opposing countries since then. We identified one dispute during the period and the subsidy was not withdrawn. In 1996, the U.S. challenged and retaliated against subsidized pasta exports from southern Italy. The Italian government claimed this subsidization was non-actionable under regional development. However, according to Article 8, the subsidy legislation must specify a rate of unemployment or income level target, rather than a specific geographical area. Despite the questionable legality of the subsidy under Article 8, the submitted panel report was not adopted.

As we will demonstrate later, our review of WTO subsidies reports filed by contracting parties found that countries continue to implement Article 8 subsidies in their national policies despite the article expiring in 2000. Early in the millennium, industrial countries tended to maintain a wide variety of agricultural subsidies, while the more advanced of the developing countries maintained export-related subsidies.

Article 8 was only enacted as a test case for five years. It is now under review in the Doha negotiations. This review offers an opportunity for nations to preserve the policy space to spur sustainable innovation. Since the article's expiration, there have been several formal and informal proposals to reinstate green-light subsidies. During the 1999 Seattle negotiations to extend some expiring provisions of the SCM, proposals by Venezuela and others to broaden green-light subsidies to include export subsidies were opposed by the U.S. (Trade Policy Monitor 2000). Canada, the EU, Korea, Czech Republic, Turkey and China supported an extension of these provisions. However, India, Brazil, Thailand, the Philippines and New Zealand opposed the extension. India felt that green-light subsidies only helped the developed countries because they had the funds for such subsidies (Raghavan 1999).

In the end, the Article 8 issue played a key role in the Doha negotiations in Qatar. Indeed, developing countries said they would not sign the declaration unless a commitment to consider the issue was included. Thus, in the new round, members have agreed to "revisit" subsidy use for development. The Doha Declaration itself refers to the revisitation of subsidies issues in paragraphs 13 (agriculture) and 28 (subsidies). Both references stress the importance of clarifying subsidies to put further restrictions on

them. Article 8 revisitation is specifically mentioned in the Implementation-Related Issues and Concerns decision of November 14, 2001. The text is as follows:

> *Proposal to allow certain subsidies for development:* Some countries have proposed that some subsidies in developing countries should not have to face countervailing measures or other actions from other governments. These are described as subsidies with "legitimate development goals," and include support for regional growth, technology research and development, production diversification, and development and implementation of environmentally sound methods of production.
>
> The ministers agree that this is an implementation issue to be handled under section 13, which in turn simply refers to Paragraph 12 of the main Doha Declaration.[15] The ministers also agree that during the negotiations their governments will exercise due restraint in challenging these subsidies.

Despite the commitment of WTO members to revisit subsidies during the Doha round, the issue has been eclipsed by heated negotiations over agricultural support, services liberalization and non-agricultural market access. Some nations argue there has been an unspoken agreement not to take action on green-light subsidies since no formal WTO dispute panels have convened over Article 8, obviating the need for explicit language on allowable subsidies in WTO agreements (UNDP 2003). However, our analysis of the WTO panels found the one panel dispute involving subsidized pasta exports from southern Italy. The panel's ruling was not adopted, but the case is a sign that such subsidies will not be left alone.

The economics of subsidies for sustainable development

The economic rationale for banning subsidies is based on the notion they distort trade and prevent markets from attaining optimal resource allocation. Yet this premise only holds when markets work "perfectly," which is to say, under very specific, optimal conditions. When markets stray from those ideal conditions, market "failures" emerge, distorting the real function of the economy against the ideal result. This creates and sustains inequalities, environmental stress and technical stagnation or regression. However, the nature of market failures in the world economy indicates that the economic rationale for subsidizing sustainable innovation is more important than ever. The recent wave of global trade agreements has integrated vastly different economies with vastly different levels of development. Developed and developing countries alike are rife with market failures. Integration, therefore, has in many cases led to the globalization of market failure—in other words, economic distortions. Targeted and disciplined subsidies can correct these distortions and make markets work more efficiently.

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15 Paragraph 12 to which this refers focuses on implementation-related issues and concerns, and follows: 12. We attach the utmost importance to the implementation-related issues and concerns raised by members and are determined to find appropriate solutions to them. In this connection, and having regard to the General Council Decisions of 3 May and 15 December 2000, we further adopt the Decision on Implementation-Related Issues and Concerns in document WT/MIN(01)/17 to address a number of implementation problems faced by members. We agree that negotiations on outstanding implementation issues shall be an integral part of the Work Programme we are establishing, and that agreements reached at an early stage in these negotiations shall be treated in accordance with the provisions of paragraph 47 below. In this regard, we shall proceed as follows: (a) where we provide a specific negotiating mandate in this declaration, the relevant implementation issues shall be addressed under that mandate; (b) the other outstanding implementation issues shall be addressed as a matter of priority by the relevant WTO bodies, which shall report to the Trade Negotiations Committee, established under paragraph 46 below, by the end of 2002 for appropriate action.

Of course, without the proper policies in place, government subsidies can create more problems than they correct. Subsidies have to be allocated in a disciplinary manner. A framework for "smart" subsidies has been termed "reciprocal control mechanisms" and was deployed by the most successful East Asian economies.

A control mechanism is a "set of institutions that disciplines economic behaviour based on a feedback of information that has been sensed and assessed (Amsden 2005)." For the East Asian success stories, the key principle behind their use of control mechanisms was "reciprocity":

> Reciprocity disciplined subsidy recipients and thereby minimized government failures. Subsidies were allocated to make manufacturing profitable—to convert moneylenders into financiers and importers into industrialists—but did not become giveaways. Recipients of subsidies were subjected to monitorable performance standards that were redistributive in nature and result-oriented. The reciprocal control mechanism thus transformed the inefficiency and venality associated with government intervention into collective good (Amsden 2005: 222).

In addition to controlling mechanisms governing the state-market relationship, governments need to be "embedded" in the private sector while maintaining "autonomy" from sectional elite interests seeking rents (Evans 1995). While embedding themselves in markets, it is essential for states to understand the many market failures in the private sector and to be effective in correcting them (Rodrik 2005). With the proper embedded autonomy, government subsidies can be balanced by control mechanisms measuring and rewarding the receiving sector or firm. In the past, such mechanisms have taken the form of research and development or patent goals, linkages with local industry, and so forth.

The green-light subsidies gave nations the policy space to correct market distortions through three key areas vital to sustainable development. Research and development efforts are essential to building domestic capacities through knowledge creation. Subsidizing regions in or across countries is a key form of redistributing economic growth benefits to raise living standards. Subsidizing firms and communities for environmental protection and providing environmental services is important to achieve environmental sustainable development. Subsidies of this type are sound in economic theory.

There are many situations where markets fall short of providing certain goods at their optimal level; such cases are called market failures. Economic theory states that when the market fails, policy instruments should be deployed to correct the distortions created by private markets (Lipsey and Lancaster 1956). This theory is referred to as the "second-best" theory, and states that government policy can offset market failures. Subsidies are one tool for correcting market failures.

Table 1 exhibits three categories of market failures that are most likely to be "globalized" during the economic integration process: market failures related to imperfect competition, externalities and technological dynamism. Economists have shown that liberalizing trade when one country uses second-best policies and another that does not correct for distortions, can accentuate the distortions that were occurring in the first place.

For instance, if a nation liberalized trade in a sector where its firms are forced to compete with global monopolies or oligopolies, the imperfectly competitive firms can eliminate local firms and sell their products at higher prices than in a competitive environment. Or when trade is liberalized between two countries and only one of them produces with second-best policies to protect the environment, production can increase in the more environmentally-destructive country. Economists have argued the

WTO has focused on reducing tariff rates rather than economic distortions—reducing rates can simply maintain existing distortions and even exacerbate such distortions (Kowalcyk 1989, 2002). In such an environment, subsidies used in a careful manner are one of the many tools that work as second-best solutions to distortions occurring through trade liberalization.

Table 1: The Globalization of Market Failures

Externalities	Competition	Technological Dynamism
Negative Externalities	Natural monopoly and public goods	Learning Effects
environmental degradation	oil, water, and energy distribution	innovation policy
Positive Externalities	Monopsony	Lock-in problems
ecosystem services	small producers squeezed	fossil fuel economies
Information Externalites	Oligopoly	
identifying markets	dumping	

A. Externalities

Externalities are market failures that occur when an action by a producer or consumer causes costs or benefits to accrue to individuals or groups other than the person making the transaction. Thus, in the case of a negative externality, such as air pollution, too much of the good (i.e., clean air) will be consumed from society's point of view. In the case of a positive externality, such as preserving biological or genetic diversity, the good will be under-produced or under-consumed by market actors.

Negative externalities

Government intervention in negative externalities is often from the need to eradicate negative externalities in production and consumption processes. Some goods and services are over-produced because they do not reflect the true social costs of production. Such is the case of highly polluting fossil-fuel energy-sources and means of transportation, and other sources of pollution. Prices do not reflect the costs to human health and the environment. Another case is homogeneous farm products from high-productivity regions flooding into "less efficient" regions, producing crops at higher prices but while sustaining biodiversity in genetic centers of origin (Nadal 2003). In this case, biodiversity—a strategic resource for food security—is not being internalized in the market mechanism.

When a country that has "internalized" its externalities through taxes or subsidies liberalizes trade with a country that does not, there can be an incentive to over-produce in the nation without the policies (Baumol and Oates 1988). This is referred to as the "pollution haven hypothesis." The country with weaker environmental regulations becomes a "haven" for pollution-intensive economic activity. Earlier studies of this phenomenon showed that, although theoretically possible, it rarely happens. Newer studies suggest that pollution havens are indeed beginning to show up in developing countries (Kahn and Yoshino 2004).

With negative externalities, taxes and fees are better instruments to correct this type of market failure than subsidies. However, the "optimal" subsidy is equal to the optimal tax, and therefore a subsidy to a private firm for reducing pollution plays the same role as a tax. The U.S. subsidizes farmers to reduce soil erosion and France subsidizes private industry to reduce water pollution (Panayotou 1998). However, such subsidies often violate the "polluter pays principle" and can encourage too many firms to enter the market because costs of improved practices are paid by taxpayers rather than the firms themselves.

More commonly, taxes from "environmental bads" are used to subsidize environmental goods. Often times, the revenue from environmental taxes is transferred to affected communities or used for the research, development and deployment of alternatives. In developed countries, the subsidies for alternative energy are often financed through fossil fuel taxes (Hansen *et al*. 2001).

Positive externalities

Subsidies are more appropriate for providing positive externalities. Subsidies are optimal for encouraging positive externalities in the form of "economic spillovers" in industry, i.e., subsidies for learning or research and development generate positive externalities that "spill over" into the other parts of the economy. East Asian economies were very successful in generating such externalities through targeted and disciplined subsidies for industries that eventually became some of the world's largest export leaders.

Subsidies also help to internalize positive environmental externalities, such as the public goods aspects of providing environmental services. Subsidies for environmental services are just starting to catch on in the developing world. Trade liberalization without such subsidies can be harmful to people and the environment. When producers in one country generate higher positive externalities than those in another, trade liberalization can erode the supply of those benefits. Such has been the case in coffee and maize markets across the world. These markets have been liberalized and exposed to pollution-intensive (and imperfect) competition in the developed world.

Subsidies to small producers providing positive environmental services in these markets are used extensively to correct such market failures. Rural Mexican and Central American coffee growers provide vital ecosystem services in the form of water and soil conservation and purification. Governments have set up small subsidy programs to keep small coffee farmers in global export markets.

Mexico has programs that correct for the market failures of imperfect competition (see below) and for payments for environmental services (or positive externalities). Since the liberalization of global coffee markets, there has been a chronic over-supply problem and small coffee farmers have been hit hard by large firms that control most markets. To correct for these problems, Mexico's El Fondo de Estabilizacion de Precios (Price Stabilization Fund) and El Fondo de Fomento Productivo (Coffee Productivity Fund) are subsidizing small farmers the difference between the Mexican price and the New York stock price. To compensate for environmental externalities, Mexico's new Payment for Environmental Services program gives coffee farmers up to 500 pesos per hectare per year for carbon sequestration (Calo and Wise 2005). Since these subsidies are specific and affect production and exports, they could be seen as actionable.

El Salvador has a Coffee and Biodiversity Project that compensates coffee farmers for conserving biodiversity in shade-grown coffee plantations. Funded by a tax on fossil fuels, Costa Rica subsidizes communities for providing forest services in the form of biodiversity protection and carbon sequestration. From 1997 to 2002, the program covered over 300,000 hectares with subsidies totaling US$80 million (Rosa *et al*. 2004).

Information and knowledge externalities

Real world departures from the "rational man" of economic theory lead to behaviours that reproduce mistakes and avoid corrections. Incomplete information and knowledge are strong sources of market failure and trade distortions common to both technological and ecological affairs. We refer to them as "uncertainty."

Decision-making in an uncertain environment implies carrying on decisions with unknown consequences. In other words, we are unable to predict which possible consequence of our decisions is most likely. Under these conditions, optimizing behaviour doesn't make sense, and economic rationality drifts towards satisfying, adaptive behaviour (March and Simon 1958; Simon 1959).

Uncertainty can be a result of both imperfect information and complexity. In the first case, reducing uncertainty can simply be a matter of time, coordination or cost. In complex problems, uncertainty is a result of the limits of reasoning, not the limits of knowledge. For example, the complex species interactions in an ecosystem make it impossible to predict what effects changes in these populations will have, even when typical behaviour of all species and their interactions are known.

Innovation, for example, contains "elements that we do not comprehend at the beginning and about which we are uncertain."[16] Using chlorofluorocarbons (CFCs) as refrigerants is a prime example of environmental effects of uncertainty in technical solutions. Invented in 1928 as a non-toxic, non-flammable alternative to other chemical agents, CFCs were first commercially produced in the 1930s. It took almost 50 years to demonstrate their ability to catalytically break down ozone in the presence of high frequency ultra-violet light (Molina and Rowland 1974), and another decade to measure the actual reduction of the ozone layer (Farman *et al.* 1985).

Uncertainty of research and development makes it less profitable, which is the main reason why research and development under-investment will prevail without intervention (Nelson 1959). Under-investment in research and development also emerges when developing new knowledge requires complementary and simultaneous investments by different agents (Arrow 1962). Finally, scale economies in research and development are also a source of distortions of a regional nature, which we will discuss later in this section.

Summing up, uncertainty creates distortions of many kinds by both reproducing unsustainable practices and blocking the emergence of new solutions. Market intervention is then needed to stimulate change in the face of new knowledge and information.

B. Imperfect competition

Imperfect competition is a grave market failure that wreaks havoc on developing countries' ability to support sustainable development objectives. Imperfect competition in the form of oligopoly and oligopsony creates one type of distortion, while another is privatizing state-owned enterprises that are "natural monopolies."

Oligopoly/Oligopsony

Most economic textbooks and trade modelling exercises assume perfect competition. Perfect competition occurs when no producer or consumer has the power to influence prices in the market. In fact, analyses of perfect competitive markets provide the foundation for supply and demand theory. Conversely, imperfect competition occurs when conditions necessary for perfect competition are not satisfied.

16 Different degrees of innovation hold different degrees of uncertainty. Innovations that are simple variations of existing solutions hold no surprises to their designers and users, while innovations that change the operational principles of a technology produce a number of effects of unknown occurrence. Kline, S. and Rosenberg, N., 1986, "An Overview of Innovation," in N. Rosenberg and R. Landau, (eds.), *The Positive Sum Society: Harnessing Technology for Economic Growth*, Washington: National Academy Press.

Forms of imperfect competition include:

- monopoly (or monopsony): only one seller or buyer of a good; and
- oligopoly (or oligopsony): a small number of sellers.

In addition, imperfect competition arises when buyers or sellers lack information about prices and goods being traded.

There are relatively few global monopolies in the world trading system, but oligopolies and oligopsonies are widespread. If a nation liberalizes trade in a sector with imperfect competition, it can wipe out local industries and decrease economic welfare.[17] Thus, in some cases, subsidies can serve as second-best tools to correct the competition-related market failures.

Two of the most important sectors to sustainable development are characterized by oligopolistic competition: high technology and agriculture. It is constantly (and rightly) emphasized in development circles that high technology, or knowledge-based economic activity, is essential to economic development. Nations are encouraged to gain access to such knowledge-based assets by attracting foreign direct investment (FDI) in information technology sectors (IT) (UNDP 2001). Yet, such sectors are among the most highly concentrated in the world.

IT is highly sought-after by developing countries because it is one of the fastest growing sectors in the world economy and has a high knowledge content that translates into higher value-adds and profits. More importantly, IT products can spur further innovations and facilitate economic life that can lead to growth and human development. The potential for forward-linkages through all sectors of the economy is enormous. Computing power doubles every 18 to 24 months due to massive advances in microprocessors and bandwidth power doubling every six months. The UN estimates that in 2001, more information could be transmitted through a single cable in one second than was sent over the entire internet in one month in 1997. During the "roaring" 1990s, one quarter of economic growth was due to IT use and its forward linkages (UNDP 2001).

Economists define oligopolies (or oligopsonies) as industries where the four largest firms hold more than 25 per cent of overall sales (Blair 1972). In 1996, IBM alone controlled almost that amount. Highly concentrated oligopolies are said to be where the top eight firms control 70 to 85 per cent of the market, and the top four control 50 to 65 per cent. By 2000, the global IT industry has become more concentrated than the world oil industry at its cartel peak, despite declining prices. Key examples include:

- **Hard disk drive sector:** five firms account for 85 per cent of sales;
- **Head assembly:** 10 head manufacturers control 93 per cent of the market; the largest six have 78 per cent;
- **Dynamic random access memories (DRAM):** four firms control 66 per cent of the market; and
- **Personal computers (PCs):** four firms in 2004 controlled 44 per cent of the worldwide market—up from 27 per cent in 1996.

17 This depends on the level of the distortion in a specific sector. If the sector is not a highly concentrated oligopoly of course liberalization can also wipe out some local firms and make others more competitive.

"Breaking in" to highly oligopolistic markets is difficult and takes second-best policies such as subsidies. Subsidies and other measures are key tools enabling nations to use *learning capabilities*. Learning and knowledge development must form the centerpiece of development strategies. For developing countries, technological learning comes in two forms: acquiring codified knowledge (such as blueprints and designs, general scientific knowledge, etc.) and, equally as important, acquiring tacit knowledge. Tacit knowledge is firm-specific and involves incremental changes and innovations from learning-by-doing. Such knowledge is non-tradable. These two types of learning capabilities are symbiotic (Ernst 2000; Nelson 1990; Amsden 2001).

Such capabilities don't just spill over into developing-country firms automatically. Nobel Prize winning economist Kenneth Arrow showed that markets allocate learning capabilities very poorly. Arrow demonstrated that learning processes are rife with externalities, where investments in learning are a function of the gap between private and social rates-of-return. Thus, there is a clear role for states to correct these market failures with subsidies (Arrow 1962). To varying degrees, Brazil, India, South Korea and Taiwan have all become key players in the global industry by subsidizing learning in the form of research and development, and technological capabilities. This has allowed them to become key players in the global IT industry (Amsden and Chu 2003; Amsden 2001; Evans 1995). However, especially in the cases of Brazil and India, subsidization has resulted in government failures and rent-seeking behaviour that have slowed IT sector development. Thus getting the "control mechanisms" in the form of performance requirements is important. We address this issue later in the paper.

Food systems and agriculture are also key to sustainable development. Rural farmers often maintain sustainable livelihoods where growing food is vital to their subsistence. Many rural producers generate positive externalities in the form of ecosystem services. A popular measurement of imperfect competition is known as the four firm concentration ratio (CR4). As shown by the CR4 ratios in Table 2, the concentration in world food markets is even more pronounced than IT markets.

Table 2: Imperfect Competition in World Food Markets

Industry	CR4 (per cent)
Beef packers	83.5
Pork packers	64.0
Pork production	49.0
Broilers	56.0
Turkeys	51.0
Animal feed plants	34.0
Flour milling	63.0
Soybean crushing	71.0
Ethanol production	41.0
Food retailing	46.0

Source: Hendrickson, Mary and William Heffernan. (2005) Concentration of Agricultural Markets. Department of Rural Sociology, University of Missouri. February, 2005.

Thus, when trade is liberalized between northern nations where market concentration is high at both the input and final product level, the market failure of imperfect competition becomes "globalized." This can result in a form of "dumping," which in agriculture is most commonly associated with discriminatory pricing. In WTO disciplines it can also be defined as exporting at prices below production costs.

Northern agricultural policies, including subsidies, can contribute to the dumping problem by stimulating over-production and driving down prices. But even when subsidies do not directly result in

production increases and below-cost pricing, imperfect competition can produce the same result. While there remains a lively debate about the extent northern agricultural subsidies cause dumping, there is little doubt that northern countries export many agricultural commodities at below-production costs. This in turn causes serious distortions for developing countries' markets and threatens food security, rural livelihoods, poverty reduction and economic growth. The toll is particularly high on developing-country farmers growing competing crops.

Under such conditions, developing-country agricultural subsidies can help correct highly distorted markets, just as protective tariffs can defend a country's producers from predatory-pricing practices by exporters. For example, Mexican maize farmers growing highly-adapted native species of maize, find their environmental contributions to agro-biodiversity undervalued by imperfect markets, while they are also forced to compete with heavily-subsidized U.S. corn imported by highly-concentrated transnational grain traders. Government subsidies in such circumstances could address both market failures, recognizing the unvalued environmental contributions of traditional farmers and protecting those farmers from oligopoly pricing. Although they may introduce new market distortions, such subsidies could more-significantly correct others (Ritchie *et al*. 2003). Government subsidies can "correct" these highly distorted markets and maintain sustainability.

Natural Monopolies

A second type of imperfect competition of note is the natural monopoly. Natural monopolies occur in sectors with very high fixed costs accompanied by economies of scale in production and distribution. Examples include the provision of water and electricity, wastewater treatment, and other sanitation provisions. In such cases, it does not make much sense to have competition, but this gives rise to the central challenge: providing them cost-effectively.

When natural monopolies are liberalized, a private monopoly frequently takes the place of the public monopoly. The private firm often lacks incentive to provide universal access and low prices, and some citizens are denied their services. Such government services are provided not only for direct public use but also to create and enhance positive externalities. This is not to say that 100 per cent subsidies are warranted by the state, but there is a clear role for the government to get a better regulatory framework in place.

C. Technological dynamism

Technological learning and innovation is a prime source of increasing returns and monopoly power. That innovations can be imitated and eventually improved—thus reducing the technological rents to a temporary advantage—depends on so many factors it cannot be taken for granted. Under-investment in learning activities can easily trap slower firms, regions or countries in patterns of low research and development, low productivity, and high environmental impact.

Technological change is fundamentally a cumulative process. All technologies demand close contact and a certain amount of time to be correctly understood, optimally used, properly maintained and eventually improved. This step-by-step interaction and feedback between the "soft" side of technology (i.e., the knowledge accrued by producers and users) and the "hardware" is what makes technical development a *learning process*.

The cumulativeness of learning means that technological asymmetries are likely to grow in a world of free trade. Diffusion of innovations takes time and is often dependent on certain local conditions (David

1975).[18] Only the most rapid followers will survive. First-mover advantages, scale economies, limited market size, patents, and control of strategic and complementary inputs can all reduce diffusion and extend the life of technological monopolies.

Just as some technology use provides unaccounted-for positive effects, other technology characteristics cause inefficiency and rigidity. Established technologies and designs tend to shape their application-environments to their own image. The engineering and technical community behind them works normally under traditional standards and concepts, respecting the core features of basic designs and the equipment and infrastructure are compatibile to those configurations. Users tend to stick with technologies they already know, and many times choose their solutions according to external factors such as the likelihood that the solution will be applicable to a large network of users. Finally, consumers adapt their habits to the specific services they find in them. All these factors reinforce subsequent adoption and lock-in technologies in their application environments (Arthur 1988).

The "lock-in" effect can have two manifestations. One occurs when societies do not choose the best technology available—for example, acquiring the end-of-pipe solution instead of a radically new, clean technology (Masaru 2003).[19] Another type of lock-in is a reluctance to replace an established technology. Many unsustainable technologies are deeply embedded into their environments (energy, cars, chemical pesticides), which makes them very rigid and resistant to basic modifications. Entrenched technologies reduce the possibility of trying, developing and diffusing alternatives.

Learning, technological rents, spill-overs, and lock-in effects are all pervasive sources of market and welfare distortions and call for coordinated intervention. In all cases, subsidies represent an important tool to create economic niches for learning in strategic technologies, overcoming technological backwardness and escaping lock-in.

D. Regional asymmetries

Externalities, imperfect competition and technological dynamics generate abundant market distortions. Regional disparities belong to another type of distortion. Literature on regional economics recognized several sources of market failure: economies of scale as entry and location-specific barriers; external economies deriving from collective access to local pools of resources (skilled labour, technological knowledge, access to large markets, venture capital and abundant financial resources) (Marshall 1961);[20] learning-by-doing at the individual firm level (Arrow 1962); and learning-by-using through user-producer interactions (Rosenberg 1982; Lundvall 1988).

These phenomena can lead to decreased costs and other advantages on the supply side. Coupled with income and demand-concentration effects, the initial differences in productivity and development lead to "circular and cumulative causation" (Myrdal 1957), polarizing geographic regions. Additional factors accelerating "backwash" and "spread" effects on existing regional disparities are the discovery and exhaustion of natural resources, and shifts in technological paradigms.

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18 Paul David firstly argued why under certain structural conditions (for example, firm size) it is irrational to adopt a superior technology.

19 Masaru reports how the Japanese Chlor-Alkali industry, facing the ban on mercury as an industrial input, adopted prematurely the diaphragm process, instead of the already available ion-exchange membrane process.

20 All of which give rise to an "industrial district."

New theories of international trade emphasize economies of scale, imperfect competition, differentiated products and local innovation. The movers behind intra-industry trade are found "in the advantages of large scale production," specialization "in the cumulative advantages of experience which sometimes perpetuate accidental initial advantages" and "in the temporary advantages conveyed by innovation" (Krugman 1986).

Regional economics shows there are no strong reasons to expect market forces to eliminate regional disparities; there are, on the contrary, stronger reasons to think they will grow. The reason for growing disparities and distortions is because comparative advantage does not come from differences in factor endowments alone (as in orthodox trade models), but from the dynamics of coupled access *and creation* of critical factors of production. Providing economic niches for learning and experimenting in certain activities, with strategic linkages to the rest of society can produce a wide range of positive externalities at the local level (Eliasson 1998).

Subsidies play a fundamental role in improving regional distribution of wealth and opportunities in all developed countries. Differential treatment exists within the industrialized world, to the point of being one of the central foundations of the EU.

Green-light subsidies in practice and potential

Many nations are explicitly or implicitly using Article 8 subsidies to support development in a socially and environmentally sound manner. In this section, we present an analysis of reported green-light subsidies under Article 8. These reports are a gross under-estimation of their use and all subsidies cited in the previous section could qualify as green-light, but none have been reported. Nonetheless, it is interesting to understand and document the explicit use of Article 8 during its short five-year lifetime.

A. Developed-country use of Article 8

Subsidies are widely used in developed countries. They are one component of a vast, networked and specialized institutional infrastructure of economic promotion. The Organisation for Economic Co-operation and Development (OECD) Working Party on "Public Support to Industry" has reported "1,479 support programs, research and development contracts and intermediary research and development institutions, as well as government procurement" in 26 OECD countries from 1989 to 1993 (Pretschker 2004). According to this source, OECD public support to manufacturing industries reached US$37 billion in 1989, peaked at US$45.7 billion in 1991 and declined slightly to US$43.7 billion in 1993. Public resources accounted for 1.10 per cent of manufacturing GDP on average, and as a whole, grew 24 per cent at current prices over the same period. There were national differences since "support increased over the period in approximately two-thirds of participating countries," while declining in the rest. More importantly, the reported number of programs increased 11 per cent from 1989 to 1993.

In the EU, several forms of subsidies are used to directly promote targeted economic activities—especially regional development—as new EU members are at lower development levels when they first join. The most relevant subsidies are the EU Structural Funds. The European Commission (EC) budgeted €196 billion to the Structural Funds for 2000 to 2006, of which €26.2 billion were used in 2003. The Structural Funds reserved €13 billion for research infrastructure and networks, innovative business start-ups, and technical up-grading of SMEs. Additionally, the Sixth Framework Program for Research and Technological Development will distribute an average of €4.4 billion each year from 2003

to 2006 for selected research and development areas (EU Framework Program 2002). In 2002, the Common Agricultural Policy (CAP) Funds assigned approximately €41.53 billion in agricultural subsidies (EC 2002).

A second instrument of subsidization in the EU is state aid.[21] State aid is mainly grants and tax exemptions, amounting to 67 per cent and 22.7 per cent of total aid respectively. Less common are soft loans, tax deferrals, guarantees and equity participation, which account for the remaining 10 per cent. Overall state aid in the EU peaked at €74 billion in 1996, diminishing gradually to €53 billion in 2003 (EC 2005). At the same time, its composition shifted significantly from sectoral to horizontal objectives. Horizontal objectives represented 50 per cent of total aid in the mid-1990s and by 2003, it reached 79 per cent. Total state aid in the EU-15 amounted to €52.7 billion in 2003, but including subsidies for railways, the total rose to €78 billion. Including new member states would add another €6 billion.

Of the total subsidies declared as state aid by the EU, the three categories corresponding to non-actionable subsidies totaled €21.5 billion in 2003 in the 15 main European countries. Taking together the Structural Funds, the Sixth Framework Community Program, and State Aid, the EU is granting around €50 billion each year in Article 8 related subsidies (Table 3).

Table 3: Article 8 Subsidies in the EU-15, 2003 (million euros)

State Aid	21,461
Research and Development	5,271
Environment and Energy Saving	8,587
Regional Development	7,603
Structural Funds (payments 2003)	26,243
Sixth Framework Program	4,400
Estimated A-8 related subsidies' base	50,000

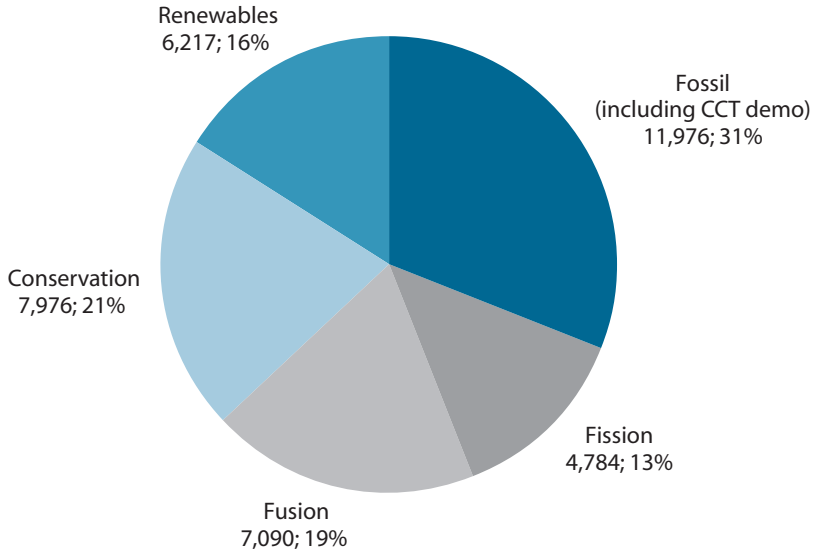
Source: Authors' calculations based on "State Aid Scoreboard, Spring 2005 Update", Brussels: EC 2005.

Although the U.S. submits reports to the WTO Subsidies Committee, it is difficult to measure its total amount of Article 8-type subsidies. One of the main measurement problems is state subsidies. According to most authors, state subsidies are significant and pervasive (Trebilcock and Howse). According to the 2003 U.S. notification to the subsidies committee, its only Article 8-type subsidies were a spacecraft technology development program (US$19 million), a renewable energy resource subsidy (US$357 million), empowerment zones and renewable communities (US$730 million) and the energy conservation program (US$242 million). Figure 2 shows that the U.S. has a long history of providing research and development support for renewable and non-renewable energy development (Gallagher *et al.* 2005).

Comparative and analytical reports on Article 8-type subsidies are rare. For the U.S., data from the mid-1980s suggests the average subsidy rate was 0.5 per cent (subsidies as a percentage of the value of industry output) at the U.S. federal level. This jumps to two per cent once defense is included (Bence and Smith 1989).

21 According to Article 87(1) of the EU Treaty, state aid excludes: a) subsidies channeled to recipients which are not enterprises; b) general tax measures, quotas and public procurement; c) community funds and instruments (like the Common Agricultural Policy funds); d) aid granted by supranational organizations (like the European Space Agency); and e) Defense and public works.

Figure 2: Cumulative Support for U.S. Energy RD&D (1985–2005) in $ millions 2000



The line between developed countries' support programs and specific subsidies is blurred. It is difficult to prove how much European and U.S. support programs are allowable under WTO regulations. Yet our point is not to provide any evidence for actionability, but to argue that developing countries should share (and fully exploit) this broad policy room for industrial promotion. The re-installation and broadening of Article 8 non-actionable subsidies could benefit both developing and developed nations.

B. Developing-country applications

Developing countries lack the resources to spend anywhere near what developed countries can in terms of subsidies. However, subsidies played an important role in bringing a select number of poor countries into "middle-income" country status in the 20th century. These countries, such as South Korea, Taiwan, China, Brazil and Mexico, are referred to as "developmental states." They industrialized their economies through building public infrastructure, conditional government subsidies and import substitution. In addition to loans from national development banks, government subsidies and international protection were given to industry in exchange for concrete results, including local content requirements, price controls, technological innovation, capacity and exports (Amsden 2001).

Through this process, developmental states created "national leaders" in the form of key state-owned enterprises (SOEs) in petroleum, steel and other industries. These sectors were linked to chemical, machinery, transport and textiles industries that also received government patronage. By the 1960s, manufacturing became a large share of total production. In 1940, Mexico's agricultural sector accounted for 22 per cent of total output and manufacturing 17 per cent. By the early 1970s, agriculture was just over 10 per cent and manufacturing was almost 23 per cent.

Developing countries continue to use subsidies for development. Indeed, our analysis of WTO reports since 1995 reveal that only a handful of nations have formally reported on the use of Article 8-like subsidies. Table 4 exhibits green-light subsidies reported to the WTO between 1995 and 2000. The developing-country nations listed here are clearly the middle-income nations such as Chile, Bulgaria, Poland and Korea.

There are a few reported programs for research and development. Barbados reported its program to encourage and promote development of export sales while assisting exporters in finding new and existing markets. Korea reported many research and development programs. They provide assistance for researching and developing large and high-risk information and communication projects, assisting the research and development activities of private enterprises, and promoting research for developing environmental technologies to improve the nation's environment. Yet Korea's industrial support for exports reacted markedly to the SCM Agreement. Before 1995, it offered approximately 2.5 trillion Won across 26 different types of subsidies. In 1995, the program was reduced to a single type of subsidy for SMEs from a 15.2 billion Won fund (Bora *et al*. 1999).

Most Article 8 subsidies reported were regional development programs. Brazil reports many programs providing subsidies to reduce economic and social imbalances among the Brazilian regions to develop its north, northeast and mid-west regions. Chile reports subsidies to reverse backward economies in the provinces of Arica and Parinacota, by developing trade and tourist attractions, strengthening entrepreneurship and consolidating Arica as an inter-ocean corridor. They also have a program to develop the regions of Tarapacá, Aysén, Presidente Carlos Ibáñez del Campo, Magallanes, the Chilean Antarctic territories and the provinces of Chiloé and Palena, by providing assistance to small and medium-sized organizations investing or reinvesting in production in these remote regions.

Table 4: Reported Article 8 Subsidies

Country	Type	Subsidy Title
Barbados	R&D	Research and development allowance.
Brazil	R&D Regional development Regional development	Industrial technology development programme Industrial technology development programme Constitutional funds for the financing of the North, Northeast and Midwest
Bulgaria	Environmental subsidies	Assistance for reduction of soil and water pollution Economic and regional development agreements/general development agreements
Canada	Regional development	(ERDA)
Chile	Regional development Regional development	Tax credit for investment in the provinces of Arica and Parinacota Fund for the Promotion and Development of Remote Areas
Cyprus	Environmental subsidies	Assistance to manufacturing industries to establish pollution control systems
Czech Republic	R&D Regional development Environmental subsidies Environmental subsidies	Support for research and development Aid for endangered regions and regional aid Support of energy saving Environmental aid
EC	Regional development	European regional development fund
Hungary	Regional development Environmental subsidies	Assistance to the development of disadvantaged regions Central environment protection fund
Israel	R&D R&D Regional development	The Law for the Encouragement of Industrial Research and Development, 5744-1984. Long-term R&D support for large investors in industrial R&D Cost of land development
Japan	Environmental subsidies Environmental subsidies R&D	NA Subsidy for loans to the Pollution Prevention Fund Programme to Promote Research and Development of Regional Technology
Korea	R&D R&D R&D Environmental subsidies	Support for R&D of environmental technology development projects Loan program for R&D of information and communication Science and Technology Promotion Fund Environmental Improvement Loan Programme
Poland	Regional development	Support of regional programs

Source: WTO, 2005

Subsidies listed by the EC are for regional development as well. It is well documented that EU admission comes with subsidies of up to four per cent of a nation's GDP to develop infrastructure, social and

environmental programs, and institutions on par with the original EU countries. To the WTO, the EC reports that the subsidy program "is intended to help redress the main regional imbalances in the Community through participation in the development and structural adjustment of regions whose development is lagging behind and in the economic and social conversion of areas facing structural difficulties."

A handful of developing countries report use of environmental subsidies. Bulgaria provides subsidies to fund water treatment plants to reduce water wastes affecting soils. The Czech Republic reports a subsidy program for developing renewable energy and energy efficiency in firms. Korea also has a program helping private firms invest in environmentally sound technologies.

Opportunity for preserving and creating policy space

This paper argues that nations should be able to use subsidies to correct distortions in the world trading system that act against sustainable development. Such subsidies are justified in economic theory and can help create economic growth that is socially and environmentally sustainable. The Article 8 green-light subsidies of the SCM provided cover for such subsidies. However, their potential could not be fully realized before the subsidies expired in 2000. Nonetheless, numerous countries recognized their potential, and have since called for their reinstatement and expansion. Rather than letting green-light subsidies expire, they should be expanded so a larger range of countries can take advantage of them. Indeed, the Doha round leaves ample room to not only reinstate Article 8 subsidies, but to expand them.

Policy space for these subsidies is needed for both developed and developing countries. Developed countries must cut subsidies for highly-polluting fossil fuel activities and increase them on renewable energy alternatives and energy efficiency. Developing countries need this window to develop globally competitive industries in a sustainable manner. The window for regional development knits the two together and provides space for developed countries to help finance developing countries.

In the Doha documents, space has been created for negotiating subsidies that support "legitimate development goals." The documents state that these subsidies could include support for regional growth, technology research and development, product diversification, and the development and implementation of environmentally sound production methods. These categories evoke the green-light subsidies, but provide room to be expanded for improved sustainable development.

- **Technology research and development, and product diversification.** Climbing the technology and product ladder is essential for sustainable growth. Nations need to develop and obtain knowledge-based assets for development. By adding "product diversification," the Doha language can help nations build knowledge-based assets through subsidies to new sectors. Many nations are locked in negative terms of trade situations. Language that reinstates subsidizing for research and development and allows for product diversification could help address the declining terms of trade in many developing countries.

- **Regional growth.** Continuing to provide policy space for programs that support regional equality will be essential for sustainable development. Developing countries have rightly pointed out that only the developed countries have thus far subsidized regional development. However, it is sometimes overlooked that less developed countries are often the recipients of the subsidies themselves. Up until now, the EU has been the leader in providing and protecting subsidies for

regional development, offering less-developed countries up to four per cent of their GDP to upgrade infrastructure, social and environmental programs, and export capabilities.

The U.S., while as aggressive as the EU in terms of pursuing regional integration, has yet to support regional development. More than 12 years after the North American Free Trade Agreement (NAFTA) was signed, there is widespread agreement that NAFTA did not fulfil its development promises for Mexico. Country incomes rose less than one per cent annually, while industrial competitiveness, poverty and inequality, and environmental degradation worsened (Weintraub 2004; Gallagher and Zarsky 2004; Middlebrook and Zepeda 2003). Recently, a tri-national commission called for a North American economic and security community by 2010 to address shared security threats, challenges to competitiveness, and interest in broad-based development across the three countries (Council on Foreign Relations 2005).

As trade and integration continues across nations with widely different levels of development, regional development arrangements will be essential to correct distortions that come with such integration. Developing countries are increasingly demanding "adjustment funds" to integrate with developed countries. Without such funds, more integration arrangements will look like the NAFTA rather than the EU.

- **Environmentally sound methods of production.** Whereas the original green-light subsidy provisions only allowed one-time subsidies for purchasing end-of-pipe technologies, the new Doha language stresses "sound methods of production." Some in the environmental community were concerned that the original provisions could give perverse incentives encouraging end-of-pipe technology rather than clean-production alternatives. Although some environmental problems presently require end-of-pipe technology, efforts to shift toward more clean-production alternatives are needed. In the interest of developing countries, "production" could also cover the environmental services that are "produced" by developing-country rural communities. Indeed, "payment for environmental services" (PES) schemes are gaining momentum in the developing world. According to the World Bank, national PES schemes are underway or being prepared in nations like Colombia, Costa Rica, Ecuador, El Salvador, Mexico and Venezuela for managing water, energy and biodiversity. Sometimes, as in the case of coffee support, these funds can help boost exports. Such schemes should not be jeopardized.

- **Special and differentiated treatment.** The international regulatory framework should return some degree of *selective* policy space to developing countries. These countries should benefit from differential treatment that enlarges the range of non-contestable policy tools to address technological, environmental, and regional distortions. Selective and conditional subsidies should be rescheduled as non-actionable for developing countries, proving that they do not harm other parties' internal markets.

The new Doha language on developmental subsidies leaves ample opportunity to create policy space for subsidizing knowledge acquisition, poverty and inequality eradication, and environmental protection. Echoing the positions of nations like Brazil, India and Canada, these subsidies should be justified as non-actionable if they are used to correct distortions in the world trading system. Subsidies that create distortion should be discouraged.

Not all countries support reinstating Article 8. Initial resistance came from India and other advanced developing countries. They suggested that Article 8 subsidies were mainly used by developed countries to subsidize their activities. This was a problem because the poorer developing countries did not have the resources to offer subsidies. There was also general resistance to Article 8 exceptions because India and other developing countries did not like the environmental provisions. However, by the time of Doha, India had turned and there was a general agreement that developing countries were supportive of at least revisiting the issue.

A recent proposal from India noted that, because industries in developing countries suffer from structural weaknesses, the state will have to play a more proactive role in assisting industry. India stressed the role of industrial input subsidies in developing countries and argued the WTO should take a broader view concerning industrial subsidies in developing countries (Pal 2004). Canada has also recently stated support for such subsidies: "Canada continues to support Article 8 provisions to reinforce the ability of governments to provide financial assistance in support of certain legitimate economic and social goals (Department of Finance 2004)."

However, given the vast controversy concerning issues like agricultural support in the north, services liberalization and manufacturing tariffs, the SCM has received relatively little attention. This is a mistake. Adjusting the SCM is a relatively easy task, and some of the major players originally against reinstatement have now come around. Both northern and southern nations use these subsidies, and more are needed as global economic integration accentuates the many distortions in today's economies and impedes progress toward sustainable development.

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