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TRADE LIBERALISATION AND THE ENVIRONMENT: ASSESSING THE EVIDENCE

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Abstract

The rise in trade liberalisation has led to a renewed interest in the effects that the growth in world trade may have on the environment. The aim of this paper is to provide an evidence-based assessment of the impact of trade liberalisation on the environment, focusing particularly on the empirical evidence provided by recent quantitative economic analysis. In so doing, the intention is to facilitate a more informed debate on the relationship between international trade and the environment and to contribute to the evidence-base available to policy makers.

Key Words: trade liberalisation; environment; economic growth; impact assessment

1. Introduction

The growth in globalisation and the increased importance of trade liberalisation have led to a heightened interest in the relationship between trade, economic growth and the environment. Sustainable development is enshrined in the first paragraph of the charter establishing the World Trade Organisation (WTO), and the WTO's Doha Development Agenda has acknowledged the potential contribution that a rules-based system of international trade can make to economic development and environmental protection. Interest in the potential impact of trade liberalisation on the environment is not confined to international trade negotiators, however, and international development agencies,

NGOs, researchers and civil society at large are also concerned with the potential effects of the expansion of international trade in goods and services on the environment.

This concern with the impact of trade liberalisation on the environment reflects a general awareness that these linkages may not always be benign. Public awareness of the potential threats to the natural environment has grown rapidly in recent years, and the rapid expansion of international trade has heightened fears that irreparable damage will be incurred through the contraction of finite natural resources, reduction in biodiversity and increased air and water pollution.

The aim of this paper is to provide an evidence-based assessment of the impact of trade liberalisation on the environment, focusing particularly on the empirical evidence provided by recent quantitative economic analysis. In so doing, the intention is to facilitate a more informed debate on the relationship between international trade and the environment and to contribute to the evidence-base available to decision makers. There are six sections to the paper. This introduction is followed by an overview of the theoretical economics literature on the relationships between trade liberalisation, economic growth and the environment. The third section summarises the main analytical tools that have been used by economists and others, to undertake empirical investigation of these relationships. The fourth section presents a detailed review and interpretation of the results of econometric and modelling studies of the effects of trade liberalisation on the environment. The fifth section discusses the role of environmental regulation in affecting the environmental consequences of trade liberalisation. The final section provides a summary and concludes.

2. The Relationship between Trade, Economic Growth and the Environment

The issue of whether or not trade liberalisation will lead to increased pressures on the environment largely through increased levels of trade and economic activity has fuelled much of the ongoing trade-environment debate. Much of the economic analysis of trade liberalisation uses a combination of classical trade and welfare theory to deduce, *under idealised market conditions*, that trade liberalisation will lead to increased economic welfare and ‘optimal’ environmental quality. According to the theory of comparative advantage, free trade enables countries to specialise in goods and services which they are most efficient in producing. In the absence of market imperfections, environmental problems

(negative externalities) do not occur because externalities are internalised within the market system. The level and composition of environmental impacts may change but the new equilibrium level of environmental quality will, by definition, be optimal. However, *in imperfect market conditions*, 'win-win' outcomes are not guaranteed. In real world situations, both negative and positive effects should be expected and the reallocation or structural effects of trade liberalisation may result in adverse environmental impacts. 'Win-win' outcomes may be potentially realisable, but whether this is achieved in practice may depend on the nature and extent of the flanking and other supporting measures that are being taken.

According to the classical theory of trade, trade liberalisation will lead to structural changes in a country's economy, allowing specialisation in those goods or services where the country has a comparative advantage, for example in low labour costs, low natural resource costs, or high availability of skills and socio-economic infrastructure. If the changes favour industries that pollute less, or extract less of the country's natural resources, positive environmental can be expected. If the products for which the country has a comparative advantage have high pollution intensities or a greater dependence on local natural resources, the effects will be in the opposite direction. While the theory of comparative advantage is a static analysis that is concerned with the optimal allocation of existing resources, more modern trade theories also allow for the potential dynamic effects of trade liberalisation, where the lowering of trade barriers 'opens' the domestic economy to imported technology and know-how. In theory, access to new technology can reduce the environmental costs of production.

Will trade liberalisation increase the rate of economic growth? Economic theory suggests several different possibilities and does not provide an unambiguous answer. If the assumption of full employment of resources (which is made in the comparative advantage trade model) is relaxed, then we can expect trade liberalisation to lead to an increase in output of traded goods and services. But this increase in production will only be sustained in a higher rate of economic growth if the underlying rate of productivity growth is also raised by trade liberalisation. Other recent contributions to trade theory assert that trade openness may lead, even if in steady state, to higher growth rates. This may occur when the steady-state growth rate is not an exogenous constant, and when one departs from the

assumption that the marginal product of capital monotonically declines to zero as the capital-labour ratio increases indefinitely (Srinivasan and Bhagwati, 1999). On the other hand, other theoretical trade models have also argued that trade liberalisation may not have any impact on growth rates or may even reduce them if market failures are present. The uncertainty and the several different assumptions and possibilities in the theoretical literature on the relationship between trade and economic growth suggests that the impact of trade liberalisation on economic growth may not necessarily follow a single or unique pattern, and may depend on country specifics, as well as policy and institutional measures accompanying the trade reform process.³

If trade liberalisation does result in an increase in economic growth, it is likely to be accompanied by an increase in the use of natural resources and higher levels of pollution. However, though freer trade and increased production levels might be accompanied (*ceteris paribus*) by adverse environmental effects, a number of other factors make it difficult to isolate “pure” scale effects and identify a strong pattern in the commonly-assumed detrimental relationship between increased economic activity and environmental performance. Environmentally beneficial income effects might arise when augmented financial capacity supplies more resources for environmental protection (supply-side effects) and fosters greater demand for environmental quality (demand-side effects) (Esty and Ivanova, 2003). In addition, the technology effects discussed above can offset the adverse environmental scale effects.⁴ Nevertheless, though it may be difficult to isolate the “pure” scale effect, it is increasingly acknowledged that anthropogenic activities (in terms of scale and methods of production, as well as consumption effects) are having a net negative impact on the environment, particularly with reference to climate change and global warming (IPCC, 2001).

For these reasons, an automatic ‘win-win’ outcome (economic and environmental) from trade liberalisation cannot be deduced from the economic theory relating to trade,

³ The empirical literature fails to find strong evidence of a causal link from trade liberalisation to economic growth (Rodriguez and Rodrik, 1999; Kenny and Williams, 2001). Winters (2004) argues that trade liberalisation by itself is unlikely to boost economic growth, unless openness improves the quality of governance and is accompanied by improved macroeconomic policymaking.

⁴ This is emphasised by Morita and Robinson (2001) who find no evidence of a causal pattern in the economic activity and GHG emissions nexus. The study undertakes several global future scenarios and attributes its findings to the possible emergence of mediating forces (*e.g.* increased energy efficiency and shifts to a service based economy) that might counteract the negative environmental scale effects.

economic performance and the environment. There may be potential economic welfare gains, but environmental gains are not assured unless other complementary measures are taken. Arrow *et al.* (1995) rightly conclude “Economic growth is not a panacea for environmental quality; indeed it is not even the main issue.” Though this is common ground among most researchers in the field, it is less clearly articulated in the economics literature on the effects of trade liberalisation which gives insufficient attention to the role that regulatory policy and institutional capacity play in determining the effect that trade liberalisation will have on economic and environmental performance.⁵ The better the understanding of these linkages and the extent of their influence, the easier it will be to identify and appraise remedial measures to accompany trade policy changes, which offer potentially better prospects of ‘win-win’ outcomes.

3. Analytical Approaches

The growing availability of large cross country time series data bases, combined with increasingly powerful computing capacity, has fostered the rapid growth in quantitative studies of the relationship between economic growth and the environment. Two main techniques have been extensively employed. The first approach has involved the application of econometric techniques to aggregate cross-country data (sometimes combined with time-series data), in an attempt to establish a common ‘pattern’ in the relationship between economic growth and the environment. Nevertheless, the limitations of the econometric approach need to be acknowledged. Firstly, there is a standard problem of demonstrating causality. It is relatively simple to show a statistically robust correlation between a change in trade policy and a change in measures of environmental quality: It is more difficult however to ‘prove’ that the change in trade policy is the cause of the change in environmental quality. Secondly, there are major concerns about the quality of the data and the econometric specifications in this literature (including weak theoretical underpinnings), with considerable differences in the results and in the policy conclusions drawn from the findings.⁶

⁵ The role of institutional factors has been integrated in the recent economic growth literature (North, 1990; Rodrik et al 2004). Interestingly, the new institutional economics has had less impact on trade theory.

⁶ See Ravallion (2006) for a discussion of these issues.

The second technique used to empirically investigate the trade liberalisation - economic growth – environment relationship is Computable General Equilibrium (CGE) modelling. The CGE approach is based on the simulation of outcomes for a specified policy ‘shock’, and it has been widely used to estimate ex-ante the likely impact of trade liberalisation. Although CGE models may render useful information on some economic aspects of trade policy appraisal, by design they are unlikely to perform well when it comes to assessing the environmental effects (Scriciu, 2006).⁷ For example, CGE models support the conventional neoclassical approach according to which applying well-known established liberal concepts, such as supply and demand forces, market equilibrium, profit maximisation, cost minimisation, utility maximisation, agent rationality and monetary valuation to address ecological challenges are presented as a viable solution in tackling environmental problems. However, as Söderbaum (2000) argues, this encompasses a monetary reductionist approach that places a strong emphasis on the market as the solution to all kind of environmental problems and fails to appropriately account for the institutional arrangements, ethical issues and the developmental needs of a society.

4. Assessing the Evidence

Econometric Findings

Much of the literature relevant to the growth-environment nexus focuses on empirical tests of the Environmental Kuznets Curve (EKC). The EKC hypothesis proposes an inverted U-type relationship between environmental decay and income per capita. Studies that analyse and test this hypothesis commenced in the early 1990s and since then, there have been numerous studies. Most undertake a cross-country analysis, others use time series analysis and some combine both approaches. A number of cross-sectional studies include both developed and developing countries but time series analysis involving developing countries are rare (Vincent, 1997).

The indicators of environmental degradation used in these studies vary considerably, both in terms of the range of environmental parameters that are included and in the ways in which each is defined and measured. The number and type of pollutants covered vary substantially, some being measured as estimated emissions and others as ambient

⁷ Several other arguments emphasising the limited role and appropriateness of CGE models in adequately and effectively providing consistent insights into the sustainability impacts of (trade) policy proposals are forwarded in Scriciu (2006).

concentration levels. Coverage of changes in stocks of natural resources is variable and very incomplete in most studies. Finally, most indicators relate to environmental degradation within a country (*i.e.* resulting from that country's production and final consumption activities) and omit the impacts (negative and positive) of the country's import and export activities on the environment of its trading partners (Rothman, 1998).

A variety of different econometric forms of the EKC have been tested. These include the 'inverted U' shape (which has one peak level of environmental degradation) and the 'N' shape (which has two peaks). Strictly speaking, only one shape (progressive reductions in environmental degradation over the fully-observed income range) unambiguously meets the 'win-win' requirement (particularly if "tunnelling through" to the downward sloping part of the curve is achieved and the peak of environmental decay, which may very well be irreversible, is avoided). Despite the great diversity of studies undertaken, there is a broad consensus in their findings relating to the 'inverted U' shape of the EKC, although there is considerable laxity in defining the boundaries of this consensus. Barbier (1997), for example, summarises the findings of fifteen studies as follows: "The EKC hypothesis seems mainly to be valid for the air pollution indicators used, with the possible exception of CO₂ emissions. However, the results, apparently valid across all countries, are not necessarily valid for individual countries ... The evidence for water pollution is more mixed. Many studies appear to have difficulty in finding any significant relationship between water pollution indicators and income ... A myriad of other environmental indicators have also been examined for evidence of an EKC-type relationship. With the exception of heavy metals and a measure of toxic intensity, these indicators generally do not appear to support the EKC hypothesis" (pp. 372-374). Additionally, even where support is found for the EKC hypothesis, the 'turning point' in the curve can differ significantly between different environmental parameters and between different studies relating to the same parameter. Very few studies support the hypothesis of continuing improvement in environmental quality over the full income range.⁸ Consequently, the relationship between growth in income levels fostered by trade liberalisation and environmental outcomes is of an ambiguous nature and might depend on the type of environmental damage and country under analysis. For example, inconclusive results are more generally obtained when the hypothesis is applied to deforestation as compared to

⁸ Alpay (2002) finds no statistical evidence that economic development in terms of income per capita or openness to international markets would follow an EKC relationship.

other environmental problems such as pollution for which the EKC hypothesis has been more successfully tested (Angelsen, 1996; Panayotou, 1994, 1997).

The first important finding from the literature review is that, following extensive empirical testing of the inverted U-shaped EKC, its lack of robustness has been clearly demonstrated. Similarly, there is no empirical and, surprisingly, no solid theoretical support,⁹ other than in special cases, for assuming that increases in per capita incomes reduce environmental degradation across the full income range, covering both developing and developed countries. The second finding is, even if those situations where the EKC hypothesis has some empirical support (*e.g.* certain forms of local air pollution) and could be generalised to all forms of pollution, overall environmental degradation would still be predicted to increase as income rises in low income and industrialising developing countries. Their current income levels are well below levels associated with the turning points in most estimated EKCs. Without additional, more effective environmental policy interventions, environmental quality would be expected to continue to decline, as per capita income rises, at least over the medium term (Barbier, 1997, p. 380).

For these reasons, an automatic ‘win-win’ outcome (economic and environmental) from trade liberalisation is not confirmed by the econometric literature. Nordström and Vaughan (1999) identify a number of factors that ‘help identify why [the EKC] can assume the multiplicity of shapes that we observe in reality’ (p.49). These include the income elasticity of demand for environmental goods, the possible existence of economies of scale in the provision of pollution abatement facilities, structural change during the development process and the influence of different elements of government policy. Based on their review of the earlier literature, Nordström and Vaughan (1999) conclude: “... nothing in the relevant literature suggests that the pollution trajectory will turn downward with increasing income by compelling necessity... income growth, while perhaps a necessary condition for changing the focus from more immediate economic and social concerns to longer-term sustainability issues, is not sufficient to reverse degradation. Environmental policies must follow suit.” The more recent econometric evidence does nothing to challenge the soundness of this conclusion.

⁹ In a recent survey of the literature on the EKC hypothesis, Copeland and Taylor (2004) find a striking feature of the EKC literature, namely that theory has only played a limited role in the development of the hypothesis.

Modelling Results

The modelling literature on trade and the environment has also grown rapidly over the last decade with the advance in modelling tools and increasing worldwide concerns for the sustainability of greater trade liberalisation and higher economic growth. The majority of these studies tackle the trade-environment relationship at a very aggregated global, regional or country level (Cole and Rayner, 2000, Dean, 2000, Townsend and Ratnayake, 2000, Nijkamp et al, 2005, Zhu and van Ierland, 2006). A smaller but significant body of literature investigates the implications of trade reforms on environmental quality at a more disaggregated level of the economy by undertaking a sector-specific approach, particularly related to agro-food activities. For example, Saunders and Catagay (2004) use a combined economic-environment static agricultural partial equilibrium model to assess the effects of trade liberalisation policies in the dairy sector on trade flows, production systems and groundwater nitrate levels in the developed world. The authors find that economic (price and production) impacts as well as environmental (water quality) impacts vary across and within the different developed countries analysed.¹⁰

The assessment of the impact of trade liberalisation on core environmental indicators is poorly represented in the CGE modelling literature. They only partly address impacts on environmental quality indicators (typically addressing changes in air pollution),¹¹ as CGE economic models by design are not able to deal with complex environmental impacts related to the effects on biodiversity and natural resource stocks. This is partly because CGE models are typically constructed to target aggregates, whereas many of the environmental problems are of local nature and of local relevance (e.g. the pollution of specific water bodies, biodiversity loss in specific regions). Böhringer and Löschel (2006) present a generic (“core”) CGE model with energy flows (fossil fuels used as a primary factor of production releasing carbon dioxide) as used for a comparative-static assessment of trade and environmental or energy related policies. The authors further develop the core model and discuss several extensions for a better evaluation of potential interactions and

¹⁰ For instance, trade liberalisation by developed countries, on one hand, decreases dairy production and water pollution in the EU, US and Australia, and on the other hand, the balancing increase in dairy output is associated with marginally higher pollution elsewhere.

¹¹ Trade liberalisation-induced changes in air pollution (climate change) are usually addressed in CGE models (typically labelled E3, Energy-Economy-Environment, CGE models) in terms of energy-linked emissions (i.e. CO₂ greenhouse gas emissions) coupled to economic activities (Böhringer and Löschel, 2006). For example, Nijkamp et al (2005) add an explicit capital-energy composite input into the production structure to model the impacts of international climate change policies in a CGE context.

trade-offs between economic/trade and environmental indicators. These refer to the inclusion of non-CO₂ greenhouse gases, accounting for market distortions such as taxes or subsidies, involuntary unemployment and imperfect competition, adding dynamic specifications and endogenous technological change.¹² However, the authors do not provide greater detail on their practical implementation and the appropriateness of their incorporation into a CGE modelling framework.

When economic and environmental linkages are assessed within a CGE modelling framework, their complexity tends to be narrowed down for example to the attachment of an environmental module to production or consumption functions often under the form of technical coefficients of emissions. Moreover, several crucial limitations related to the appropriateness of CGE models to simulate policy reform and environmental sustainable issues, particularly pertaining to climate change, and the interactions between energy and output have been highlighted in Barker, Köhler and Villena (2002). These include the limited disaggregation of productive sectors and factors of production, high uncertainty regarding the assumed values of substitution elasticities between factors of production, and the very limited representation of technical progress. In addition, the key neo-classical assumptions, restrictions, and behavioural laws underpinning CGE models, for which there is no general consensus and no empirical foundation,¹³ are made to render these models well behaved, resulting in strong climate policy recommendations with a high degree of certainty, even though environmental (climate change) analysis is plagued by uncertainties, multiple equilibria, unstable dynamics, intergenerational equity concerns and alternative distributional outcomes (DeCanio, 2003). Bearing in mind the limitations of CGE models in assessing trade-liberalisation driven environmental impacts, the overall conclusion that emerges from the economic modelling efforts so far undertaken in the literature is that the net impact of further trade reforms on environmental quality is ambiguous and depends on a variety of country and product-specific factors. Trade liberalisation *per se* is unlikely to achieve both environmental and economic benefits, and, if pursued, will require the adoption of contextualised complementary domestic reforms.

5. Regulatory Effects

¹² The disaggregation of the representative agent into heterogeneous households represents a further proposed extension to the core CGE model that would allow for the analysis of equity issues, as well as linking models to ensure a more comprehensive coverage of SIA requirements.

¹³ CGE models, which are typically based on one year's data, are inherently not falsifiable and tend to fit the data perfectly (Barker, 2004).

The relationship between trade liberalisation and the environment will both be affected by, and have an effect on, a country's environmental and regulatory policy framework. Trade liberalisation policies can have a direct environmental impact. An example is the EU's reform of its Common Agricultural Policy that seeks to replace protectionist production and export subsidies with farm payments that would promote environmental conservation. However, from a global and especially developing country point of view, the EU's shift in agricultural policy is merely seen as a strategy to continue subsidising uncompetitive production.¹⁴ The challenge therefore, is to decouple protectionist policies from measures that protect the environment. One solution might be the creation of a multilateral rules-based system for the environment, a World Environmental Organisation that would represent the counterpart to the WTO and a strong environmental voice on a global scale (Esty and Ivanova, 2003, Shahin, 2002, Ruggiero, 1999, Biermann, 2002). This would mean that environmental problems could be tackled at their source (*i.e.* where the externalities arise), instead of supporting protectionism and building trade barriers on environmental grounds.

Trade liberalisation may also have an impact on the environment as a result of increased trade in environmental goods and services. WTO liberalisation in the area of environmental services is widely advocated as a means of enhancing developing countries' access to private capital, technology and management expertise, and improving market access for exports of environmental services (Hockman, Mattoo and English (eds), 2002, Part IV). It has been argued that by improving access to environment know-how and technology, liberalisation will lead to greater environmental protection, thereby providing a 'win-win' outcome for the economy and the environment (OECD, 2000). However, the potential benefits of increased access to environmental goods and services will depend in part on the effectiveness of the domestic regulatory framework which is often needed to ensure that the positive environmental externalities are fully realised (Kirkpatrick, George and Scricciu, 2006). In the case of water services, for example, regulatory measures are required where the services are being supplied by a monopoly private-sector utility (Kirkpatrick and Parker, 2005).

¹⁴ Shahin (2002), for example, argues that the CAP reforms are an example of developed countries using environmental issues as "noble excuses" to safeguard and keep protecting their sensitive sectors.

The increased liberalisation of international trade and integration of the world economy have been accompanied by a growing interest in the relationship between international investment and the environment. In part, this debate has reflected the concerns of environmentalists that the global trend towards trade and investment liberalisation will intensify environmental pressures as countries compete for an increased share of foreign investment by engaging in a ‘race to the bottom’ on environmental regulations. Similar concerns have been raised by economists who have argued that the adoption of more stringent national environmental standards could reduce a country’s competitive advantage and encourage pollution intensive industries to relocate to countries with lower standards. On the other hand, some commentators have argued that foreign investment may be attracted to locations where environmental regulations are more stringent, on the grounds that tighter regulation reduces the risks of environmental liabilities and allows foreign firms to exploit their competitive advantage based on technological innovation.

If the costs of compliance with environmental regulations differ across national boundaries, then we might expect to see the relocation of pollution intensive industries to locations where the costs of compliance are lower. These shifts may in turn have a ‘chilling’ effect on the introduction of new environmental regulation as countries become more reluctant to increase environmental control measures or deliberately try to attract FDI by offering lower environmental standards, leading to a competitive ‘race to the bottom’. Although this ‘pollution haven’ effect has been the subject of extensive empirical investigation, the literature has failed so far to produce conclusive evidence confirming that differences in environmental regulations across countries are a significant determinant of trade and investment flows (Smarzynska and Wei, 2001)¹⁵. A comprehensive review of the earlier literature concluded that ‘fears of a “race to the bottom” in environmental standards, based on the idea of “pollution havens” may be generally unfounded’ (OECD, 1997). The majority of more recent studies of the pollution haven hypothesis have confirmed this conclusion (see Levinson, 1996; Adam, 1997; Busse, 2004; Kirkpatrick and Shimamoto, 2006). A number of studies, however, have found (weak) evidence that

¹⁵ Copeland and Taylor (2004) distinguish between the pollution haven *effect* and the pollution haven *hypothesis*. In the former case, a tightening of environmental regulations will, at the margin, have an effect on trade and investment flows. In the latter case, the effect of environment regulation dominates the influence of all other factors that affect trade and investment flows, and leads to a shift in pollution intensive industry from countries with more stringent regulations to countries with weaker environmental regulation.

differences in environmental regulations can affect FDI flows (Mani and Wheeler, 1999; List and Co, 2000; Eskeland and Harrison, 2003).

The existing empirical literature has a number of limitations, which may go some way in explaining the ambiguity in the results obtained. These limitations include differences in econometric methodologies, data sources and proxies, as well as alternative conceptual frameworks (Letchumanan and Kodama, 2000). A major limitation of empirical studies that have examined the linkage between trade and investment flows and environmental regulation has been the almost complete lack of comparable data on environmental regulation across countries. In attempting to overcome this lacuna in the data, most studies have tested the pollution haven hypothesis indirectly, by examining the international changes in the emissions output of 'dirty' industries on the assumption that stricter environmental regulations results in better environmental conditions, and vice versa (Hoffmann et al 2005). Typically, US data on either emission intensity or the level of pollution-abatement costs as a fraction of value added are used in estimating output levels. Assuming that environmental regulation and compliance costs are increasing more rapidly in the developed economies (the 'North') than in the lower income economies (the 'South'), evidence of a rising share of pollution intensive output or investment in the South is taken as confirmation of the pollution haven hypothesis. An additional limitation has been that due to a paucity of data on international investment flows over time, most empirical studies have relied on FDI flows by US transnational corporations.

6. Summary and Conclusions

Much of the economic analysis of trade liberalisation uses a combination of classical trade and welfare theory to deduce, *under idealised market conditions*, that trade liberalisation will lead to increased economic welfare and 'optimal' environmental quality. However, *in imperfect market conditions*, 'win-win' outcomes are not guaranteed. In real world situations, both negative and positive effects should be expected. The findings of the empirical studies, though they differ in detail, are consistent with the findings reached in the review of theoretical studies. Although there are often potential, aggregate economic welfare gains to be made from trade liberalisation and increased foreign investment inflows, a significant

number of the studies reviewed contain examples where the environmental effects are negative.

The review of the literature provides support for the conclusion that most 'win-win' outcomes for sustainable development are conditional upon the application of effective regulatory measures and appropriate flanking measures. Formal appraisals of flanking measures for trade policies are not well developed. However, certain types of environmental policy instruments that may be used have been appraised in other policy contexts and these may be adapted for use in the trade policy area. The responsibility and authority for adopting and implementing the different flanking and other supporting measures varies. Only some of these lie with the WTO. The remainder fall within the competence of other international organisations, including the multilateral environmental agreements, or more commonly, with national and local government authorities supported by their social partners.

In conclusion, even if trade liberalisation is proved to be a necessary condition for continued growth and hence provide one of the cornerstone policies in promoting sustainable development, it is not a sufficient one. To ensure that trade liberalisation contributes to environmental sustainability in developed and developing countries, sound environmental policies are needed, both at the national and international level. This requires the development of appropriate regulatory frameworks. The robustness of environmental and social policies and institutions, including the adequacy of supporting regulatory instruments, are important determinants of the environmental impacts of trade and investment liberalisation.

How environmental policy-making relates to multilateral trade and investment policies is an ongoing and contested area for international discussion and negotiation within and outside the WTO. However, irrespective of the institutional structures that evolve, multilateral trade policy and environmental policy-making need to jointly address issues in a balanced and coherent manner, which recognises that trade liberalisation and environmental protection can each contribute to the end goal of global sustainable development. Policies on economic development and environmental protection should be designed and implemented in conjunction with each other, thereby avoiding the separation of trade liberalisation policy from environmental policy. In other words, the more

integrated environmental and trade policies are, the more sustainable economic growth will be (Panayotou, 2000). Moreover, it is crucial in the case of developing countries that besides effective cooperation between various institutions and governments, substantial additional financial and technical assistance is provided to enable the poorer nations to engage effectively in this process of enhancing understanding and strengthening policy coordination in the areas of trade, environment and development.

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