

# THE POTENTIAL CONTRIBUTIONS OF MUTUALLY CONSISTENT, SECTORALLY DISAGGREGATED NATIONAL ECONOMIC MODELS TO ANALYSES OF NATIONAL ENVIRONMENTAL POLICIES AND GLOBAL ENVIRONMENTAL INTERDEPENDENCE

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## 1. Overview of the Issue

Much of the contemporary concern for "structural change" in advanced economies has its origins in the significant changes in patterns of international trade which have occurred over the last two decades. While these changes in trade patterns are the joint consequences of developments in a number of interrelated dimensions (e.g., differentials in rates of technological innovation and diffusion and differential changes in relative factor prices, in rates of savings and capital formation, in the vintage of the capital stock and in primary materials and energy prices and availabilities), a growing emphasis in a number of countries on the environmental consequences of productive activities has constituted an important contributing factor, serving to discourage apparently "environmentally-adverse" ("pollution-intensive") production in some countries and to encourage the transfer of that production to countries in which environmental concerns are less intense (or impinge less severely on productive activity).

If "open economies" enjoyed "closed (natural) environments," then international trade would represent an effective means by which to "purchase" environmental amenities. In those societies in which these amenities were valued more highly, higher "prices" would be placed on "environmental services" as factors of production (either *de jure* or, through regulation, *de facto*). Other economies, placing lesser value on environmental services and amenities, would enjoy a comparative advantage with reference to commodities the production of which was environmentally "intensive." In consequence, patterns of trade would evolve exhibiting relative specialization, either in environmentally-adverse or in environmentally-neutral production. Those countries more highly valuing environmental amenities would experience an apparent deterioration in terms of trade, compensated by simultaneous increases in the consumption of environmental amenities relative to the consumption of other commodities. In the absence of barriers to international migration, individuals would distribute themselves over countries (characterized, *inter alia*, by closed environmental systems and open economies)

so as to maximize welfare.<sup>1</sup> On the assumption that environmental services were efficiently priced in each country, i.e., that any given level of environmental quality (consumption of environmental amenities) in any country could not be achieved at lesser cost (higher real income and output in that country), it would follow that the the global distributions of population, production and environmental quality would be Pareto optimal.<sup>2</sup>

In fact, of course, virtually all of the assumptions (explicit or implicit above), necessary for the conclusion that independently-taken national decisions concerning the explicit or implicit pricing of environmental services will lead to a globally Pareto-optimal solution, can be expected to be violated. Thus:

- Individual countries are not characterized by open economies and closed (natural) environments.
  - Because of less than "complete" environmental closure, the transfer of production from one country to another may be offset to a greater or lesser extent by trans-border environmental impacts of production, i.e., consequences of production in any one country on the environments of other countries.
  - Because of less than "complete" economic openness, the anticipated benefits of national actions designed to raise the effective prices of environmental services may not materialize or may be inefficiently achieved. For example, adverse changes in international competitiveness of industries engaged in environmentally intensive production may lead to the imposition of import tariffs and quotas and to other trade interventions which preclude to some extent the efficient global reallocation of productive activity, erode the intended improvement in environmental quality in the initiating country and raise the effective economic cost of such environmental improvement as is achieved in that country. Similarly, restrictions on international capital movements may well prevent full adaptation of the global economy.

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<sup>1</sup>What is required here is freedom of movement of individuals both as consumers (of environmental amenities) and as factors of production (labor). The absence of barriers to international movements of capital as a factor of production is implicit in the assumption of a perfectly "open" economy, and corresponding stipulations concerning knowledge and technology are also implicit.

<sup>2</sup>The general system, as just described, would be in the class described by James Buchanan's "economic theory of clubs" and Charles Tiebout's "pure theory of local government" (analysis of local governmental expenditure and taxation).