



NORTH-HOLLAND

Macroeconomic Income Adjustment and Tropical Forest Conservation: A General Equilibrium Analysis of Malaysia

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This article examines the loss in “metered” aggregate income that could occur if Malaysia surrendered the lumber value of its tropical forest resources to nonlumber uses. We estimate these losses under a variety of assumptions about what “business as usual” and “conservation” might entail. We also consider the sensitivity of income losses to variations in our model’s parameter values and to some of its maintained hypothesis. In a context where lumber’s initial contribution to aggregate income is around 2 percent, we estimate that a switch from lumber to nonlumber uses of tropical forests could cost up to 4 percent of baseline income. Of broader significance is the implication that the associated dynamic general equilibrium multipliers are consistently greater than unity, and often close to two in value. These large income multipliers are observed despite an assumed recovery of income through the reallocation of mobile factors initially employed in lumber activities, and an increase in returns to capital. In this study, a terms of trade deterioration, prompted by the loss of lumber foreign exchange revenue, accounts for about one-half of the total income losses we observe. For economies that rely to a greater extent than Malaysia on lumber foreign exchange revenue, these terms of trade-induced losses could be more important still. From a policy perspective, our results provide a benchmark against which the contingent valuations and other imputations of the monetary value of nonlumber use values of tropical forests may be gauged. © 2000 Society for Policy Modeling. Published by Elsevier Science Inc.

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1. INTRODUCTION

Policies that seek to correct environmental externalities raise distributional tensions not only within countries but also sometimes between them. Where a nation owns resources that others regard as part of the global commons, it could be compensated for exporting that part of any conservation benefit stream not captured locally. This principle has appeal, and may be a political precondition for conservation, where the resource economy is “poor” and other countries are “rich.”

While disagreement about environmental cost–benefit calculus is likely to be commonplace, partly because of uncertainty about the associated science (Cline, 1991), the economic principles that might govern compensation are clearer. The costs borne by a nation that conserves a global resource will be bounded from above by the sacrifice of consumption that conservation entails. The actual costs will almost certainly be less than this ceiling, because some residents of the resource-owning economy will benefit from conservation. The minimum other nations should be prepared to pay for conservation is what it would cost them to secure equivalent net benefits by alternative means.

In this paper, we attempt to measure the loss of “metered”¹ income that could occur when an economy surrenders the lumber value of its forests to nonlumber uses. We estimate these costs for Malaysia, one of the world’s largest producers of tropical lumber products. However, our analysis, which is largely counterfactual in nature, has more general applicability. We find that the indirect income loss entailed by a switch of forest resources to nonlumber uses dominates the direct loss, and that the associated general equilibrium income multiplier is greater than one. In this study, a terms of trade deterioration triggered by a loss of lumber foreign exchange revenue has a large adverse effect on household real income.

In principle, there is no difficulty in weighing these income losses against the environmental benefits that conservation would secure. But, in practice, there are formidable measurement problems. Many of the markets in nonlumber uses of forests (e.g.,

¹Here we use the term “metered” income in the sense of Nordhaus (1991) to refer to incomes that have a counterpart market transaction, and which would therefore normally enter into the measurement of national income. The adjective is intended to signify that there are other incomes that go unmeasured.

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