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## Tax Neutrality and Tax Amenities

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## TAX NEUTRALITY AND TAX AMENITIES

*by*

*David Hasen\**

### ABSTRACT

Efforts to identify and implement an appropriate tax neutrality benchmark have been persistent themes in scholarly and policy debates on international taxation for fifty years. This paper questions whether the concept of tax neutrality has been adequately specified for analyzing the efficiency properties of international tax systems. As distinct from the closed-economy setting, in the open-economy setting, neither tax revenues received nor the burdens that tax revenues pay for may be taken as fixed. Because tax revenues finance infrastructure and other productivity-enhancing goods — so-called “tax amenities” — and because capital burdens infrastructure, the reallocation of tax revenues among jurisdictions and the movement of assets and productive capacities across borders cause the amount of tax revenue collected in each jurisdiction to diverge from the revenue target. A consequence is that what are viewed as tax incentive effects, or distortions, improve productivity in some cases. Neutrality as a value, however, rests on the idea that tax incentive effects reduce efficiency by causing resources to be allocated away from some optimum non-tax-affected baseline; this idea is what justifies referring to tax-influenced allocations as distortions. An implication is that the baseline is not well specified in the open-economy setting.

This article suggests that, in light of these considerations and of the difficulty in implementing a theoretically satisfactory specification of neutrality, an analysis focusing on the allocative, distributive, and competitive properties of international tax rules would be more helpful than

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one focused on their neutrality properties. A simple model relating tax revenue and population to productivity is offered.

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## I. INTRODUCTION

Few policy goals loom larger in the economic analysis of international taxation than the promotion of tax neutrality, or the idea that tax considerations should not drive the economic decisions of private actors engaged, or potentially engaged, in cross-border activity.<sup>1</sup> Talk of neutrality animates official policy discourse,<sup>2</sup> while scholarly literature on the subject has become something of a cottage industry.<sup>3</sup> Many papers are devoted to promoting a particular conception of neutrality over one or more rival conceptions;<sup>4</sup> others develop or test various empirical claims about neutrality.<sup>5</sup> It is safe to say that the disagreements are substantive and the debates robust.<sup>6</sup>

Operating as part of the background consensus to these debates is the assumption that the idea of tax neutrality has been adequately specified to provide a framework for analysis. This paper questions that assumption. The public finance model in which the concept of tax neutrality originally was developed applies to the closed-economy setting and assumes that taxes represent a pure cost. In that setting, it is possible to formulate the concept of a non-tax-affected world with sufficient rigor (not to say accuracy) to specify a baseline of apparently non-tax-distorted economic activity. The baseline, in turn, serves as the yardstick by which one can measure the distorting effects of taxes. As explained below, a centerpiece of the framework is the assumption that one may take levels of tax-financed infrastructure and other

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1. Michael S. Knoll, Reconsidering International Tax Neutrality, 64 *Tax L. Rev.* 99, 100 (2011) [hereinafter Knoll, *Int'l. Tax Neutrality*].

2. See, e.g., *Hearing on the Impact of International Tax Reform on U.S. Competitiveness: Hearing Before the Subcomm. on Select Revenue Measures of the Comm. of Ways and Means, 109th Cong.* 5 (2006) (statement of R. Glenn Hubbard, Dean and Russell L. Carson Professor of Finance and Economics, Columbia Business School, New York, New York).

3. See Daniel Shaviro, *The David R. Tillinghast Lecture The Rising Tax-Electivity of U.S. Corporate Residence*, 64 *TAX L. REV.* 377, 385 (2011) [hereinafter Shaviro, *Tax-Electivity*] (noting that the neutrality issue “has been the dominant question explored and debated in [international tax policy] literature for more than fifty years”). A Westlaw search returned 212 results for articles in law journals having the terms “international” and “tax neutrality” in the same sentence. A JSTOR search of the same terms in economics journals returned 100 results.

4. See, e.g., Mihir A. Desai & James R. Hines Jr., *Old Rules and New Realities: Corporate Tax Policy in a Global Setting*, 57 *NAT'L TAX J.* 937 (2004) [hereinafter Desai & Hines, *Old Rules*].

5. *Id.* at 946–50 (citing studies).

6. See, e.g., Knoll, *Int'l Tax Neutrality*, *supra* note 1.

tax-financed goods that contribute to productivity — “tax amenities,” as I refer to them — as exogenously given.<sup>7</sup>

The model for the closed-economy setting is ill-suited to a regime of open economies. In such a regime, the problem of non-neutrality arises because any system of rules for taxing cross-border arrangements induces flows of capital, labor, or both across national boundaries and affects patterns of ownership as well.<sup>8</sup> It is well understood that these reactions affect the productivity, both of the assets that are somehow shifted in response to the rules and of all factors of production to the extent the relative supplies of and demands for them are shifted through the first effect. But these responses have a third consequence as well: They alter the supply of and demand for tax revenue in every jurisdiction that is a part of the regime. Because of the relationship over the long term between tax revenues and the supply of tax amenities, tax incentives circle back to alter the rates of return that function as baselines to start with, thereby upending their status as baselines. Expressed in the terms of the standard model, it no longer becomes reasonable either to suppose that funding for tax amenities is exogenously fixed or, as a consequence, to indulge the fiction that taxes represent a pure cost.

Several conclusions follow. First, it is not clear that the concepts of tax neutrality and tax distortion as they have been formulated are particularly meaningful in the international setting. If no neutral baseline has been articulated, it would seem difficult to justify normative claims about the value of minimizing actual departures, that is, “distortions,” from whatever is taken as the baseline. Second, any effort to model the neutrality properties of tax rules for capital flows or ownership patterns must account for the relationship between the provision of tax-financed amenities and the productive capacity of factors of production. (Similar problems would apply to the analysis of tax-induced individual migration, but, following most of the literature,<sup>9</sup> I assume that individual migration is much less sensitive to tax rules, and I therefore disregard it.) It is not sufficient to account merely for the effects of tax rules on the supply of and demand for either capital or its owners in any given jurisdiction, taking pre-tax rates of return as given.

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7. See Julie Roin, *Competition and Evasion: Another Perspective on International Tax Competition*, 89 GEO. L.J. 543 (2001) [hereinafter Roin, *Competition*], for an explanation of the standard model.

8. See Knoll, *Int'l Tax Neutrality*, *supra* note 1, for a statement of the basic neutrality problem.

9. See, e.g., Michael S. Kirsch, *Taxing Citizens in a Global Economy*, 82 N.Y.U. L. REV. 443, 493 (2007) (noting that few Americans change residence in response to tax rates). To the extent labor location is sensitive to taxes, the effects analyzed in this paper would be compounded. See Ruth Mason, *Tax Expenditures and Global Labor Mobility*, 84 N.Y.U. L. REV. 1540 (2009), for an extension of neutrality analysis to labor as a tax-sensitive factor of production.

Third, to the extent the benefit-purchasing character of taxes plays a role in productivity, worries about tax distortions likely are overstated because higher tax burdens will be correlated with (to be sure, not on a one-to-one basis) higher pre-tax returns. And finally, it seems that a more useful mode of analysis either would begin with a concept of neutrality adequate to the task or, if no such concept is in the offing, would downplay considerations of neutrality in favor of a focus on other significant properties of tax regimes, informed by an idea of how tax revenues affect productivity.

These points are developed as follows. Part II briefly reviews the traditional framing of the problem of tax distortions in cross-border investment; readers familiar with the literature on international tax neutrality can skip this discussion. Part III describes the standard model of tax neutrality as developed in the closed-economy setting and argues that its extension to the open-economy setting is problematic because of the effects on productivity of shifting allocations of resources and tax revenues that arise as tax revenues and economic activity move across borders. Subpart C of Part III goes on to describe what a theoretically accurate account of neutrality would look like but suggests that a workable model would be difficult to apply. Part IV offers, instead, a simple model of the relationship between taxation and productivity that attempts to capture the basic intuitions supporting the criticism of the standard model. Part V examines the likely productivity consequences of various tax regimes in light of the model developed in Part IV.

## II. THE PROBLEM OF INTERNATIONAL DOUBLE TAXATION

Tax non-neutrality in the international setting arises from the fact that at least two jurisdictions plausibly lay claim to tax income earned from cross-border arrangements: the jurisdiction of the place of investment (the “source” or “host”) and the jurisdiction where its owner resides (the “residence” or “home”). By contrast, in the domestic setting there is generally only one plausible candidate to assess tax, as source and residence (host and home) are identical.

Recognizing the magnitude of the bias toward domestic investment that would result if both home and host jurisdictions exercised their full prerogatives to tax, states have regularly sought to alleviate the high tax burden that otherwise would fall on cross-border income.<sup>10</sup> The general solution has been for residence states to cede all or a portion of their taxing power, whether by treaty, unilateral action, or a combination of the two, so that the total rate faced by a taxpayer in the cross-border setting

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10. Reuven S. Avi-Yonah, *The Structure of International Taxation: A Proposal for Simplification*, 74 TEX. L. REV. 1301, 1305–07 (1996).

approximates the rate of one of the two states involved.<sup>11</sup> Where the effort is successful, exactly one tax (or an amount of tax exactly equal to the tax imposed by one of the states on its residents' domestic income) applies to all income, whether earned domestically or abroad. Thus, so-called "double taxation" is eliminated.

The widely-recognized difficulty with these solutions is that they only partially address the problem of non-neutrality, which persists because: (a) the location of capital, the quantity in which capital is supplied, and, in more recent treatments, the identity of capital owners, all are somewhat elastic to taxes; (b) different jurisdictions impose different rates of tax; and (c) different jurisdictions adopt different methods of double-tax relief.<sup>12</sup> In particular, because capital or its owner may seek the lowest possible tax, locational or ownership decisions continue to be driven by tax considerations, even though one or the other of the decisions may be tax-neutral. The question then becomes which type of neutrality is least distorting over all.<sup>13</sup>

#### A. *The Basic Problem*

To illustrate these points, consider the following three-stage analysis as applied to a simple system consisting of two states, State A and State B, in which a resident of State A has \$100 to invest. Assume in the first stage that no taxes apply. If the State A resident has an investment opportunity that is expected to yield 9 percent if made in State A, but 10 percent if made in State B, the economically efficient decision is for the resident to make the investment in State B. Because no taxes apply, the State A resident realizes \$10 of income after one year, and total wealth has concomitantly increased by \$10. (In a dynamic model, investors from both states would continue to favor investment in State B until the return there converged with the return in State A, but for present purposes it is sufficient to use a static model.<sup>14</sup>)

Now, in the second stage, assume the same situation except that State A adopts a 35 percent rate of tax for all of the income of its residents as well as for income produced domestically by non-residents, and State B

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11. See generally Adam H. Rosenzweig, *Why Are There Tax Havens?*, 52 WM. & MARY L. REV. 923 (2010) [hereinafter Rosenzweig, *Tax Havens*].

12. Michael J. Graetz, *The David R. Tillinghast Lecture Taxing International Income: Inadequate Principles, Outdated Concepts, and Unsatisfactory Policies*, 54 TAX L. REV. 261, 272 n.36 (2001) [hereinafter Graetz, *Taxing Int'l Income*].

13. See Desai & Hines, *Old Rules*, *supra* note 4, at 955–57, for an example of this type of analysis.

14. See, e.g., Fadi Shaheen, *International Tax Neutrality: Reconsiderations*, 27 VA. TAX REV. 203, 215–17 (2007) [hereinafter Shaheen, *Reconsiderations*].



adopts a 25 percent rate on an analogous basis. In the absence of any relief for double taxation, a resident of either state will face a tax rate at the level imposed solely based on its residence for purely domestic investments, but a rate equal to the sum of the two states' rates, or 60 percent, for cross-border investments. (It is possible that a state would treat foreign taxes paid as a deductible business expense, but deductibility would merely alleviate the disparity between domestic and cross-border investment, not eliminate it. For the sake of simplicity, I omit discussion of the deduction model here.) Accordingly, even though the pre-tax yield and therefore total wealth is greater if the State A resident makes the investment in State B, the State A resident will make the investment domestically because the after-tax yield in State A is greater: 5.85 percent versus 4 percent.<sup>15</sup> Without relief from double taxation, after one year, \$9 of total wealth will be produced instead of \$10, meaning that \$1 of "deadweight loss" arises in the system. Again, although it can be expected that after-tax rates of return will equalize over time as capital investment responds to tax rates, the resulting allocations of capital and labor will be inefficient, or "distorted," when compared with the allocations that would result in the absence of taxes, taking as a given in the latter case that tax revenues would be provided for in some fashion.<sup>16</sup>

As described above, the general solution to this problem is either to eliminate one level of tax or to eliminate an amount of tax equal to that imposed by one of the states. Thus, consider in a third stage two common alternative methods for achieving a single rate of tax: providing residents a credit against their domestic tax liability for foreign income taxes paid (a "foreign tax credit," or "FTC"), and exempting residents' foreign-source income, loss, and expense from domestic tax entirely. As the following discussion makes clear, under either method, the problem of non-neutrality is alleviated but not eliminated. More generally, under any solution to the problem of double taxation where tax rates differ across jurisdictions, non-neutrality arises across some margin of possible taxpayer behavior.<sup>17</sup>

### 1. *First Variation: Worldwide Taxation with an Unlimited FTC*

To see how tax distortions persist, assume in the first variation that both states tax the income earned in the state but that residence states provide an unlimited FTC to their residents for foreign income taxes paid. This model is generally referred to as residency-based worldwide taxation.<sup>18</sup> Under the residency-based model, foreign taxes paid by the state's residents

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15. After-tax yields were computed as follows: 5.85 percent is 9 percent reduced by 35 percent, and 4 percent is 10 percent reduced by 60 percent.

16. See, e.g., Knoll, *Int'l Tax Neutrality*, *supra* note 1, at 104.

17. Graetz, *Taxing Int'l Income*, *supra* note 12, at 272 n.36.

18. Knoll, *Int'l Tax Neutrality*, *supra* note 1, at 101.

reduce domestic tax liability on a dollar-for-dollar basis. Further, since, in this case, the credit is “unlimited,” the resident’s tax rate is fixed regardless of the rate in the source state, because the resident state will reimburse its resident any excess of foreign taxes paid over domestic taxes due. Such an excess arises when the average tax rate in the source jurisdiction exceeds the average rate in the residence jurisdiction.

In this setting, the problem of double taxation is eliminated in the sense that each individual pays the same domestic rate of tax regardless of where the investment is made. Moreover, taking as fixed both the quantity of capital available to invest and the identities of the owners of capital, tax neutrality is preserved because the FTC regime eliminates the only remaining tax-based incentive, which is to adjust the location of the investment in response to taxes. (The incentive to change owner location persists, but, as explained below, it does not appear that any efficiency losses flow from changes in owners’ locations.) That is, the resident of State A will face a 35 percent rate of tax whether the investment is made in State A or in State B: if in State A, State B has no basis to tax and the rate is 35 percent; if in State B, the State A resident pays a 25 percent tax to State B and receives a credit in the same amount to be applied against State A’s 35 percent tax, leaving a 10 percent tax to be collected by State A, for a total tax of 35 percent. Analogous treatment will apply to an investor situated in State B, who will face a 25 percent rate no matter where the investment is made. (If it is made in State A, the State B investor pays \$3.50 in tax but gets \$1.00 from State B.) An unlimited foreign tax credit system thus results in neutrality over the location of capital investment. Under these assumptions, \$10 of wealth is created after one year, just as in the non-tax world, but \$3.50 in net tax revenue is collected if the investor resides in State A (\$2.50 to State A and \$1.00 to State B), and \$2.50 if in State B (\$3.50 to State A and -\$1.00 to State B). This type of neutrality is referred to as capital export neutrality (“CEN”) because it removes tax considerations from the decision whether to export capital or invest it at home.<sup>19</sup> CEN is also sometimes referred to as production neutrality to reflect the idea that the allocation of investment capital is based on pre-tax returns worldwide, meaning that the worldwide distribution and resulting productivity of capital are unaffected by taxes.<sup>20</sup>

Universal residence-based taxation also preserves so-called capital ownership neutrality (“CON”), a benchmark recently introduced into the legal literature by Mihir Desai and James Hines.<sup>21</sup> A tax system preserves

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19. James R. Hines Jr., *Reconsidering the Taxation of Foreign Income*, 62 TAX L. REV. 269, 272 (2009) [hereinafter Hines, *Reconsidering*].

20. *Id.*

21. Desai & Hines, *Old Rules*, *supra* note 4. They also have introduced the cognate benchmark of national ownership neutrality to reflect national rather than worldwide welfare maximization where ownership is elastic to taxes. *Id.* at 956. The

CON when it does not affect patterns of ownership. The importance of CON becomes apparent if one considers the fact that ownership patterns, like investment patterns and savings decisions, though perhaps to an even greater degree, are elastic to taxes. In any developed market, firms can buy or dispose of business assets with relative ease, and the transaction and personal costs of doing so are likely to be lower than those of either capital or individual locational shifts. Indeed, Desai and Hines argue that for modern economies, ownership considerations dominate locational decisions because so much of international trade consists of the exploitation of different capabilities sourced in different jurisdictions; it does not primarily involve movements of capital.<sup>22</sup> On this view, the typical form of cross-border investment is not the transfer of physical capital or the movement of its owners, but the shift in ownership of stationary capital from one country's nationals to another's. Concomitantly, when ownership moves out of the jurisdiction, it is more commonly replaced by an offsetting ownership shift elsewhere in the system than by a net movement of capital. New owners step in to fill the void created when property changes hands. In short, cross-border transactions are mostly about aligning competencies to manage fixed-base capital, not about moving capital into or out of productive jurisdictions.<sup>23</sup>

Thus, in the simplest case, suppose that the locations of all capital and all taxpayers are fixed but that taxpayers can acquire capital at home or abroad. In a first-best world without taxes, some optimal pattern of ownership of the fixed supply of worldwide capital will emerge, reflecting on one hand synergies of combined ownership of different productive activities, the advantages of vertical over horizontal integration, and other factors weighing in favor of combination, and on the other hand the advantages of specialized ownership of specialized industries, the limitations of hierarchical organizations to manage large or heterogeneous sets of assets and business opportunities, competitive price pressures, and other factors weighing in favor of dispersed ownership.<sup>24</sup> If the introduction of taxes affects the tax burden on prospective owners differently, then tax considerations are apt to alter this optimal pre-tax pattern of ownership, resulting in efficiency losses. Because, under a worldwide system, all taxpayers face the same relative cost to any investment, tax-motivated ownership shifts will not arise.<sup>25</sup>

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discussion here is confined to the examination of worldwide welfare-maximizing benchmarks.

22. *Id.* at 956.

23. *Id.* (“[M]ost FDI [(foreign direct investment)] represents transfers of control and ownership, and need not involve transfers of net savings.”).

24. See Hines, *Reconsidering*, *supra* note 19, at 275–77.

25. *Id.* at 276–77.

## 2. *Second Variation: Territorial Taxation*

Although an unlimited residence-based FTC system eliminates capital location incentives, it does not preserve neutrality along a number of other margins, including uniformity in savings versus consumption decisions, uniformity in ownership considerations (in the case of a world of mixed systems for tax relief), and uniformity in investor location; it also does not preserve “competitive neutrality,” which functions less as a genuine neutrality benchmark than, arguably, as a plea for equal treatment. When sensitivity to taxes along these margins is large, distortions may result from pursuing CEN that are no less harmful than distortions in patterns of home- and host-country investment that worldwide taxation is designed to eliminate.

The other major method of double-tax relief, foreign income exemption, or so-called territorial taxation, addresses these problems.<sup>26</sup> Under a pure form of territorial taxation, states exempt residents’ foreign-source income, loss, and expense from the tax base entirely.<sup>27</sup> In this setting, double taxation is eliminated because the only tax investors face on cross-border investment is foreign-source tax. Returning to the example above, the resident of State A will face a 25 percent rate of tax if the investment is made in State B, with State A ceding its right to tax entirely, and a 35 percent rate if it is made at home. Analogously, a resident of State B will face the same rates on investment in State A and State B that the State A resident faces.

A world of territorial systems has the following distinctive properties. First, the after-tax rather than the pre-tax rate is the same everywhere, as investment flows out of low-return jurisdictions and into high-return ones until the worldwide rate equalizes.<sup>28</sup> Although capital is not optimally allocated (since its allocation is affected by tax considerations), there is a tradeoff in that the decision about whether to save or consume, which is based on after-tax rather than pre-tax rates of return, is no longer affected differentially by taxes. This state of affairs is referred to as “savings

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26. Most of the OECD member countries tax active foreign business earnings on a basis closer to territoriality than to residence-based taxation. Robert Carroll, *The Importance of Tax Deferral and a Lower Corporate Tax Rate*, SPECIAL REPORT NO. 174, (Tax Found., Wash. D.C.), Feb. 2010, at 5, <http://www.taxfoundation.org/files/sr174.pdf>.

27. In practice, most territorial systems adopt some worldwide features (and vice-versa) to prevent tax avoidance. Edward D. Kleinbard, *The Lessons of Stateless Income*, TAX L. REV. (2011) [hereinafter Kleinbard, *Lessons*]. As an example, the opportunity to shift profits earned in high-tax jurisdictions to low-tax jurisdictions has caused some territorial jurisdictions, such as Japan, to impose floors on the rate applied to certain foreign-source income.

28. Knoll, *Int’l Tax Neutrality*, *supra* note 1, at 108–09.

neutrality”<sup>29</sup> and, by some scholars, as “capital import neutrality” (“CIN”).<sup>30</sup> Second, universal territoriality preserves what is sometimes termed competitive neutrality, or the idea that all investors face the same tax burden on investment in a given source, regardless of their residence. Perhaps unfortunately, competitive neutrality also often goes by the name CIN.<sup>31</sup> Although, as explained below, competitive neutrality sounds more in considerations of equality than welfare, it has been particularly influential as a driver of international tax policy in a number of countries, including the U.S.<sup>32</sup> Third, universal territorial taxation, like universal worldwide taxation, preserves CON, as the after-tax return to the owner of a fixed-base investment is the same regardless of who owns it.

### *B. Neutrality Tradeoffs*

The framework of international taxation and relief of double taxation described above has set the parameters for scholarly debate on international tax neutrality. This Subpart provides an overview of the tradeoffs that the various neutrality benchmarks present and canvasses some of the recent literature on international tax neutrality.

#### *1. Homogeneous Systems*

The efficiency question in evaluating any proposed tax system is which of the available arrangements minimizes total deadweight loss for the relevant population.<sup>33</sup> Here, the relevant population is assumed to be countries worldwide, though in some analyses it is the individual country.<sup>34</sup> Most scholars have agreed that in the comparison of worlds consisting solely of pure versions of either territorial or worldwide systems, the latter is

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29. *Id.*

30. *Id.*

31. PEGGY B. RICHMAN, TAXATION OF FOREIGN INVESTMENT INCOME: AN ECONOMIC ANALYSIS 8 (1963) [hereinafter RICHMAN, FOREIGN INVESTMENT]; Knoll, *Int'l Tax Neutrality*, *supra* note 1, at 110–11. Knoll notes that lawyers have tended to interpret CIN as a competitiveness benchmark (explained in the text below), while economists have interpreted it as a savings benchmark, and that the two groups have not always recognized they are talking about different benchmarks in using the term “CIN.”

32. Edward D. Kleinbard, *Stateless Income*, 11 FLA. TAX REV. 699, 730 (2011) [hereinafter Kleinbard, *Stateless Income*].

33. Daniel Shaviro, *Why Worldwide Welfare as a Normative Standard in U.S. Tax Policy?*, 60 TAX L. REV. 155, 155–57 (2007) [hereinafter Shaviro, *Worldwide Welfare*].

34. *See id.* at 157.

superior in promoting worldwide welfare.<sup>35</sup> Another way of stating the point is that it is believed that promoting production neutrality — again, in the context of the comparison of pure systems — and accepting the associated savings, competitive and investor location distortions produces less deadweight loss than the converse.

Within the parameters of the standard analysis, this conclusion appears to be well founded. First, consider tax-induced locational shifts. Under the stylized assumptions here, the failure to preserve locational neutrality of capital owners under worldwide systems would not seem to merit concern, since the location of the owner ought to have little impact on worldwide productivity. Thus, suppose that the quantity of investment capital and the identity of its owners are fixed, so that the sole tax-based incentive that arises under a pure worldwide system is for an owner in a high-tax jurisdiction to move to a low-tax jurisdiction, leaving capital where it is. The owner then would enjoy the low-tax jurisdiction's crediting of foreign tax paid in excess of source tax due when it makes economic sense to locate the investment in the higher-tax jurisdiction. As a result, total worldwide output would continue to be maximized despite the tax-induced decision to change the residence of the owner. Under these circumstances, it is unclear what inefficiency arises. Rather, the effects, if any, will be distributive and on administrative costs, as tax revenues will be eroded in low-tax source jurisdictions while administrative costs will be shifted to them.

These considerations become somewhat less decisive if one relaxes the unrealistic assumption that the quantity of capital available for investment is fixed. Treating this margin as somewhat tax-elastic, the fact that worldwide systems preserve production neutrality must be weighed against the fact that they do not preserve savings neutrality.<sup>36</sup> If one assumes there is a single, optimal worldwide rate of return to savings that is approximated by the weighted after-tax return across all jurisdictions, then worldwide taxation introduces distortions in the decision to save or invest. Investors located in high-tax jurisdictions will save too much, while those in low-tax jurisdictions will save too little. One may conclude that this situation is non-optimal because worldwide welfare theoretically could be increased if some of the return to savings earned in the low-tax jurisdiction were reallocated to the high-tax jurisdiction.<sup>37</sup> A territorial system avoids this distortion because the after-tax return to all investments worldwide will converge into a single worldwide rate, for, if there were differences in the

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35. Hines, *Reconsidering*, *supra* note 19, at 274.

36. Rosanne Altshuler, *Recent Developments in the Debate on Deferral*, 87 TAX NOTES 255, 257 (Apr. 10, 2000) [hereinafter Altshuler, *Recent Developments*]; Thomas Horst, *A Note on the Optimal Taxation of International Investment Income*, 94 Q. J. ECON. 793, 793 (1980) [hereinafter Horst, *Optimal Taxation*].

37. Altshuler, *Recent Developments*, *supra* note 36, at 257.

after-tax rate of return in two jurisdictions, capital would flow to the one providing the higher rate (even though the allocation would not be desirable in terms of production efficiency) until the rates were equalized.<sup>38</sup>

Although territorial systems preserve savings neutrality, the proposition that savings neutrality is a proper subject of efficiency analysis when the focus is on worldwide welfare is debatable.<sup>39</sup> Differing incentives to save or consume across jurisdictions would appear to be more a reflection of differing policy choices about the optimal mix of private and public returns to savings than to be an inefficiency traceable to tax-motivated incentives for cross-border investment.<sup>40</sup> Further, it is not clear that savings decisions are as responsive as capital location decisions to taxes;<sup>41</sup> higher taxes may induce both income and substitution effects among savers, meaning that some taxpayers may save more (on a pre-tax basis) in the presence of the tax than in its absence in order to ensure they have adequate savings in light of a greater tax burden.<sup>42</sup> Nevertheless, the view that the inefficiency resulting from non-uniformity in returns to savers has equal status with production inefficiency has had a significant influence in the literature,<sup>43</sup> and a number of scholars have framed the question of optimal tax design in terms of the relative efficiency losses arising from pursuing either efficiency benchmark — production versus savings.<sup>44</sup>

Finally, consider competitive neutrality, or the idea that some form of neutrality exists when investors meet on an equal tax footing in a given

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38. *Id.*

39. Hines, *Reconsidering*, *supra* note 19, at 274.

40. *See id.* (“As a practical matter, since many national policies influence the return to savers, CIN is often dismissed as a policy objective . . .”).

41. *See* DOES ATLAS SHRUG? THE ECONOMIC CONSEQUENCES OF TAXING THE RICH (Joel B. Slemrod ed., 2000) (presenting research on the sensitivity of savings decisions to tax rates).

42. For an explanation of income effects, see HARVEY S. ROSEN & TED GAYER, PUBLIC FINANCE 19 (9th ed. 2010) [hereinafter ROSEN & GAYER, PUBLIC FINANCE].

43. *E.g.*, Altshuler, *Recent Developments*, *supra* note 36, at 256 (“The standard result [in the analysis of the efficiency properties of residence- and source-based taxation] is that a pure residence system ensures efficiency in investment location decisions whereas a pure source system preserves efficiency in savings decisions.”).

44. *See, e.g.*, Altshuler, *Recent Developments*, *supra* note 36, at 258. *See generally* Knoll, *Int’l Tax Neutrality*, *supra* note 1, at 100–01; Horst, *Optimal Taxation*, *supra* note 36. It also has been observed that the availability of deferral in worldwide systems such as the United States’, coupled with the formality of corporate residence for U.S. tax purposes, makes it easier for taxpayers to shift the location of capital owners to lower-tax jurisdictions, thereby moving toward savings neutrality. Altshuler, *Recent Developments*, *supra* note 36, at 257.

jurisdiction.<sup>45</sup> Returning again to the discussion example, if States A and B each tax on a territorial basis, then investors from either jurisdiction face the same rate on income from the source that investors located in the source face on their source-based investments, regardless of the rates that States A and B impose on domestic income. This arrangement is competitively “neutral” in the sense that home-country rules do not disadvantage home residents in their competition with other taxpayers for investment in the host. However, as contrasted with CEN and, at least arguably, with savings neutrality, the pursuit of CIN as competitive neutrality does not promote worldwide welfare; indeed, it does not appear directly to promote the welfare of any constituency other than home-country multinational residents in high-tax jurisdictions, for the benefits to them are offset by detriments to those against whom they compete for investment; this group includes home-country investors that lack access to foreign markets. (And maintaining even this benchmark assumes that other jurisdictions do not retaliate against the residence jurisdiction’s decision to pursue competitive neutrality).<sup>46</sup> Consequently, competitive neutrality has been characterized as cheerleading for the home team<sup>47</sup> rather than a genuine neutrality benchmark, though it might more aptly be characterized as trickle-down neutrality for home-country residents who, in theory, could benefit from home-country multinationals’ prosperity.<sup>48</sup> Perhaps the best one can say about competitive neutrality is that it sounds in some theory of investor equality.<sup>49</sup>

As discussed above, the final neutrality benchmark, CON, does not come into play in the comparison of pure homogeneous systems. Both the universal adoption of pure worldwide tax systems and the universal adoption of pure territorial systems preserve CON.<sup>50</sup>

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45. RICHMAN, FOREIGN INVESTMENT, *supra* note 31, at 8.

46. *See, e.g.*, Kimberly A. Clausing, *The Role of U.S. Tax Policy in Offshoring*, in BROOKINGS TRADE FORUM 2005: OFFSHORING WHITE-COLLAR WORK 457, 473 (2006). (“Thus, capital import neutrality [in the competitiveness sense] generally puts the international competitiveness of a country’s multinational firms ahead of considerations regarding optimal investment location or government revenue. For example, capital may be allocated inefficiently toward low-tax locations because after-tax rates of return in such locations are higher.”)

47. Shaviro, *Worldwide Welfare*, *supra* note 33, at 155–56.

48. Kleinbard, *Lessons*, *supra* note 27.

49. Shaheen, *Reconsiderations* *supra* note 14, at 210.

50. Mihir A. Desai & James R. Hines Jr., *Evaluating International Tax Reform*, 51 NAT’L TAX J. 487, 495 (2003). [hereinafter Desai & Hines, *Evaluating Int’l Tax Reform*].



## 2. *Mixed and Limited Systems*

Under standard neutrality models, the case for universal adoption of worldwide systems becomes less decisive once the idealized assumptions of the preceding section are relaxed. In the actual world, no residence-based system provides an unlimited FTC, heterogeneity of methods of double-tax relief obtains, and some amount of deferral of foreign-source income is available even under worldwide systems. Each of these real-world features introduces tax distortions for states seeking to promote CEN.

First, consider the case of the limitation on FTCs. As a practical matter, a country that provides an unlimited FTC would suffer dramatic erosion of its tax base, as net capital importing countries could raise taxes arbitrarily high with no adverse effect on levels of inbound investment from countries using the FTC regime. Consequently, no country has permitted FTCs in excess of the taxpayer's erstwhile domestic tax liability.<sup>51</sup> The limitation means that residents of FTC jurisdictions with lower rates face higher taxes on investments in high-tax jurisdictions than on investments at home or in other jurisdictions having rates not in excess of the home rate. Residents of high-tax FTC jurisdictions, however, face the same rate on investments wherever located. In addition, residents of high-tax FTC jurisdictions have an incentive to locate both themselves and capital in low-tax jurisdictions, since then, but only then, can they secure the lower tax rate they would otherwise obtain just by relocating themselves and leaving capital where it was in a system of unlimited FTCs. The net effect of both phenomena is to create a worldwide bias towards investment in lower-taxed jurisdictions, which effectively moves the world in the direction of territorial taxation.<sup>52</sup> Depending on the magnitude of the effects, a formal switch to territoriality could actually be welfare enhancing, since it eliminates tax-induced shifts of ownership that arise under an incomplete implementation of worldwide taxation while preserving savings neutrality and, more importantly, ownership neutrality.

Heterogeneity of tax systems has a similar effect. In a multi-state world in which one or more jurisdictions adopt territorial taxation, residents of countries employing a residence-based FTC system are at a tax disadvantage when compared with residents in territorial jurisdictions with respect to investment opportunities in low-tax jurisdictions. To illustrate, consider a world composed of States X, Y, and Z. X and Y each impose tax at a flat 35 percent rate on domestic-source income, but whereas X adopts worldwide taxation with an FTC for its residents and nationals, Y adopts a

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51. See, e.g., I.R.C. § 904(a).

52. Hines, *Reconsidering*, *supra* note 19, at 273; Peggy B. Musgrave, *Capital Import Neutrality*, in *ENCYCLOPEDIA OF TAXATION AND TAX POLICY* 50, 50 (Joseph J. Cordes et al. eds., 2d ed. 2005).

territorial system under which neither foreign-source income nor foreign-source expense is accounted for. Z is a net capital importing country that has adopted a flat 10 percent rate on Z-sourced income.<sup>53</sup> (Z's method of taxing non-Z-sourced income is immaterial for the example.) When compared to Y residents, X residents face a tax disadvantage with respect to the Z-sourced investment because X residents cannot respond to the tax advantage of the Z-sourced investment, while Y residents can. The difficulty that this type of situation creates forms the basis for regular pleas from U.S. industry for the U.S. to move to a territorial system, as most industrialized nations have done.<sup>54</sup>

Equally importantly, the tax-insensitivity to ownership considerations that arises in a world of residence-based systems disappears in a world of mixed systems.<sup>55</sup> In the mixed setting, the incentives that residents of worldwide tax jurisdictions face differ from the incentives that residents of territorial jurisdictions face, as illustrated in the example in the preceding paragraph. In particular, residents of high-tax residence-based jurisdictions will be at a disadvantage compared to residents of high-tax territorial jurisdictions when it comes to investment opportunities in low-tax jurisdictions because they lack the incentive that residents of territorial jurisdictions have to invest in the low-tax jurisdiction. If the contention is true that most cross-border transactions involve shifting ownership of fixed-base capital, the tax disadvantage to a country employing a high-tax worldwide system becomes very large, while the tax loss of shifting to a territorial system becomes very small.<sup>56</sup>

Finally, consider the problem of deferral, as exemplified by the U.S. case. Formally, the U.S. pursues CEN through worldwide taxation of its citizens and residents together with the provision of a limited FTC.<sup>57</sup> Consistent with the standard assumptions discussed in Section 1, the costs to U.S. individuals of escaping U.S. tax on income they directly own are relatively high, because doing so generally requires the individual to leave the U.S., something most residents are reluctant to do. Consequently, it would appear that the U.S.'s promotion of CEN increases worldwide welfare more than would its promotion of either version of CIN. The difficulty with

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53. See Kleinbard, *Lessons*, *supra* note 27, for a discussion of this problem.

54. *Id.* Kleinbard describes these pleas as demands that the U.S. move to "cartoon territoriality."

55. Hines, *Reconsidering*, *supra* note 19, at 276.

56. Desai and Hines derive \$50 billion (in 2004) as a rough estimate of the dollar value of the annual efficiency losses to U.S. multinationals from the U.S. system of quasi-worldwide taxation (i.e., worldwide taxation with significant deferral opportunities). Desai & Hines, *Old Rules*, *supra* note 4, at 955.

57. See Reg. § 1.1-1(b) (U.S. citizens and residents are subject to tax on their worldwide income.); I.R.C. § 901 (foreign tax credit).

this analysis is that under U.S. law, the cost of shifting the identity of the immediate owner of capital to a non-U.S. person is quite low because corporate residency for U.S. tax purposes is almost entirely a formal matter. It depends upon the place of incorporation, not the location of significant managerial, production, or other operations, or on ultimate beneficial ownership of corporate capital.<sup>58</sup> When coupled with the fact that most active business income of foreign corporations that are owned by U.S. persons is not taxed until it is repatriated,<sup>59</sup> the result is a tax system that approaches territoriality because of deferral and the ability of taxpayers to time inclusions with offsetting losses.<sup>60</sup> As a consequence, the neutrality question in the U.S. setting has to some extent devolved into a question of determining the appropriate limits on deferral.<sup>61</sup> If the ultimate U.S. owners of non-U.S.-source income can defer inclusion for U.S. tax purposes for long enough, the fact that the income ultimately is subject to tax at U.S. rates will not deter taxpayers from shifting formal ownership together with actual capital from domestic to foreign entities. This shifting is completely at odds with CEN because the incentive arises to move capital to the low-tax jurisdiction based on the after-tax, not pre-tax, rate of return there. In effect, deferral pushes the system closer to territoriality.<sup>62</sup> However, it comes with the further disadvantage that an efficiency loss arises from the tax cost on repatriation of foreign profits under the U.S. system that would be absent under territoriality. Because the U.S. continues to tax foreign-source income when it is repatriated, the large incentive to earn income offshore is coupled with a large disincentive to bring it into the U.S.<sup>63</sup> This disincentive has

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58. I.R.C. § 7701(a)(4).

59. The U.S. system requires immediate inclusion by certain U.S. persons of corporate profits earned through certain controlled foreign corporations and passive foreign investment companies. See I.R.C. §§ 951–65 CFCs, 1291 (PFICs). Neither of these regimes, however, currently taxes most earnings of actively conducted foreign businesses.

60. See Kleinbard, *Stateless Income*, *supra* note 32, at 718–19, for a comprehensive analysis of the problem.

61. See, e.g., Altshuler, *Recent Developments*, *supra* note 36, at 255. If, for example, the discount rate is 5 percent, then a ten-year deferral of tax reduces the effective rate by approximately 39 percent; a twenty-year deferral reduces it by 62 percent.

62. E.g., *id.* at 257; Shaviro, *Worldwide Welfare*, *supra* note 33, at 160.

63. It is probably more accurate to say that the disincentive is to bring the cash back efficiently rather than to bring it back at all. For example, a U.S. multinational can obtain the economic benefit onshore of earnings held offshore through borrowing secured by the offshore earnings or through other similar mechanisms. The effect of such arrangements is to overcome the gross inefficiency of keeping earnings offshore solely for tax reasons, but it comes at the price of establishing and

regularly given rise to demands from U.S. multinationals, occasionally successful,<sup>64</sup> for both short-run relief in the form of tax holidays and the transition to a full-blown territorial system.<sup>65</sup>

### 3. Conclusion on Tradeoffs

Against the backdrop of the considerations outlined above, a lively debate in the U.S. context has emerged on the relative merits of worldwide and territorial taxation, principally on the question of whether the U.S. should move to shore up its worldwide system or instead move to more full-blown territoriality.<sup>66</sup> Those taking the latter position have argued that substantial deadweight loss arises when the residence or owner of capital changes in response to taxes, as it must when the system is heterogeneous or the FTC is limited.<sup>67</sup> That is, they have argued that there is no reason to bear the efficiency losses associated with tax-induced changes in ownership and savings non-neutrality, or (taking a national welfare perspective) the losses from competition with investors located in territorial jurisdictions, when the benefits from doing so — limited neutrality with respect to the location of capital, or CEN — have been lost anyway. On top of these losses are losses resulting from the incentive to keep offshore earnings offshore unless and until they can be repatriated on a tax-favored basis.<sup>68</sup> A territorial system would remove this incentive (as would a purer worldwide one). Others have argued that territorial taxation is not inferior to residence-based taxation even

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maintaining the relevant tax-avoidance strategy. I thank Ed Kleinbard for identifying this point.

64. See, e.g., American Jobs Creation Act of 2004, Pub. L. No. 108-357, § 422, 118 Stat. 1418 (2004) (enacting I.R.C. § 965, which provided for a temporary reduction in rate, to 5.25 percent, on certain foreign income repatriated to the United States).

65. See Kleinbard, *Lessons*, *supra* note 27. Kleinbard notes that most of these pleas are for systems that he terms “cartoon territoriality” — that is, systems so generous as to effectively permit full tax exemption for U.S. multinationals. *Id.*

66. See, e.g., Robert C. Pozen, *A Two-Pronged Approach to Reforming International Corporate Taxes in the U.S.*, 63 TAX NOTES INT’L 951 (Sept. 26, 2011).

67. A prominent example is the proposal that former President George W. Bush’s tax reform panel made to move to an exemption system. President’s Advisory Panel on Federal Tax Reform, *Simple, Fair, and Pro-Growth: Proposals to Fix America’s Tax System* 103-07 (2005). For a critique of the Panel’s proposal, see J. Clifton Fleming Jr. & Robert J. Peroni, *Exploring the Contours of a Proposed U.S. Exemption (Territorial) Tax System*, 109 TAX NOTES 1557 (Dec. 19, 2005) [hereinafter Fleming & Peroni, *Exploring*].

68. See Desai & Hines, *Old Rules*, *supra* note 4, at 938, and Kleinbard, *Lessons*, *supra* note 27 for (quite different) discussions of this problem.

on first-best grounds and that it is much preferable given the much wider use of territorial systems today.<sup>69</sup> For example, from the perspective of CON, the adoption of territoriality would be superior to remaining with a residence-based system in light of the wide use of territoriality by other countries and the contention that most of the efficiency losses associated with taxing cross-border transactions arise from ownership rather than capital-location or savings distortions.<sup>70</sup>

On the other side, a number of commentators have argued that the solution to the problem of corporate residence-shifting is to tighten the rules on deferral, thereby moving closer to a true worldwide system, and not to abandon the ideal of CEN.<sup>71</sup> In response to the Desai and Hines argument that the dominant margin of tax-induced behavior is ownership, some have argued that ownership is, at best, one of a number of relevant margins of response to tax rules and that no evidence has yet been offered to show that tax-induced ownership effects swamp capital-location effects.<sup>72</sup> Against the view that worldwide taxation is inadvisable on competitive grounds when most jurisdictions pursue territorial taxation, it has been noted that even territorial jurisdictions tend to adopt worldwide tax features for foreign-source income that is subject to exceptionally low rates, that most industrialized countries tend to have rates roughly comparable to each other (so that tax considerations may be minimized as long as it is not possible to exploit tax havens), and that if the U.S. moved closer to true worldwide taxation, other countries might follow suit.<sup>73</sup>

Which of these positions is correct depends in some measure on who is right about the economic facts — where the margins are more elastic and what efficiency costs result as taxpayers respond to tax incentives along one or another of them. But the assumption that there are answers to these questions depends on the more basic premise that neutrality is a well-formulated concept, for if it is not, then it is not clear what it means to say that one set of tax rules is more distorting than another and, consequently, is associated with greater efficiency losses. The next part makes the case that neutrality has not been well-defined in the international tax literature; the parts following offer an alternative way to consider the relationship between tax rules and productivity and an argument for applying different policy criteria in evaluating international tax rules.

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69. E.g., Shaheen, *Reconsiderations*, *supra* note 14, at 205–06.

70. Hines, *Reconsidering*, *supra* note 19, at 282.

71. See, e.g., Fleming & Peroni, *Exploring*, *supra* note 67, at 1577.

72. E.g., Mitchell A. Kane, Commentary, *Considering “Reconsidering the Taxation of Foreign Income,”* 62 TAX L. REV. 299 (2009) [hereinafter Kane, *Considering “Reconsidering”*].

73. Kleinbard, *Lessons*, *supra* note 27.

### III. NEUTRALITY GENERALLY

The discussion in Part II was designed to explicate the problem that double taxation of cross-border income poses for efficiency analysis and to give a flavor for the debates surrounding the relative merits of various methods of double-tax relief. In what follows, I offer a criticism of the supposition that the relevant baselines for the evaluation of tax distortions are well specified under standard approaches. As contrasted with narrower inquiries into whether one or another local legal change is likely to increase or reduce efficiency system-wide, the global question of which international tax regime is closest to an ideal of neutrality has not been well-formulated in the neutrality literature. In the case of local changes, one can make a meaningful evaluation of the effects of a new rule in light of reasonably fixed background conditions; in the case of global changes, current approaches fail to specify an ideal against which the actual world is to be measured because the ideal turns out to be affected by the world for which it is supposed to operate as an ideal.

This feedback effect materializes because any system for taxing cross-border arrangements causes economic actors to make decisions that affect not only the amount of tax paid, but which jurisdiction receives it; correlatively, the tax system will cause actors to make decisions that affect the burden in every jurisdiction on tax-financed goods because capital (and perhaps labor), like tax revenues, flows across borders, and because, even when it does not, trade-induced adjustments in productivity will have comparable effects. When economic decisions cause tax revenue streams or capital assets to be redirected from one jurisdiction to another, or affect the local productivity of capital (as under the CON analysis), they affect the absolute productivity of the factors of production in all jurisdictions because of the relationship between tax revenues and tax amenities: tax revenues finance productivity-enhancing tax amenities. As productivity rates diverge from prior levels, the rate of return that was supposed to remain uniform across jurisdictions under the relevant benchmark (e.g., pre-tax for production neutrality, after-tax for savings neutrality) diverges as well, meaning that the benchmark is not maintained.

One can frame the point as follows. There are not two but at least three moving parts to the analysis of the effects on rates of return of any regime for taxing cross-border income: (1) the flow of capital (and possibly labor or investors) and adjustments to productivity in response to taxes, (2) the adjustments in both net importing and net exporting countries to the relative prices of factors of production that result from these flows, and (3) the effects of (1) and (2) on both tax revenues and the burdens that tax revenues pay for in every affected jurisdiction. Analysis of the first two items

is part of the standard fare of neutrality analysis,<sup>74</sup> but the third, which generally has been overlooked, is also important to a comprehensive analysis of a tax system's neutrality properties. Because levels of funding for tax amenities affect the absolute rate of return to factors of production in each jurisdiction, tax-induced adjustments to tax revenues or to burdens that tax revenues pay for, no less than changes in the relative supply of and demand for factors of production, will affect the productivity of those factors, and indeed in ways that diverge between the affected jurisdictions.

This Part illustrates the problem by examining the development of the neutrality model in the domestic setting and the difficulties that arise when the model is appropriated for use in the international setting. Subpart A explicates the concept of tax neutrality in general terms. Subpart B examines the question of how to articulate the problem of non-neutrality in the international setting, concluding that the most cogent statement of the problem is one that analyzes the effects of moving from a system of closed economies to one of open economies. Because this statement also subverts the idea of the single-tax-affected baseline that underwrites the analysis of tax distortions, it turns out that the concept of neutrality in the international setting is not well-formulated under standard approaches.

#### A. Tax Neutrality Generally

Under the standard public finance model, a tax is optimally efficient when it does not change relative prices.<sup>75</sup> A tax that has this property is said to be neutral. Correlatively, if taxes do change relative prices, then prices are said to be “distorted” and, when the change alters the decisions of economic actors, the decisions are said to be distorted as well.<sup>76</sup> Such tax-affected decisions are characterized as distortions because they produce less total social wealth than would result in their absence. This conclusion follows if one accepts the assumptions commonly applied to describe the behavior of rational actors in free markets — namely, that they have ordered preferences,

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74. See, e.g., Desai & Hines, *Old Rules*, *supra* note 4; Hines, *Reconsidering*, *supra* note 19; Knoll *Int'l Tax Neutrality*, *supra* note 1; Shaheen, *Reconsiderations*, *supra* note 14.

75. See, e.g., ROSEN & GAYER, *PUBLIC FINANCE*, *supra* note 42, at 19. Tax-induced changes in relative prices are to be distinguished from tax-induced changes in absolute prices, which also may cause taxpayers to alter the composition of goods and services they consume or the labor they supply. *Id.* To the extent a tax-induced price change is absolute, the alteration in behavior is said to result from so-called income effects, or the fact that the taxpayer is poorer in absolute terms by reason of paying the tax and, consequently, has a lower budget line. *Id.* Income effects are not inefficient, though they may be problematic for other reasons, for example, that they reduce the wealth of the wrong person.

76. *Id.* at 329.

that they are free to deploy their resources to satisfy those preferences, and that there are no externalities.<sup>77</sup> In this setting, total social wealth is maximized.<sup>78</sup> Consequently, when decisions are affected by tax-induced changes to relative prices, the resulting arrangements do not maximize total social wealth because individuals have substituted less-efficient outcomes for more-efficient ones as a means to maximize their after-tax welfare. The reduction in total social wealth that arises through these substitution effects is referred to as the deadweight loss, or excess burden, of taxes.<sup>79</sup>

The following simple example illustrates these ideas. Suppose that a taxpayer faces two investment opportunities, one of which, Opportunity A, has an expected value of  $\$X$  and the other of which, Opportunity B, has an expected value of  $\$.9X$ , in both cases on a pre-tax basis. In the absence of tax considerations, and disregarding the possibility that risk preferences might affect the investment decision, the taxpayer would choose Opportunity A. If, however, Opportunity A is sufficiently less favorably taxed than Opportunity B, the taxpayer will choose Opportunity B, other things equal. In such a case, the decision is distorted by taxes as compared to a baseline of the efficiency-maximizing non-tax world. In the example,  $\$.9X$  rather than  $\$X$  of total social wealth is created, simply because the ultimate value to the taxpayer is greater if the non-wealth-maximizing choice is made.

The “non-tax” world is a standard heuristic employed to get at the idea that taxes create these sorts of inefficiencies.<sup>80</sup> However, the non-tax world cannot function as a true baseline for the simple reason that taxes are necessary to fund infrastructure and other goods that make possible a system of competitive markets in which rational actors satisfy their ordered preferences. In other words, the non-tax world would seem to require taxes in order to function as the baseline against which to measure the effect of taxes. This difficulty, however, can be functionally circumvented if one bears in mind that the problem is not, strictly speaking, the existence of taxes but the fact that most real-world taxes create substitution effects because tax liability is determined, in part, by economic decisions. Stated otherwise, real-world taxes alter the relative prices of goods. For example, even a broad-based income tax creates an incentive to work less if leisure goes untaxed because the tax alters the relative prices of work and leisure. Consequently, we can expect leisure to be over-supplied and labor to be under-supplied

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77. See generally PAUL A. SAMUELSON & WILLIAM D. NORDHAUS, *ECONOMICS* 84–106 (19th ed. 2010).

78. This is simply a statement of the first fundamental theorem of welfare economics, which itself can be considered a formal version of Adam Smith’s theory of the invisible hand. See Allan M. Feldman, *Welfare Economics*, in 4 *THE NEW PALGRAVE DICTIONARY OF ECONOMICS* 889 (John Eatwell et al. eds., 1987).

79. ROSEN & GAYER, *PUBLIC FINANCE*, *supra* note 42, at 329–36.

80. See *id.* at 330.



even under a broad-based low-rate income tax system, when compared to a system in which tax revenue is raised in some way that does not affect the decision about how much labor to supply.

The question, then, is whether it is possible for tax revenue in fact to be supplied in a way that does not affect behavior. In general, a tax imposed without regard to what the taxpayer does — generally referred to as a lump-sum tax — is thought to have this property. A head tax is the simplest example of such a tax. Although a head tax may affect taxpayer behavior simply because taxpayers have fewer resources, and may be objectionable on distributive or other grounds, the absolute reduction in wealth it effects does not lead to inefficient substitutions, but only to less consumption (or more production) as a way to compensate for the reduced wealth. Relative prices remain unaffected and, as a result, resources continue to be allocated optimally.<sup>81</sup> Distributive concerns can, theoretically, be addressed either through government redistribution or by tailoring the lump-sum tax liability to whatever non-behavior-affected metric is deemed appropriate.<sup>82</sup>

If one begins with the idea of a lump-sum-tax-financed world as the baseline, it becomes possible to sketch a model of tax neutrality in the closed-economy setting. A revenue target is exogenously set based upon some procedure by which relevant preferences are aggregated and sorted. This exercise is part of the larger procedure for identifying and implementing what is commonly termed the “social welfare function,”<sup>83</sup> or the societal determination about how to weigh individual utilities and other tradeoffs among conflicting values. For example, in a democratic polity, voters might express their preferences about levels of tax-financed amenities through a referendum in which the majority prevails, or the choice might be mediated through the election of representatives empowered to make decisions about such matters.<sup>84</sup> The level having been set, a base and rate schedule are then adopted. The latter decisions would, it is hoped, be based on efficiency considerations and take into account as well the various additional costs of administering the tax system. Although the base is unlikely to include, much

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81. *Id.* at 332.

82. Thus, the standard assumption in the public finance literature is that the optimal theoretical tax would be a lump-sum tax assessed on the basis of wage rate or ability (not actual wages). An ability base would seem to combine the tax neutrality properties sought from an efficiency perspective with the desired utility-maximizing distributive properties, assuming the declining marginal utility of ability. *See id.* at 333. A large literature addresses the philosophical cogency of this view. *See* Linda Sugin, *A Philosophical Objection to the Optimal Tax Model*, 64 *Tax L. Rev.* 229 (2011) (reviewing the literature).

83. *See, e.g.*, ROSEN & GAYER, *PUBLIC FINANCE*, *supra* note 42, at 44.

84. *See* Sarah B. Lawsky, *On the Edge: Declining Marginal Utility and Tax Policy*, 95 *MINN. L. REV.* 904, 913–14 (2011), for a discussion of social welfare functions.

less to consist solely of, lump-sum taxes, it is at least possible to have in view the economy that would result if the desired levels of tax-financed amenities were funded with lump-sum taxes.<sup>85</sup> That economy represents the “non-tax world,” or more accurately, the non-tax-affected world, and deviations from that world that result from tax-induced substitution effects represent tax distortions. The world has its own distributive and productive properties, including a pre-tax rate of return.

It is important to be clear about the conceptual price that employment of the idea of the non-tax-affected world exacts on the theory of tax distortions. Initially, the observation that the existence of a rate of return requires tax-financed amenities vitiated the notion of a non-tax-world that would operate as a baseline to measure tax distortions. The motivating idea of that model, however, is not that there are no taxes, but that taxes do not affect decision making by causing taxpayers to substitute more favorably-taxed goods or services for those less favorably taxed. It was then recognized that if taxes were conceptualized as imposed on a lump-sum basis, the link would be severed between the funding of goods paid for with tax revenues and the avoidance behavior of the individuals that pay for them. The resulting model purports to solve the problem of establishing the conditions under which a non-tax-distorted rate of return is possible even though taxes must somehow be collected, but the model is not complete.<sup>86</sup> Since different quantities of tax-financed goods supplied correspond to different quantities of tax-financed amenities and, in consequence, different private-sector rates of return,<sup>87</sup> one cannot establish the rate of return in the non-tax-affected world without a specification of the revenue target. The target itself, however, cannot be derived from the conditions imposed by the model but, rather, must be taken as an exogenously given amount based on a normative judgment — for instance, by ascertaining and applying the operative social welfare function. The pre-tax rate of return, in other words, does not exist as a purely factual datum..

### *B. Adapting Neutrality to the International Setting*

The question on the table is whether the closed-economy model can be adapted to the international setting without loss of normative or analytic

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85. See Roin, *Competition*, *supra* note 7, at 552 (noting the usefulness of the lump-sum ideal as a baseline against which to measure the distortions of actual taxes in a single jurisdiction).

86. See Part III.C. for a criticism of the view of taxes according to which lump-sum taxation provides a non-tax distorted baseline.

87. See, e.g., Lawrence J. Lau et al., *Efficiency in the Optimum Supply of Public Goods*, 46 *ECONOMETRICA* 269, 269 (1978) (noting the “dependence of private consumption, and hence of tax revenue, on the supply of public goods. . .”).

power. In the international setting, the analog of the non-tax-affected world is the non-double-tax-affected world.<sup>88</sup> That is, one level of real, non-lump-sum tax, together with its distortions, is taken as given, and the question is how that level will be maintained with minimal additional distortions in light of the rights of both home and host countries to tax cross-border transactions.<sup>89</sup>

The trouble is that, as will be developed below, no matter the starting point, tax-motivated behavior that results from the chosen neutrality regime fails to preserve the relevant rate of non-tax-affected return (pre-tax or after-tax) over all affected jurisdictions. As capital flows respond to the tax incentives created under the rules for cross-border transactions, both tax revenues and the burdens that tax revenues pay for are reallocated between home and host jurisdictions. Over the long term, the correspondence in each jurisdiction between levels of tax-financed amenities and the burdens on resources and infrastructure that the amenities pay for diverges as well, causing real rates of return to move, often in opposite directions, in home and host jurisdictions. Any benchmark defined with reference to the preservation of a rate of return therefore is not met and neutrality is not preserved. This result implies that under standard approaches, the non-double-tax-affected world cannot be specified for any system of independent jurisdictions in which tax rules create incentives that cause tax revenues or the burdens they pay for to be redirected from one jurisdiction to another.

The following discussion develops these ideas by examining three possible non-double-tax-affected starting points and evolutions to the real-world case: a tax-free world to which taxes are added on; a world of open economies, each of which initially has the same tax rate and in which rates are then made to differ across jurisdictions; and a world of single-taxed, closed economies that become open economies. It will be seen that only the last of the starting points actually states the problem in a coherent way. But that way of formulating the problem demonstrates both that “neutrality” is

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88. Technically, it would be more accurate to refer to the analog of the non-tax-affected world as the “single-tax-affected world,” since double non-taxation creates problems analogous to those of double taxation. As it is commonly framed, however, the problem is one of double taxation arising from the joint rights of source and residence to tax; double non-taxation generally arises because of tax base inconsistencies or strategic efforts to avoid tax, both topics that fall outside the scope of the present discussion.

89. Thus, tax treaties typically describe the elimination of double taxation as the central objective of the treaty. *See, e.g.*, United Nations Model Double Taxation Convention Between Developed and Developing Countries, Introduction, ¶ A.2, <http://unpan1.un.org/intradoc/groups/public/documents/un/unpan002084.pdf> (“Broadly, the general objectives of bilateral tax conventions may today be seen to include the full protection of taxpayers against double taxation (whether direct or indirect) . . .”).

violated as soon as cross-border trade is introduced, and that over the long term the resulting tax-motivated decisions are as likely to improve overall productivity as to harm it.

*1. First Possible Approach: From Non-Tax to Single-Tax World*

The first approach posits as a baseline a tax-free world and an associated tax-free rate of return to capital.<sup>90</sup> In this setting, the question becomes what happens to rates of return and capital allocations when different jurisdictions impose different rates of tax and adopt different methods of double-tax relief.

For the reasons stated above, it is difficult to motivate this approach. Because taxes are necessary to finance various goods needed for well-functioning markets to exist, a genuinely tax-free world would be one that lacked the features of a market economy; it would be one of rudimentary trade. As the preceding subpart explained, this problem arises in the closed-economy setting as well, but it can be addressed by substituting the concept of the non-tax-affected world for the tax-free world. The non-tax-affected world is operationalized (ideally) through lump-sum taxation. However, the concept of the non-tax-affected world requires an exogenously specified decision about the amount of tax revenue to be raised, since this target, together with other factors, determines the “pre-tax” rate of return. Without such a specification, the non-tax-affected world is indeterminate because different levels of exogenously given funding (via lump-sum taxation) result in different rates of private-sector return in the non-tax-affected world. Consider, for example, the absolute productivity differences of capital (human and physical) in Algeria and Canada, two countries of roughly equal population but dramatically different levels of development and histories of taxation. Taking GDP per capita as a proxy for capital productivity, capital in Canada is approximately 550 percent more productive than in Algeria.<sup>91</sup> Undoubtedly many factors contribute to this difference, but among them are the relative differences in transportation infrastructure, educational opportunities, a well-functioning and reliable administrative state, and other features of industrialization that are paid for over a considerable period with taxes and that contribute to the capacity of private parties to develop and diversify human capital and native resources. Not surprisingly, the percentage of GDP that historically has gone to taxes in Canada is about four

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90. See, e.g., Shaheen, *Reconsiderations*, *supra* note 14, at 214–15.

91. Canada’s GDP per capita in 2010 was \$39,057, and Algeria’s was \$6,950, in each case based on purchasing-power-parity dollars. Figures are IMF estimates. <http://tinyurl.com/6e6acpx>.

times greater than the percentage in Algeria: approximately 32.2 percent as compared to approximately 8 percent.<sup>92</sup>

## 2. *Second Possible Approach: From Single Rate to Divergent Rates*

A second approach would begin with a world in which all states imposed the same level of tax and adopted some form of double-tax relief, and then examine the efficiency consequences under alternative methods of double-tax relief, if tax rates are subsequently made to diverge. Since in the initial state all jurisdictions impose tax at the same rate, it would appear that under any method or methods of double-tax relief, the initial state of the world would be non-double-tax-distorted. Thus, the results under worldwide taxation with an unlimited FTC would be the same as under pure territorial taxation. Each taxpayer would face one rate of tax that is the same across jurisdictions, paid in every case to the source. The single rate also would apply in a world of mixed jurisdictions, in which some states adopted territorial taxation and the others worldwide taxation with an FTC. Again, each taxpayer would face a single rate of tax paid exclusively to the source. However counterfactual as a practical matter, this world at least would provide a theoretical articulation of the standard against which to measure tax distortions: a single-tax-affected world in which all individuals face the same rate of tax regardless of location of individual or capital and regardless of ownership. The system of double-tax relief under varying tax rates that created the least distortion from the baseline of the system under identical tax rates then would be the most efficient.

This method of conceptualizing the non-tax-distorted world is somewhat better than the first, but fundamentally it does not address the problem of dealing with tax non-neutrality. It requires the same decision on initial tax rates that individual states operating as closed economies face in setting a revenue target. Since heterogeneity on this decision is what characterizes the essential nature of the problem — as well as the actual world — it is not possible to pick a fixed rate that represents a non-distorted baseline without making a normative decision about appropriate levels of tax-financed amenities. Therefore, even though it is possible to model the actual world as a set of variations from any particular arbitrarily chosen baseline, one would not be entitled to conclude that the efficiency costs associated with the variations represented distortions.

One might counter that, at least within a plausible range, all states would choose to impose taxes at a rate that approximately maximizes the return to privately-held capital. On this view, heterogeneity outside of the range would not be the product of divergent national tastes on levels of tax-

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92. *2011 Index of Economic Freedom*, HERITAGE FOUNDATION, <http://www.heritage.org/index/explore?view=by-variables> (last visited Oct. 9, 2011).

financed amenities; rather it would result from technical or other constraints, such as cognitive bias, on the capacities of different jurisdictions to impose taxes at ideal rates. One then could identify a rate within the range as a neutral target (assuming it could be identified), acknowledging that the target rate functions as a proxy for the range itself.

As an initial matter, the notion that wide variations in tax burdens are due to technical or other factors appears to be inconsistent with reality, as widely varying tax burdens measured as a percentage of GDP obtain among countries not apparently under external or technical constraints to tax. As examples, the U.S. combined burden is approximately 26.9 percent, while larger Western European countries tend to impose levels nearer to 40 percent, and Scandinavian countries hover in the mid- to high- 40 percent range.<sup>93</sup> Further, the assumption that states would, if they could, seek to maximize the returns to privately-held capital within a range faces the technical difficulty that the optimal ratio of public to private investment for such a purpose is likely to depend on a variety of country-specific factors. Therefore, it cannot be specified as a uniform world rate. As examples, in order to optimize the exploitation of local resources, different countries may face different requirements for defense spending per capita; for state-funded roads, waterways, and other infrastructure; and for educational outlays. Therefore, uniformity in initial starting point will have to be absent unless one assumes that the initial rate is set to meet a worldwide optimal revenue target and that extra collections in some jurisdictions are transferred to other jurisdictions in order to ensure that adequate tax amenities are financed everywhere.

Neither of these solutions solves the problem of identifying a non-double-tax-affected world. If initial uniformity is lacking because differing distributions of resources require differing revenue targets (per capita) to fund the same pre-tax rate of return, then the non-double-tax-affected world will have to have different after-tax returns in different jurisdictions in order to preserve the single pre-tax rate of return worldwide. But investors seek to maximize after-tax, not pre-tax, returns, assuming they have the capacity to adjust their investments in response to tax variation. (If they lack the capacity, then the problem of tax non-neutrality does not arise anyway.) Consequently, they will arrange their affairs to maximize their after-tax revenue, replicating the problem that the solution is designed to address.

If, instead, a single rate with transfer payments is assumed, then a well-formulated model of the non-double-tax-affected world results (if one is willing to accept the imprecision arising from the fact that states may have different tastes for tax-financed amenities within a range). However, this

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93. Figures are from OECD tax database and are for 2008. *OECD Tax Database*, OECD Table A, [http://www.oecd.org/document/60/0,3746,en\\_2649\\_34533\\_1942460\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/60/0,3746,en_2649_34533_1942460_1_1_1_1,00.html).

approach assumes away the problem, since it is the existence of distinct, autonomous jurisdictions that gives rise to the actual problem that analyses of neutrality are designed to address. That is, the problem is how to move towards tax neutrality in a system of sovereign nations that, if they cooperate at all, tend to do so through quite limited means, such as bilateral treaties that are not enforceable through any supra-national authority. The assumption of tax transfer payments coordinated worldwide in effect reformulates the problem as one for a single, closed economy.

Finally, even if one assumes both that states generally agree that optimal tax rates are those that maximize the return to privately-held capital and that a single rate for all countries could reasonably approximate that optimal rate, it turns out that what is meant by tax neutrality cannot be specified without also articulating an optimal rate. From this perspective, distortions would not be measured by the extent to which patterns of investment in the actual world differ from those that would obtain if some version of territoriality or worldwide taxation were implemented, without absolute adjustments in rates. Rather, distortions would have to include a measure of the departure of tax revenue in any particular jurisdiction from what would be necessary to maximize the return to privately-held capital there. As an example, if it turned out that the optimal rate was uniform but, say, 45 percent, then even if every jurisdiction imposed tax at the same rate, there would be tax distortions unless that rate happened to be 45 percent. Such an approach is inconsistent with the idea that the non-double-tax-affected world is the world of existing pre-tax returns, coupled with a single level of tax.

### 3. *Third Possible Approach: From Closed to Open Economies*

A third approach would begin from the well-defined case of a set of closed economies in each of which income taxes are levied at a rate based upon a prior decision about desired levels of tax-financed amenities. Within the framework of the problem as traditionally posed — how to preserve the neutrality associated with a single level of tax in the cross-border setting — this approach is superior to the prior two because the starting point is well-defined and apparently tax-neutral; it is in fact the same starting point that is used for the analysis of closed economies. In addition, it enjoys a greater consonance with historical practice, as domestic economies historically have dwarfed international economies in size.<sup>94</sup>

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94. According to the director general of the World Trade Organization, between 1950 and 2010, world trade grew from approximately 5.5 percent to approximately 29 percent of world GDP. Pascal Lamy, *Facts and Fictions in International Trade Economics*, Speech at Conference on Trade and Inclusive Organization (Apr. 12, 2010), [http://unstats.un.org/unsd/trade/s\\_geneva2011/](http://unstats.un.org/unsd/trade/s_geneva2011/)

In this setting, the question becomes whether and how one can preserve the initial neutrality when borders are opened. It will be seen that what is called neutrality — namely, the removal of tax effects across some specified margin — is compromised once cross-border trade is introduced, unless elasticity along the margin of behavior is not associated with redirection from one jurisdiction to another of either tax revenues or burdens that are paid for with them. In particular, as capital moves or levels of economic activity adjust with the opening of borders, two developments occur: tax revenues in each affected jurisdiction diverge from the target that was set initially (and that was associated with a prior decision about desired productivity levels), and the burden on infrastructure shifts as economic activity increases or declines in the jurisdiction. If either of these changes (that is, burdens or tax collections) while the other does not move in concert, pre-tax rates of return will shift because of the non-correspondence between tax revenues and the requisite supply of tax amenities. If both change (as typically will be the case in a world in which taxes are not of the lump-sum variety) the net effect is uncertain. In most cases, however, because both the resulting effect of changes in tax revenue on capital productivity and the shift in burdens on tax-financed amenities can be large, the divergence from the closed-economy baseline that results has a significant impact on both pre- and post-tax rates of return and consequently on the level of taxes necessary to maintain the previously set baseline. The feedback effect of tax-induced capital flows on tax revenues and, ultimately, on the productivity of factors of production makes it impossible to articulate a neutrality standard compatible with cross-border trade among distinct, sovereign tax jurisdictions, as long as one models taxes as pure costs that purchase literally nothing.

These ideas can be made clearer with the aid of a discussion example. Thus, consider a system of two states, A and B, in which the economies initially are closed. Pursuant to their own internal political processes, each state selects a level of tax amenities and a tax base and rate designed to supply those amenities in a reasonably efficient manner. State A taxes at a high average rate, devotes much of its tax revenue to building institutions and infrastructure and, in consequence, has a high level of productivity, expressed as GDP per capita. State B taxes at a low rate and has a correspondingly lower level of productivity. The question is what happens when borders are opened and capital flows from one jurisdiction to the other.



*(i) Non-Preservation of Savings Neutrality*

Suppose that A and B adopt systems of territorial taxation on the basis that they wish to promote savings neutrality. Savings neutrality, it will be recalled, holds when all investors face the same after-tax return to savings. When that criterion is met, it is not possible for total global welfare to be improved by reallocating some savings from investors in low-tax jurisdictions to investors in high-tax jurisdictions (or vice-versa).<sup>95</sup> Worldwide allocations of goods to savings and consumption are asserted to be Pareto-optimal.<sup>96</sup>

By the terms of the standard analysis,<sup>97</sup> universal territorial systems satisfy savings neutrality because they cause capital to flow from high-tax to low-tax jurisdictions until the after-tax return to savings everywhere is the same. In the stylized world under consideration here, when borders are opened, capital is expected to flow from A to B as investors reap the benefits of lower taxes there, which make the after-tax rate of return higher. As capital flows out of A and into B, its relative supply in the former drops and in the latter rises, causing, respectively, an increase and a decline in after-tax rates of return to capital in the two jurisdictions relative to the rates in effect immediately prior to the opening of borders. The flow continues until after-tax rates equalize, at which point equilibrium is reached and the economic return on the decision to save or invest is the same in A and B. Savings neutrality, under this view, is preserved.

The standard analysis disregards the fact that if capital begins to flow from A to B, then, under territorial taxation, A's tax revenues will drop, and, over time, the level of tax-financed amenities in A will drop as well. The drop in amenities will lower the pre-tax and after-tax rates of return to investment in A apart from any effect caused by changes in the relative supplies of factors of production there. That is, the drop in amenities will lower the value of A-sited assets in real terms. (Note that if A raises its rates to compensate for the reduction in tax revenue, the incentive to move capital out of A to B becomes greater, undermining the effectiveness of the revenue-raising measure.) B's tax revenues will rise with parallel but opposite effects.

In this setting, it is not clear what significance there is to the resulting neutrality in savings decisions. The asserted efficiency property of savings neutrality is that it prevents taxes from differentially influencing investors' decisions to allocate more or less than they would to savings in the absence of taxes,<sup>98</sup> or, more accurately, in the absence of lump-sum taxes. The result qualifies as efficient on the standard assumption that non-tax-

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95. Altshuler, *Recent Developments*, *supra* note 36, at 257.

96. *Id.*

97. *See, e.g.*, Shaheen, *Reconsiderations*, *supra* note 14, at 211.

98. Altshuler, *Recent Developments*, *supra* note 36, at 257.

affected decisions maximize productivity, because they are based on real market prices, not tax-affected prices.<sup>99</sup> Implicit in this formulation is that all tax effects on market prices represent distortions, or, put otherwise, that taxes purchase nothing. The conclusion does not hold, however, if real, (pre-tax) market prices depend on inputs that are supplied with taxes. Stated in the converse, if tax amenities contribute to productivity, then real market prices are not given by pre-tax prices, but by those prices plus some portion of assessed taxes, which means that the payment of taxes contributes to the value, not just the price, of the good purchased.

In the closed economy setting, this truth was implicitly acknowledged in the recognition that taxes were necessary, but it was disregarded on the basis that tax revenues were supplied through lump-sum taxation. With lump-sum taxation, neither the real tax price of goods (the cost of providing tax amenities) nor the real tax benefit to goods (the value received for that tax price in the form of enhanced productivity) is impounded into prices; taxes are determined and assessed separately from the economic activity that gives rise to the need for tax revenues. Where both the supply of tax revenue and the demand for tax benefits may be taken as fixed, as they are in the closed economy setting, this separation poses little difficulty, at least from the perspective of articulating a model that reaches a stable equilibrium.<sup>100</sup> In the real-world, open economy setting where goods and taxes flow across borders, things are different. Neither the supply of tax payments nor the demand for tax benefits can be taken as fixed. The supply of tax payments is not fixed because taxes are not assessed on a lump-sum basis. The demand for tax benefits is not fixed because the flow of capital across borders and fluctuations in productivity resulting from ownership shifts alter the burden on infrastructure in each jurisdiction and thereby alter the productivity of factors of production there as well. Each of these effects poses problems for efficiency analysis, because they cause actual revenue received to diverge from the revenue target required to maintain a given rate of (pre-tax) return. Indeed, the fact that the demand for tax benefits adjusts in response to economic activity means that distortions would arise as borders were opened even in a world in which all taxes were of the lump-sum variety.

Returning to the discussion example, once it is acknowledged that taxes purchase part of the return to savings — that is, that taxes are not merely a cost added on to the price of savings — it is not possible to maintain that the identity of after-tax returns to savings is efficient if tax revenues or the burdens on infrastructure have been redirected from one

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99. *See supra* Part III.A.

100. It does, however, introduce a distortion by failing to incorporate into the cost of goods their tax prices, which results in over-production. *See supra* Part III.C.

jurisdiction to another along the way. The efficiency produced by ensuring that investment decisions do not differ on substitution grounds from what they would be in pre-tax terms holds only when it is possible to assume that tax benefits will be separately supplied at the level necessary to support the pre-tax rate of return. It is that assumption that makes what are called non-tax-affected decisions efficient, because it is that assumption that authorizes backing out the tax cost of goods and the tax benefit purchased for them from their market prices (i.e., representing ideal taxes as lump-sum taxes). The redirection of tax revenues and burdens on infrastructure from one jurisdiction to another in the open economy setting violates the assumption. In order to assess the efficiency properties in that setting, one can no longer assume (if one ever could) that the non-tax-affected world provides a benchmark of efficiency because, as demonstrated above, its efficiency properties depend upon a fixed demand for tax benefits. It is the assumption of a fixed demand for tax benefits, itself following from the assumption that taxes are a pure cost, that ensures the Pareto-optimality of non-tax-affected decision making. That same assumption is both necessary to justify backing out tax costs and factually inaccurate, as reflected in the statement of the problem itself: different revenue targets produce different levels of tax-financed amenities.

Thus, consider what happens over time as capital flows and tax revenues adjust in the example. The real return to savings will be enhanced in B, the low-tax jurisdiction, as increased tax revenues improve the private-sector pre-tax rate of return there, causing increased investment. This development produces the seemingly odd result that tax-induced behavior causes an increase in productivity, not a reduction. The result is odd if one assumes that taxes are a pure cost, but perfectly sensible if one assumes that taxes buy something, even if only part of what they buy is something acquired in the good produced. Capital that remains in A becomes less productive, which means the same physical quantity of capital drops in value compared to the value it had in the pre-trade (not pre-tax) world. The resident of A nominally gets the same return on A-sited investment as the resident of B does on B-sited investment, but the resident of A has less to invest in real terms. The opposite effect in B, however, should be larger if B started with a lower level of tax amenities and lower productivity.<sup>101</sup>

On balance, it is not clear whether savings decisions in the resulting post-trade world are superior to the decisions that would be made if savings neutrality did not hold. To see this, assume the same facts, except that A and B satisfy all revenue requirements via lump-sum taxation. When borders are opened, capital will flow from B to A because of the superior return there. If that were the sole effect, optimum savings decisions would result when rates equalized. But the inflow of capital to A will impose an additional burden on

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101. *See infra* Part IV.

A's infrastructure, causing the revenue target to fall short of what is needed to maintain its higher productivity. The opposite effect will occur in B. If revenue targets are not adjusted, then in real terms asset prices in A will drop and in B will increase. After-tax rates of return, however, will be identical in both jurisdictions. If some tax revenue were allocated from B to A (or if some capital were reallocated from A back to B), greater overall productivity would result, meaning that the world of lump-sum taxes is not Pareto-optimal. This implies that the non-tax-affected world is inferior to the tax-affected world.

Such an allocation in fact is what occurs under territorial taxation. When capital moves from A to B in the original example, tax revenue is redirected from A to B. Productivity in B is increased, resulting in a tax-affected world that is superior to the non-tax-affected world given that B began with fewer tax amenities than A.

*(ii) Non-Preservation of Production Neutrality*

Similar conceptual difficulties arise if A and B instead pursue CEN, or identity of pre-tax returns, through a system of residence-based taxation with a FTC. In this case, as capital flows from A to B, A initially will retain some revenue on its residents' B-sited investments, and there may be only slight adjustments to the levels of tax-financed amenities in A in consequence; indeed, the adjustments could go either way depending on the relative reductions in A's tax revenue and the demand for it to pay for tax amenities in A at the rate that was chosen before borders were opened. However, the indifference of A's investors to tax rates in B (at least up to A's rate) gives B an incentive to raise rates and improve its tax amenities, thereby increasing the pre-tax rate of return in B and, as a result, attracting more capital to B. The increase in B's productivity will then reduce the residual tax revenue available in A to finance tax amenities there — especially since more capital also will be attracted to B as a result of its improved productivity. Again, the result is reduced productivity in A. And, just as in the territorial case, despite the fact that the relevant benchmark is satisfied (here, CEN, or identity on pre-tax rates of return), it is clear that tax rules have caused locational adjustments that affect pre-tax rates of return in absolute terms, which were supposed to be preserved under CEN. Therefore, it again is not clear what the normative significance is of satisfying the benchmark. Nor, conversely, is it clear why the fact that the tax law has induced locational adjustments means that the resulting state of affairs is distorted: The pre-tax rate of return in A and B, which was supposed to function as a baseline to measure tax distortions, has itself been shifted in both jurisdictions, while the effect of tax-induced capital flows has been to increase productivity overall. One again is left with the odd result that tax-induced flows of capital — that is, “distortions” — have resulted in greater

rather than less productivity. Indeed, tax-induced flows even have resulted in greater rather than less efficiency over all, when the latter is understood to include the realization of latent productive power available to capital and labor.

*(iii) Comparison With Ownership and Competitive Neutralities*

Capital ownership neutrality offers a useful contrast to savings neutrality and production neutrality on the question of the effects of taxation on productivity. The case for pursuing CON over other benchmarks rests in large part on the contention that tax-induced ownership effects dominate capital location and savings-spending decision effects.<sup>102</sup> To the extent the facts support this contention, the feedback effects just discussed are muted, because tax rules generally do not redirect tax revenues into or out of jurisdictions if capital doesn't move. There may, however, be adjustments on the demand side for tax amenities even if the location of factors of production is fixed, meaning that some feedback effect may occur.

Thus, consider again the example of States A and B as borders open, but assume that the only tax-sensitive margin is ownership. In the first scenario, both A and B adopt territorial systems. One would expect ownership shifts to occur as borders are opened, and, if one supposes that better tax amenities reliably produce greater competencies, it seems that in an initial stage there will be a net shift of ownership of B-sited assets to A residents. Because gains from non-tax-affected trade can be expected to increase output over all, one would expect tax revenue increases in B as B-sited assets become more profitable. However, as long as there is not a net reduction in productivity of assets remaining in A (by whoever held), tax revenue should not decline in A either.

Whether A-sited assets remain as productive as before depends on what happens when A residents acquire more-profitable assets in B. The CON story plausibly holds that when resident investors acquire foreign-sited assets, new owners enter to fill the void created by the investor's decision to sell property at home in order to finance the foreign acquisition.<sup>103</sup> It does not follow that the new investors of the residence-sited assets will be as effective as the old owners, but a guess based purely on intuition is that the long-run tax revenue differences would not be large. If, however, intuition fails and there is a material net reduction, then tax revenue would decline, much as in the case where it is assumed that capital is mobile and ownership is fixed.

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102. Desai & Hines, *Evaluating Int'l Tax Reform*, *supra* note 50, at 499.

103. Hines, *Reconsidering*, *supra* note 19, at 277–78.

If A and B each adopt a worldwide FTC system, it would appear that the effect would be more muted still, because residual residence-based tax remains when ownership shifts from low-tax to high-tax residents.

These considerations suggest that it is an empirical question whether tax revenue streams or burdens on tax-financed infrastructure will be dramatically affected by tax rules. As indicated above, there is wide disagreement on the question of which margins of investor behavior, if any, dominate in response to tax rules.<sup>104</sup>

Finally, a word on competitive neutrality. As discussed in Part II, treating “competitive neutrality” as a genuine neutrality benchmark seems mistaken because there are no efficiency losses, other than those associated with savings non-neutrality, that result from failure to ensure that home and host residents face identical tax burdens on host-sited investment. Not surprisingly, there are no implications for competitive neutrality from the fact that capital will move in response to lower rates (assuming capital location is responsive to tax considerations). Competitive neutrality says nothing explicitly or implicitly about relative productivity in home and host.

### C. *Neutrality Reformulated*

#### 1. *Inadequacies of the Lump-Sum Ideal*

The preceding considerations highlight the infirmities of neutrality analysis when it proceeds on the basis that taxes represent a pure cost unrelated to the provision of contingently demanded benefits. Yet even the statement of the problem of tax neutrality for the closed economy setting, in which the decision on a revenue target is treated as exogenously given, represents an acknowledgment that some, perhaps most, taxes fund benefits that may or may not be provided and that are in some measure associated with identifiable, optional benefits. Put simply: most taxes pay for goods that are necessary only if a given level of productivity is desired. If that were not the case, there would be little reason for different levels of tax to be associated with different productivity levels.

To the extent taxes fund such optional benefits, the lump-sum ideal is incorrect. Recall that the ideal supposes at Stage One that tax revenues are financed from without, so that the individuals who benefit from tax revenues bear no cost whatever in supplying them. A level of economic activity then arises that is Pareto-optimal under these conditions. By definition, that level is the one such that the cost of engaging in any more activity just equals the

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104. See, e.g., Kane, *Considering “Reconsidering,”* *supra* note 72, at 310; Stephen E. Shay, *Commentary, Ownership Neutrality and Practical Complications*, 62 TAX L. REV. 317, 319–24 (2009).

benefit of doing so.<sup>105</sup> In other words, economic activity is supplied until the cost of doing so just equals the benefit. After that point, the costs of any additional economic activity exceed the benefits — for example, in forgone leisure — and thus additional economic activity does not occur. This result follows simply from the rational, utility-maximizing behavior of economic actors.

Stage Two of the basic model then supposes that taxes are imposed on the same economic actors on a lump-sum basis in order to meet the associated revenue target. The result is asserted to be maximally efficient. In other words, the introduction of lump-sum taxes paid by those who enjoy their benefits is assumed not to affect the Pareto optimality of the result at Stage One, when tax revenues were supplied from without. Now, in order for Stage Two to be Pareto-optimal given that Stage One is, there must be no incremental costs that individuals bear in supplying tax revenues used to finance the last increment of economic activity. If that were not the case, then it would be possible to improve things by avoiding the cost and not supplying the associated activity, as it is known that the benefit from the activity is just equal to the cost that was incurred *before* there was any cost to supplying tax revenue. But it is clear that there are incremental costs to supplying tax revenues, inasmuch as taxes cause wealth reductions to those who pay them. This implies that economic activity is inefficiently over-supplied in the standard model.

One can restate the point as follows: the Pareto optimality of Stage Two follows only if the cost in taxes of the last bit of activity undertaken when tax revenues were free is zero. But that would be the case only if it were not possible to associate activities with identifiable, tax-financed burdens. Clearly, however, almost any activity creates burdens that are paid for with taxes. One can't get the pin from Manchester to London without a road, but if one doesn't need to get the pin from Manchester to London, one may not need the road, or at least not one that good. For that reason, some portion of the burden can be forgone simply by forgoing the activity.<sup>106</sup> Since the last amount of many activities had economic value only on the assumption that there was no tax cost to them, it follows that things would be improved by not engaging in those last amounts once a tax cost is added in, rather than assessing that portion of the (lump-sum) tax and then engaging in the economic activity.

The argument does not imply that taxes function precisely like payments for identifiable benefits. It implies only that, for the overwhelming

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105. KARL E. CASE, *ECONOMICS AND TAX POLICY* 117–118 (Oelgeschlager, Gunn, & Hain, Publishers, Inc.) (1986). [hereinafter CASE, *ECONOMICS*].

106. See Roin, *Competition*, *supra* note 7, at 555–62, for an extended discussion of the relevance of benefits that taxes purchase to an analysis of the problem of tax competition.

share of economic activity, there is some identifiable burden imposed that is paid for with taxes. The lump-sum model denies this, supposing instead that taxes pay for an entirely different kind of good from that supplied through private markets. It supposes, that is, that every benefit paid for with taxes exceeds the tax cost. Whereas markets are the setting in which costs are impounded into identifiable goods for which purchasers are fully charged, taxes are the setting in which costs are necessary but do not supply anything identifiable at all. The truth is that most taxes finance activities that fall somewhere in between.

## 2. *Neutrality Modeling Consequences*

The core of the neutrality concept is the idea that costs are perfectly internalized to those who impose them and associated benefits are correlatively enjoyed.<sup>107</sup> Indeed, the efficiency properties even of private markets rest on the assumption that they effectively impound costs to private actors.<sup>108</sup> Thus, the main implication of the considerations here for the analysis of tax neutrality in the cross-border setting is that an adequate conception of neutrality would need to reflect the extent to which various activities result in costs or benefits that are not otherwise internalized to the actor. What I have been referring to as the standard model of efficiency in taxation purports to satisfy that assumption by treating taxes as funding activities the benefits of which are so diffuse and yet so necessary that every dollar of tax revenue up to the last dollar collected finances a benefit greater than its cost.<sup>109</sup> Therefore, the entire revenue target is taken to represent a cost that is somehow necessary for both any and every benefit that derives from economic activity. For the reasons explored in Section 1 of this Subpart, that assumption is inaccurate. Indeed, as stated at the outset, if the assumption were true it would not be possible to make sense of the fact that different levels of taxation are associated with different levels of economic activity – that is, with the basic framing of the problem of international tax neutrality (or, indeed, of neutrality generally).

By the same token, as an ideal, the benefit model of taxation is at least as inaccurate as the standard model. Taxes pay for benefits that are enjoyed much more diffusely than are most benefits purchased in private markets. The fact that one needs a good road only if one needs to get the pin from Manchester to London does not imply that only the producer of the pin (or, ultimately, its beneficial purchaser) benefits from the road. Again, most

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107. See CASE, ECONOMICS, *supra* note 105, at 121.

108. *Id.*

109. Again, it should be borne in mind that the tax revenues of relevance here are what I have termed “amenity taxes,” not taxes, for example, to fund redistribution or pure consumption goods.



benefits that are purchased with taxes have this character. If that were not the case, benefits supplied with taxes instead could be supplied through private markets. So a model of neutrality that accurately accounted for the burdens that economic activity creates can no more be assimilated to a market model than to the standard model; rather, it would need to identify that portion of burdens that any particular activity creates that are imposed diffusely and then accurately assign the cost of the activity to each individual beneficiary of it. In other words, it would require assigning to individual economic activities the otherwise-externalized costs that they create so that the tax could be assessed to the actor.

As a practical matter, there is no way to do this. Consider that if the improvements to the Manchester-London road are enjoyed more widely than by the pin producer (as they assuredly are), then to preserve neutrality, it is not just the pin producer who needs to be made responsible for the better road; it is a larger, more diffuse group, and one would need some way to identify that group's members and "how much" each member benefited in order to assign tax liabilities accurately. A vast literature on the pricing of such public goods, originating with the work of Erik Lindahl,<sup>110</sup> has grown up over the last century in an effort to answer these questions. Its main conclusion is that the problem is largely intractable as a practical matter, even if it is possible in some cases to articulate theoretically how such goods should be priced.<sup>111</sup> The main theoretical problem is that, to the extent a benefit is non-rival and non-excludible, no one has an incentive to disclose his true valuation of the good; rather each has an incentive to give an artificially low signal for the price of the good, because, if the good is supplied, each will be able to enjoy it without having to pay for it.<sup>112</sup> Added to this core difficulty are the problems of identifying who benefits, which activities burden, and by how much.

In light of these difficulties, one could abandon the aspiration to evaluate the productivity consequences of international tax systems on the basis that it is simply not possible to identify a neutral baseline against which to measure distortions that adversely affect productivity. An alternative, which I pursue in the next two parts, is to take an aggregative approach that assumes that tax revenues are associated with economic productivity at a macro-level that can be modeled in a relatively simple manner. The object is

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110. See Barbara H. Fried, *The Puzzling Case for Proportionate Taxation*, 2 CHAP L. REV. 157, 168–72 (1999) [hereinafter Fried, *Proportionate Taxation*] (discussing the literature on pricing of public goods initiated by Lindahl).

111. Paul A. Samuelson, *The Pure Theory of Public Expenditure*, 36 REV. OF ECON. & STAT. 387, 388–89 (1954) [hereinafter Samuelson, *Pure Theory*]. See also, Fried, *Proportionate Taxation*, *supra* note 110, at 165–72 (discussing the literature).

112. Samuelson, *Pure Theory*, *supra* note 111, at 388–89.

to get a rough idea of the extent to which expenditures on tax-financed types of benefits contribute to productivity. Part IV develops a model that offers some useful hypotheses about the likely productivity properties of international tax systems. Implications of the hypotheses are explored in Part V.

#### IV. NEUTRALITY AS A COMBINATION OF RATES AND AMENITIES

This Part and the next attempt to quantify the conceptual points developed in Parts III.B and III.C. The extent of the effect of tax rules on productivity depends on the nature of the relationship between tax revenues and tax amenities. In this Part, I begin with a simple model that offers rough measures of that relationship and of the magnitude of the effect on tax revenues from tax-induced capital flows. I then explore the consequences for productivity under the model when capital enters or leaves the jurisdiction in response to taxes. The object here is not to predict what is likely to happen to actual flows under possible real-world conditions (a topic addressed in Part V), but rather to explore the efficiency and productivity of properties of tax systems, assuming that certain flows of tax revenues and of productive activities occur and that these flows are affected by whatever set of tax rules is in place.

##### *A. Estimating the Value of Tax Amenities*

Technically the question of interest is what quantity of those tax-financed governmental goods and services that contribute to productivity needed to support a given level of productivity. I have been referring to these goods as “tax amenities.” Redistributive taxation and taxation for the provision of what might be called pure consumption benefits, such as public parks for enjoyment, are not relevant to this question.

The precise relationship between tax amenities and productivity undoubtedly is quite complex and varies depending on such factors as the size of the jurisdiction, its available resources, social and political views about various matters, and other variables. Rather than seek to tease out the relationships between these factors and productivity, I proceed with a more tractable, if less precise, model that seeks to specify the general nature of the relationship between taxation and productivity.

It is helpful to begin with the observation that most tax amenities exhibit characteristics somewhere between those of “pure private goods” and “pure public goods.” A pure private good is one whose unit price can be determined under a standard model of supply and demand; it exhibits no externalities and its producer bears all associated costs and enjoys all

associated benefits of producing it.<sup>113</sup> Pure private goods also exhibit the characteristics of “excludability” and “rivalry,” meaning, respectively, that the good’s availability can be limited to those who pay for it and that one person’s consumption of the supply of the good reduces its availability for consumption by another.

A pure public good, by contrast, would be entirely non-rival and non-excludable.<sup>114</sup> National defense is close to a pure public good because militias provide a benefit to all residents without regard to the amounts of tax they pay that support national defense and, within limits, without regard to population size. Clean air is a similar example. For these goods, it is impossible to exclude those who do not pay for them from enjoying them, and the enjoyment of them by anyone (whether paying or not) does not reduce the quantity available for others to enjoy.

In practice, most tax-financed goods exhibit some aspects of non-rivalry and non-excludability, but they are not “pure.”<sup>115</sup> (The converse holds to some extent as well: many market-supplied goods have public-goods features, in that they provide benefits to persons who do not pay for them.)<sup>116</sup> Locally provided amenities such as street cleaning or schools exhibit less of these characteristics, since ordinary market forces, such as the cost of housing, may determine who gets to enjoy the benefits. A public school may be open only to community residents (excludability), and there are limits to the number of attendees (rivalry).

It is well understood that public goods cannot be priced under the standard model applicable to private goods because of endemic market failure, which takes the form of positive externalities.<sup>117</sup> In particular, non-excludability creates a free-rider problem in that the goods are enjoyed by non-purchasers, and non-rivalry means that pricing presents a collective action problem.<sup>118</sup> As a consequence, the use of market mechanisms to supply public goods will result in a systematic undersupply unless there is someone who so values the good that it is worthwhile for that person to provide it even if no compensation from other beneficiaries is forthcoming. A large literature explores the problem of funding public goods in a manner that addresses these difficulties.<sup>119</sup>

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113. *Id.*

114. *Id.*

115. *Id.*

116. As one example among many, local real property enhancements may improve property values in the surrounding area.

117. Samuelson, *Pure Theory*, *supra* note 111, at 388–89.

118. *Id.*

119. John Hudson & Philip Jones, “Public Goods”: *An Exercise In Calibration*, 124 PUB. CHOICE 267 (2005).

Although the pricing of public goods is relevant to the problem of their supply, here the concern is not so much with setting prices but with determining the value they add to factors of production via tax amenities. What, in general, does it cost to supply a given level of productivity, and how is that cost related to the quantity of capital in the jurisdiction, assuming that all tax amenities are financed with tax revenues?

If tax amenities were pure private goods, the feedback problem of tax-induced capital flows on tax revenues and, consequently, on tax amenities would disappear. In that case, each unit of capital would be ticketed with just the taxes that it requires in order to be as productive as it is for a given rate of tax, and not more. Net capital exports would reduce total taxes collected and, concomitantly, total tax amenities supplied by exactly the amount no longer needed in the jurisdiction to maintain the same level of capital productivity, while net capital imports would increase tax amenities analogously. But tax amenities, even though narrowly construed to include solely those tax-purchased goods that contribute to the productivity of capital, are not pure private goods, and the cost of providing them cannot be assumed to be linearly impounded into taxes assessed on capital. Many tax amenities, such as national defense or the broadcast spectrum, have costs that are not systematically related to the quantity of capital in the jurisdiction. Other tax amenities, such as a court system, public safety, and transportation infrastructure, have costs that are partly related and partly unrelated to the quantity of capital present in the jurisdiction. More generally, it seems reasonable to suppose that for a given level of capital productivity, tax amenities will be supplied partly from public goods financed with fixed costs and partly from public goods the cost of which varies in some way with the amount of capital in the jurisdiction.

### *1. Model*

Equation (1) attempts to capture these intuitions in a simple, stylized model that relates GDP per capita, a proxy for capital productivity, to the product of the logarithms of total taxes collected per capita and country population, backing out, however, taxes paid for pension contributions. The underlying intuitions are as follows:

- i. over the range of reasonable possible tax burdens, taxes are positively correlated with capital productivity because taxes pay for infrastructure;

- ii. by backing out the largest single item (retirement) that is largely unrelated to productivity, a reasonable approximation of taxes used to fund productive activity is employed;<sup>120</sup>
- iii. especially in the case of public goods, there are returns to scale for larger countries so that, all else equal, the same quantity of tax revenue per capita will fund more tax amenities in a country with a larger population than in a country with a smaller one; and
- iv. the use of logarithm functions is appropriate because both the marginal benefit from greater tax burdens and the marginal benefit from greater population exhibit the property common to many economic inputs of being constantly declining, so that the next dollar of tax revenue or the next person does not contribute as much as the previous one to the improvement of GDP per capita.

Thus:

$$GDP_i = \log_n(T_i + C_1) * \log_n(P_i + C_2), \quad (1)$$

where  $GDP_i$  is gross domestic product per capita as a share of a reference GDP per capita,  $T_i$  is tax revenue per capita as a share of reference tax revenue per capita, and  $P_i$  is population as a share of reference population, in each case in Country  $i$ . The  $C$ -terms are constants. Reference rates are used to avoid the problem of expressing relative productivity levels and tax burdens in dollars or other units.

Because the model attempts to derive the consequences of international tax rules on productivity as economies move from relatively closed to more open status, an older data set is a better candidate than a newer one for an approximation of the relationship between tax revenue and population on one hand and productivity on the other for a closed economy. The earliest year for which data are readily available is 1980. At that time, the value of world trade as a percentage of world GDP was 42.1 percent. (By 2007 this value had risen to 62.1 percent.<sup>121</sup>) Expressing total taxes in Country  $i$  as a fraction of U.S. total taxes in 1980 (in each case, less pension contributions) and population in Country  $i$  as a fraction of U.S. population in

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120. Additional outlays that could have been backed out include unemployment insurance, public consumption goods, such as parks, and transfer payments from high-income to low-income persons. The first and third of these items plausibly contribute materially to productivity, while the second is generally inconsequential in amount. See, e.g., OFFICE OF MGMT. & BUDGET, EXEC., OFFICE OF THE PRESIDENT, BUDGET OF THE UNITED STATES GOVERNMENT, FISCAL YEAR 2010 (proposing \$12 billion, or approximately 0.8 percent of the federal budget, for the Department of the Interior).

121. International Monetary Fund, Globalization: A Brief Overview, <http://www.imf.org/external/np/exr/ib/2008/053008.htm>.

1980, a regression for then-member OECD countries against the exponent of GDP per capita (expressed as a fraction of U.S. GDP per capita) was run for 1980.<sup>122</sup> The parameters derived for the regression are:  $C_1 = 1.3228$ , and  $C_2 = 2.4750$ . The two independent variables appear to account for approximately 79 percent of the variation in GDP/capita, although tax revenue per capita alone accounts for nearly 65 percent of total variation.<sup>123</sup>

Substituting these values into Equation (1) yields:

$$GDP/cap_i = \log_n(T_i + 1.2899) * \log_n(P_i + 2.9285), \quad (1')$$

where  $GDP/cap$  is expressed in terms of the fraction of U.S. GDP per capita,  $T_i$  is expressed as the fraction of total U.S. tax revenue, and  $P_i$  is expressed as a fraction of U.S. population, all in 1980. Total tax revenue includes both income and other taxes and includes sub-national tax revenue. Table 1 lists predicted productivity levels under Equation (1') associated with different levels of tax revenue for selected populations and tax revenue values.

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122. The data set consisted of all OECD member countries in 1980 except Iceland, Luxembourg, and Sweden. Iceland and Luxembourg were excluded because they were judged too small in population to be representative, while Switzerland was excluded because it was judged to be a tax haven and, therefore, unlikely to exhibit the properties of a relatively closed economy funding its infrastructure primarily with taxes from domestic productive activity. Additional attributes of the data set and results for statistical significance are provided in the Appendix.

123. R2 for Equation (1') is 0.7979. See Appendix.

**Table 1: Productivity at Selected Tax Revenues and Populations***a. Population Equal to U.S. Population (1980)*

	<b>Tax revenue per capita as percent U.S. tax revenue per capita</b>	<b>Predicted GDP per capita as percent U.S. GDP per capita</b>
	200	162.91
	180	154.33
	160	145.16
	140	135.36
	120	124.79
	100	113.34
	80	100.84
	60	87.08
	40	71.77
	20	54.54

*b. Population Equal to One-Half U.S. Population (1980)*

	<b>Tax revenue per capita as percent U.S. tax revenue per capita</b>	<b>Predicted GDP per capita as percent U.S. GDP per capita</b>
1.	200	139.19
2.	180	131.86
3.	160	124.04
4.	140	115.65
5.	120	106.62
6.	100	96.83
7.	80	86.15
8.	60	74.40
9.	40	61.32
10.	20	46.60

c. *Population Equal to One-Twentieth U.S. Population (1980)*

	<b>Tax revenue per capita as percent U.S. tax revenue per capita</b>	<b>Predicted GDP per capita as percent U.S. GDP per capita</b>
1.	200	121.25
2.	180	114.87
3.	160	108.05
4.	140	100.75
5.	120	92.88
6.	100	84.36
7.	80	75.05
8.	60	64.81
9.	40	53.42
10.	20	40.60

2. *Observations*

With coefficient of determination ( $R^2$ ) of 0.798, the model may be taken as identifying a meaningful correlation between productivity on one hand and tax amenities and population on the other. As with any model, the establishment of a correlation does not establish causation: the model does not prove that higher tax rates or larger populations cause greater productivity. Nonetheless, in considering possible alternative explanations for the correlation, it would appear that causation more likely runs in this direction than either in the opposite direction or from some third thing to both productivity increases on one hand and higher tax rates and larger populations on the other.

Begin with the alternative thesis that high productivity causes higher tax rates. The story could be based on the idea that highly productive countries have a greater taste for tax-financed goods than do less-productive countries. That account may partly explain a portion of higher tax rates in some countries — Scandinavia may be a good example — but it largely disregards the fact that most economic activity plainly requires goods that are paid for with taxes.<sup>124</sup> Moreover, the idea that populations in wealthier countries generally clamor for higher taxes to fund various programs seems counter-intuitive. As for the idea that it is some third thing that causes both productivity and higher taxes, one can only say that it is always possible that an as-yet unidentified factor explains a correlation; however, no such third thing readily comes to mind. Rather the fact that so many tax expenditures

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124. See, e.g., David Hasen, *Liberalism and Ability Taxation*, 85 TEX. L. REV. 1057, 1109 n.203 (2007) (citing literature).



are devoted to goods that enhance productivity suggests the causation runs mostly from tax rates to productivity.

Similarly, it would seem that in the end higher populations are more responsible for higher productivity than the other way around. While greater productivity may result in higher populations, it seems likely that the resulting higher population in turn increases productivity. Smaller countries have fewer opportunities than larger ones to exploit comparative advantage, and the greater opportunities that larger populations have to diversify factors of production would suggest that larger countries are more productive than smaller ones.

The limits of the model also should be noted. The model does not purport to explain the relationship between rates or population and productivity at values far outside of observed ranges. Average effective tax rates near or in excess of 100 percent obviously would not be associated with higher levels of productivity than are much lower rates, but the model as formulated does not expressly take this limitation into account, as no country imposes an average effective tax rate nearly that high. No claim of explanatory power for rates much outside the range of observed rates (on either side) is made. The model also does not tease out the effects of different kinds of taxes on productivity or, more importantly, the effects of progressivity (or lack of it) on productivity. For example, there likely are different productivity properties from the imposition of taxes primarily on income, on income and consumption, and primarily on consumption. Similarly, there likely are different effects depending upon whether those with greater incomes (or who consume more) are taxed more heavily. And, relatedly, productivity may be related to income or wealth distribution more generally. The model addresses none of these factors.

Within these limitations, and in light of possible explanations for the observed correlations, it would appear that over the range of reasonable average effective rates, higher taxes do tend to cause higher productivity. In other words, Equation (1') may be interpreted to say that within the range of reasonable average effective tax rates, over time a higher rate is likely to result in productivity gains roughly consonant with the pattern of predictions in Table I.

#### *B. Productivity Consequences of Capital Flows Under the Model*

Whether and how capital will flow as the world moves from a system of closed economies to one of open economies are topics developed in Part V, but here it is worth considering in a general way the revenue and productivity effects that the model predicts assuming that significant amounts of capital do flow into or out of a representative jurisdiction. Again, the object in this subpart is simply to get an idea of the relationship between capital flows and productivity consequences, not to offer claims about the

particular flows that are likely to result from the feedback effects from either altered supplies of tax revenues or altered demands for them.

In order to simplify the analysis, the following assumes that all countries derive one-half of their tax revenues from a flat-rate income tax, with the balance derived from taxes and fees not dependent upon the presence of capital in the jurisdiction. It also assumes that one-half of world income is derived from labor and one-half from capital. This assumption is one possible approximation of the generally accepted view that labor accounts for between 40 and 60 percent of GDP, and capital the balance.<sup>125</sup> Thus, under these assumptions, one-quarter of world tax revenue derives from income taxes laid on capital.

### *1. Territorial Systems*

In a system of universal territoriality, the flow of capital out of a jurisdiction is associated in the short term with the elimination of all income tax revenues generated by the capital from the residence jurisdiction and the generation of new tax revenue in the source jurisdiction (at the source rate). It also is associated with the elimination of tax revenue from labor supplied in conjunction with the operation of that capital in the residence to the extent the labor is not reabsorbed into the residence economy; additional tax revenue resulting from the inflow of capital in the source arises on an analogous basis.<sup>126</sup> Based upon the assumptions described above, and in light of the associated revenue losses and gains resulting from capital movements, the exodus of one percent of capital from a jurisdiction leads to a minimum 0.25 percent reduction in total tax revenues there. Thus, the transfer of 20 percent of the capital from the residence to a source jurisdiction is associated with at least a 5 percent reduction in residence tax revenues.

Consider a country having a population one-twentieth of the U.S. 1980 population whose initial tax revenues per capita are 1.6 times that of the U.S. in 1980. This would be approximately the situation of a small Western European country such as Belgium. Assume that, after borders are opened, over time the country experiences a 25 percent net capital outflow and an associated 8 percent reduction in tax revenues, factoring in lost productivity from the sub-optimal reallocation of labor to other activities in the residence. Although residents would continue to own income generated by off-shore capital, the residence would experience a reduction in

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125. Malte Lübke, *Labour Shares*, International Labour Organisation, Technical Brief No. 1 (2007), [http://www.ilo.org/integration/resources/briefs/WCMS\\_086237/lang--en/index.htm](http://www.ilo.org/integration/resources/briefs/WCMS_086237/lang--en/index.htm).

126. DAVID F. HEATHFIELD & SÖREN WIBE, *AN INTRODUCTION TO COST AND PRODUCTION FUNCTIONS* 1–27 (1987).

productivity of approximately 4.5 percent due solely to reductions in tax revenues, from 108 percent of U.S. productivity to about 103.5 percent.<sup>127</sup> This drop may not appear to be large, but even an economy 5 percent of the size of the U.S. economy would have approximately \$729 billion in annual GDP,<sup>128</sup> meaning that a 4 percent reduction in productivity is associated with approximately \$29 billion in lost productivity, or more than \$1,800 per person per year.

Perhaps more importantly, a further effect of a reduction in in-country capital productivity is to make foreign investment still more attractive to home-country residents, leading to a cycle of capital exodus that continues for as long as the reduction in productivity associated with lower tax revenues exceeds the increase in capital productivity associated with greater scarcity of capital in the jurisdiction.<sup>129</sup> And if the residence responds to falling productivity by reducing tax rates, the problem is likely to get worse unless the drop in rates encourages capital inflows. (Whether it does depends upon the tradeoff to foreign investors between lower productivity in the residence and lower taxes there. This subject is addressed in Part V.) Unless and until the drop in rates encourages net capital inflows, residence productivity will decline further still. When equilibrium is reached, in-country GDP will have declined substantially below the optimum level that existed before borders were opened. Whether the drop represents a worldwide productivity loss depends, however, on the capital productivity increase, if any, associated with the movement of capital into source jurisdictions and the associated infrastructure improvements resulting from additional tax revenues there. Of importance for the neutrality question is

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127. An 8 percent reduction in tax revenue per capita from 1.6 times the U.S. level is 1.472 times the U.S. level. Under Equation (1'), the resulting productivity is given by:  $\log_n(1.472 + 1.2899) * \log_n(0.05 + 2.71828) = 1.034$ , or 103.4 percent of U.S. productivity, a drop of approximately four-and-one-half percent from the level for tax revenue per capita equal to 1.6 times that of the U.S. See Table 1.c., line 3.

128. For 2010, the OECD estimated U.S. GDP as \$14.58 trillion. OECD, Gross Domestic Products in U.S. Dollars, [http://www.oecd-ilibrary.org/economics/gross-domestic-product-in-us-dollars\\_2074384x-table3](http://www.oecd-ilibrary.org/economics/gross-domestic-product-in-us-dollars_2074384x-table3). According to Equation (1'), a country one-twentieth the size of the U.S. with a per capita tax burden equal to 1.6 times that of the U.S. would have GDP per capita of 99 percent of that of the U.S., resulting in an economy approximately 5 percent of the size of the U.S. economy.

129. To be clear, the upward pressure on the price of capital remaining in the jurisdiction resulting from tax-induced outflows is a consistent theme of neutrality analysis. See, e.g., Knoll, *Int'l Tax Neutrality*, *supra* note 1, at 101–04; Shaheen, *Reconsiderations*, *supra* note 14, at 215–19. The claim here is that the focus equally needs to be on the downward pressure on the price of capital remaining in the jurisdiction (relative to the price of capital in other jurisdictions) that results from the reduced productivity of capital as tax amenities go unsupplied.

that, however that analysis plays out, one cannot read off from the fact that capital flows into or out of the jurisdiction that neutrality either has been “maintained” or has not according to the savings neutrality benchmark.

In the case of a net capital importer, the situation is roughly reversed. A net 25 percent increase in capital inflow will be associated with a 25 percent increase in tax revenues and rising productivity. Of course, this result presupposes that tax rates remain generally constant. As discussed in Part V, below, this expectation is not reasonable in a world of territorial states divided into net capital exporting countries and net capital importing countries.

## 2. *Worldwide Systems*

In worldwide systems, the productivity consequences of a net inflow of capital, without more, do not differ from those in territorial systems, while the consequences of a net outflow of capital may or may not differ markedly from those in territorial systems. As in a territorial system, the source collects its full rate on imported capital, and the associated benefits to tax amenities all arise there. The productivity consequences in the residence are more ambiguous. If capital moves to a higher-taxed jurisdiction, the result is the same as in a territorial system, assuming the FTC is limited: The residence experiences a net reduction in tax revenues equal to all tax on the departed capital, giving rise to the same reduction in productivity that arises under a territorial system. (If the FTC is unlimited, there is an additional reduction in residence tax revenue equal to the difference between the tax on income at the source rate and the tax on income at the residence rate, resulting in even greater degradation of residence productivity. However, as noted earlier, no system provides or is likely to provide an unlimited FTC.<sup>130</sup>)

If the source jurisdiction taxes at a lower rate than the residence jurisdiction, the residence retains residual tax revenue equal to the difference between the residence country and source country rates applied to net source-based investment income. The productivity consequences of the retention are unclear. The model of productivity developed in this Part is based on the theory that over the range of reasonably possible tax rates, tax revenues significantly drive the rate of return to privately-held capital. The model further supposes that, for a variety of reasons, the increase or reduction in taxes on capital will be related to the logarithm of the pre-tax rate of return. In other words, if, as capital leaves the jurisdiction, all of the associated tax revenues leave the jurisdiction, the resultant reduction in tax revenues has a downward effect on productivity that exceeds the upward effect from having to supply fewer tax amenities by reason of the reduced quantity of capital

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130. *See supra* Part II.B.

present there. By the same token, however, the departure of capital from a jurisdiction does imply that the burden on infrastructure, and consequently the cost of tax amenities, drops to some extent. Therefore, in a worldwide system where capital leaves a high-tax residence for a low-tax source, the effect on residence productivity from reduced tax revenues depends on whether the residual tax revenue in the residence covers the cost of maintaining the reduced need for tax amenities there. This is an empirical question that is a function of a number of variables, including the initial quantity of tax revenue per capita in the residence (a higher amount associated with less reduction in productivity as capital leaves), the difference between the source and resident rates (a greater difference associated with less reduction in productivity as capital leaves) and the size of the residence (a larger population associated with less reduction in productivity as capital leaves). As a general matter, however, one may say that to the extent tax revenue remains in the residence as capital departs for the source, the downward effect on residence productivity is muted, while it may even be the case that there is net increase in productivity.

### *C. Conclusion on Neutrality and Amenities*

The discussion in this Part has developed the thesis, backed by evidence, that the presence in a jurisdiction of what I have termed “tax amenities” — infrastructure and other public or quasi-public goods that are paid for with tax revenues — plays a significant role in the productivity of capital there. The ramifications of the thesis, if true, are reasonably far-reaching. Part III developed the argument that any system for taxing cross-border transactions creates incentives that alter the absolute productivity of capital in any jurisdiction, assuming that capital moves or its ownership is adjusted, or that tax revenues are reallocated, in response to tax rules. (Similar consequences follow if labor moves or is reallocated, a question not treated here.) Changes in absolute productivity in the jurisdiction, no less than tax-induced movements of assets or capabilities or changes to the relative supplies of labor and capital, have an effect on the “pre-tax rate of return” and indicate that productivity enhancements may result from what would count as tax distortions under the standard view of the effects of taxation on productivity.

This Part suggests that predictions under the amenity approach about whether capital will flow and the productivity consequences of capital flows as borders become more open differ markedly from predictions under the standard models. Under those models, productivity is not made to depend on tax revenues, and tax rules accordingly are expected to have effects on productivity largely because of tax-induced changes in allocations of resources to the wrong person or place and resulting misallocations of the

relative supplies of and demands for factors of production in affected jurisdictions.

Thus, if, when borders are lifted, the world consists of a system of territorial regimes, under the standard model capital can be expected to flow to the lowest-tax jurisdictions until after-tax rates of return there reach after-tax rates in the next-lowest-taxed jurisdictions, then to those latter jurisdictions, finally reaching a single worldwide after-tax rate with some significant amount of distortion in capital location once all tax benefits have been capitalized.<sup>131</sup> This pattern follows if one assumes that taxes generally represent a cost laid on top of other costs to investment, with the difference that, unlike other costs, tax costs purchase nothing that need not be purchased. Similarly, if ownership is the dominant margin along which behavior is elastic to taxes and a mixed system of worldwide and territorial regimes is in effect as borders become open, one can expect the identity of owners of capital to shift in similar ways until a single after-tax rate of return is reached with an associated (inefficient) pattern of ownership.<sup>132</sup>

By contrast, under the approach developed here, it is unclear whether under a territorial regime capital will flow into low-tax jurisdictions or ownership will shift from high-tax to low-tax investors: On one hand, for the resident of a high-tax jurisdiction, the tax burden of investment is lower in a low-tax jurisdiction; but, on the other hand, the absolute rate of return to capital in the low-tax jurisdiction is likely to be lower than it is in a high-tax jurisdiction. Whether it makes sense to move capital or change ownership to enjoy those lower tax rates depends on the tradeoff between them and the lower productivity associated with them, since the issue is which combination of low rates and high amenities produces the highest after-tax rate of return. This is an empirical question the answer to which depends on actual productivity levels and tax rates in both jurisdictions.

It is perhaps worth noting that the low levels of capital inflow into low-tax jurisdictions suggested by a focus on tax amenities is consistent with observation.<sup>133</sup> The theory that generates them also helps to explain the so-called “Lucas Paradox,” which states that despite the fact that (standard) theory predicts net capital flows to low-cost jurisdictions, observed flows tend to run in the opposite direction — to high-cost jurisdictions.<sup>134</sup> It would

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131. See, e.g., Rosenzweig, *Tax Havens*, *supra* note 11, at 945–47, for a standard statement of the thesis.

132. See, e.g., Hines, *Reconsidering*, *supra* note 19, at 276, for a description of how ownership changes result from tax rules.

133. Laura Alfaro et al., *Why Doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation*, 90 REV. ECON. & STAT. 347 (2008). [hereinafter Alfaro, *Capital Flow*]

134. Robert Lucas, Papers and Proceedings of the Hundred and Second Annual Meeting of the American Economic Association, *Why Doesn't Capital Flow*

appear that the puzzle can be partly explained, or at least better understood, once the role that taxes play in establishing productivity is taken into account. In particular, a jurisdiction's after-tax return to higher taxes will often, perhaps typically, exceed the after-tax return to lower taxes. For example, under the model set out in Part IV, a country one-twentieth the size of the U.S. in population having an initial tax amenity rate equal to 80 percent of the U.S. tax amenity rate in 1980 would have an amenity tax rate of 20.62 percent<sup>135</sup> and a model-predicted GDP per capita of 75.05 percent of 1980 U.S. GDP per capita.<sup>136</sup> If the tax rate were cut in half, model-predicted GDP per capita as a fraction of U.S. GDP per capita drops to 53.42 percent. Thus, while an investment earning \$100 at the higher productivity rate would yield in \$79.38 after-tax, the same investment at the lower productivity rate would yield approximately five-sevenths the return on a pre-tax basis, or \$71.18. The after-tax return would be \$63.28. A rational investor would therefore favor investment in the high-tax jurisdiction.<sup>137</sup>

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*from Rich to Poor Countries?*, 80 AM. ECON. REV. 92 (1990). The Lucas Paradox is more of a puzzle than it is a paradox. Lucas attempted to explain the fact that capital flowed into the U.S. much more readily than into India in 1988, despite the fact that theory predicted the marginal productivity of capital in India would be fifty-eight times higher than in the U.S. *Id.* Lucas offered two possible explanations: differences in "fundamentals," or country-specific factors affecting productivity, and market failure.

Alfaro et al. examine a larger data set for the period 1971-2000 and conclude that fundamentals are the key determinant. In particular, they state: "low institutional quality is the leading explanation for the Lucas Paradox." Alfaro, *Capital Flow*, *supra* note 133, at 347. The explanation offered in this Article is consistent with Alfaro inasmuch as many fundamentals, including those affecting institutional quality, tend to be financed with tax amenities.

135. In 1980, the U.S. tax rate (national and sub-national) as a percentage of GDP per capita was 26.40 percent, of which 78.1 percent, or 20.62 percent of GDP, was devoted to spending on tax amenities, defined as all tax outlays other than to fund pensions (social security). Data on total taxes as a percentage of GDP and on pension taxes as a percent of GDP, in each case for a range of years, is available from the OECD <http://stats.oecd.org/Index.aspx?DataSetCode=REV>.

136. *See* Table 1.c., Line 7.

137. Other tax explanations for the Lucas Paradox have been offered. For example, Kleinbard notes that the capacity of multinational firms to deflect income economically earned in high-tax jurisdictions to low-tax jurisdictions for tax purposes removes the added cost of investing in high-tax jurisdictions while enabling the investor to reap the greater productivity benefits there. Kleinbard, *Stateless Income*, *supra* note 32, at 770-71. Kleinbard's explanation is entirely consistent with the theory of tax amenities offered here, since it presupposes that the absolute pre-tax return to investment in high-tax jurisdictions is superior to that in low-tax ones.

Finally, there are dramatic welfare consequences to tax-induced capital flows that have gone largely unnoticed in the literature. The link between tax revenues and productivity means that the flow of capital in response to taxes has a multiplier effect on increases in productivity in the source and, at least in the case of territorial systems, on reductions in productivity in the residence, disregarding the very real problem of tax competition (addressed in Part V). For the source enjoying net capital inflows, if statutory rates of tax remain constant (which they rarely do in a territorial world) the news generally would be good regardless whether the system is territorial or worldwide, as the source gets all the additional tax revenue associated with the net inflow of capital. The additional tax revenue improves the rate of return in the source, thereby making it more attractive for additional investment. This virtuous circle continues until the improvement in the rate of return is balanced by a reduction resulting from the increased relative supply of capital in the source as a factor of production.

By contrast, for a residence country experiencing net capital outflow, the news is likely to be bad — especially in a territorial system. In a territorial system, as capital leaves the residence, productivity declines because of the decline in tax revenues. The decline in productivity makes the residence still less attractive to capital, meaning that still more capital can be expected to depart. The downward spiral continues until the increased scarcity of capital relative to other factors of production in the residence counterbalances any additional reduction in the rate of return to capital resulting from reductions in tax revenues. The point at which equilibrium is reached, however, is likely to be one at which productivity is markedly lower than it would have been if tax revenues were kept at a level sufficient to maintain capital productivity in the residence. Whether there is an overall reduction in productivity — that is, a worldwide reduction — depends upon the consequences in the source. It seems safe to say, however, that residence reductions in productivity are less likely in a system of worldwide taxation, as high-tax resident jurisdictions retain some tax revenue after the departure of capital to lower-tax jurisdictions. Where the revenue retained is sufficient to maintain productivity levels (as it may be given the reduced burden to finance tax amenities resulting from the net departure of capital), no downward spiral occurs.

## V. ALLOCATIVE, DISTRIBUTIONAL, AND COMPETITIVE EFFECTS

Part III laid out the case against the traditional understanding of international tax neutrality, arguing that the effects of capital flows on pre-tax rates of return render the idea that there exists a worldwide baseline against which one can measure return problematic. Part IV developed a model for thinking about cross-border taxation that takes account of the



relationship between tax revenues and the pre-tax rate of return — the effect of so-called tax amenities on productivity. Part IV also detailed some of the productivity consequences of capital flows for home and host jurisdictions, assuming that capital moves in response to taxes.

This Part briefly examines the circumstances under which such capital flows are likely to occur in light of the model and compares predictions of the model with observation. It also surveys the likely allocative, distributional and competitive properties of international tax systems under the model. If the case for pursuing some global form of neutrality fails, these effects loom larger in any effort to develop policy prescriptions for principles of international taxation.

#### A. After-Tax Returns

A range of average effective tax rates and levels of development obtains in the actual world,<sup>138</sup> but in broad brush the world consists mostly of a set of industrialized, developed countries and a set of relatively non-industrialized, undeveloped countries.<sup>139</sup> Here I consider the situations of a developed and an undeveloped country under alternative international tax regimes as the world moves from closed to open economies, taking into account that under any system, investors generally seek not to minimize their effective tax rates, but to maximize their after-tax returns.

In general, the after-tax rate of return is given by:

$$q_i = (1 - t_i) * r_i, \quad (2)$$

where  $q_i$  is after-tax rate of return,  $t_i$  is tax rate, and  $r_i$  is pre-tax rate of return (in each case expressed as decimals), all in Country  $i$ . In making investment decisions, investors seek a combination of tax rate and rate of return that provides the maximum value for  $q$ .

Many factors are responsible for  $r_i$ , but for present purposes I bracket all those except taxes and population, which Part IV suggests are highly correlated with productivity. Using Equation (1'), it is possible to derive an expression for  $r_i$  in terms of  $t_i$  and population for a world in which all taxes

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138. See Heritage Foundation, 2011 Index of World Economic Freedom, <http://www.heritage.org/Index/download> for a list of all countries and tax rates. It is possible to compute tax revenue per capita using the Heritage Foundation data.

139. According to the World Bank, in 2010, of the 215 countries for which data are available, more than one-half have gross national income (GNI) per capita of less than one-half the worldwide average of \$9,097. The populations of these countries account for substantially more than one-half of world population. See World Bank, Gross National Income Per Capita 2010, Atlas Method and PPP, <http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf>.

are income taxes levied at a flat rate. Recall that Equation (1') relates pre-tax rate of return (expressed as the ratio of GDP per capita to that of the U.S. in 1980) to amenity tax rate and country population (also as fractions of the respective U.S. values for 1980) as follows:

$$GDP_i = \log_n(T_i + 1.2899) * \log_n(P_i + 2.9285). \quad (1')$$

Taking population as fixed for any particular Country  $i$ , the second logarithm term becomes a constant and for that country (1') simplifies to:

$$GDP_i = A_i * \log_n(T_i + 1.2899), \quad (1'')$$

where  $A_i$  is the constant derived by applying the logarithm function to the argument of the second logarithm term in Equation (1'), taking as  $P_i$  the ratio of Country  $i$  population to U.S. population in 1980.

If GDP per capita is taken as a proxy for pre-tax rate of return, then one can rewrite  $r_i$  as the product of  $GDP_i$  and some constant,  $K$ . However, it is not necessary to derive  $K$  if one expresses the after-tax rate of return not directly as a rate but as the ratio of the Country  $i$  GDP per capita to the same reference GDP per capita that was used in Equation (1) (that is, U.S. GDP per capita in 1980), multiplied by one minus the tax rate in Country  $i$ . (Under this procedure, the  $K$  term drops out.)

Therefore, let  $Q_i$  be the ratio of  $q_i$  to  $q_{US-80}$ , U.S. GDP per capita in 1980. Then:

$$Q_i = (1 - t_i) * R_i, \quad (2')$$

where  $R_i$  is simply Country  $i$  productivity measured against 1980 U.S. productivity, or the expression given on the right side of Equation (1'). For a fixed population in Country  $i$ , that expression is given by Equation (1''), so that:

$$R_i = A_i * \log_n(T_i + 1.2899). \quad (1''')$$

Finally, since  $T_i$  is just the ratio of  $t_i$  to the reference tax rate, U.S. amenity taxes in 1980 (expressed as the ratio of all U.S. tax revenue to U.S. GDP for the year), or 0.206, Equation (1''') can be rewritten as:

$$R_i = A_i * \log_n((t_i/0.206) + 1.2899), \quad (1''''')$$

and Equation (2') becomes:

$$Q_i = (1 - t_i) * A_i * \log_n((t_i/0.206) + 1.2899). \quad (2''')$$

Equation (2''') relates the after-tax return in Country  $i$  to its average amenity tax rate and population, the latter of which it treats as fixed for any given country. For any population size, after-tax return reaches a maximum

at a value for  $t_i$  of approximately 0.34, or 34 percent,<sup>140</sup> though what this maximum value is depends slightly upon population.<sup>141</sup> Table 2 provides values at selected tax rates for a country having one-quarter the population of the United States in 1980. For such a country,  $A$  is 1.156, and at  $t = .34$ ,  $Q_i$  has a value of 0.633. In other words, the after-tax maximum rate of return in Country  $i$ , assuming it is one-fourth the size of the U.S. in 1980 population, is approximately 82.3 percent of the pre-tax rate of return in the U.S. in 1980, which translates into approximately 103.7 percent of the after-tax rate of return in the U.S. in 1980.<sup>142</sup> Table 2 shows that the “sweet spot” for maximum after-tax returns runs from average effective tax rates of about 30 percent to about 40 percent, a range covering average tax rates (expressed as the ratio of total tax revenues to GDP) in developed countries, not developing countries.<sup>143</sup>

Equation (2'') suggests, contrary to the usual assumptions about the effects of tax rates on investment, that as trade restrictions are lifted, capital is more likely to flow into high-tax jurisdictions than into low-tax ones. The evidence is consistent with this hypothesis.<sup>144</sup> The vast majority of international trade takes place among developed countries.<sup>145</sup> Alfaro et al., summarizing data from the IMF and other sources, report that for a sample consisting of 23 developed and 75 undeveloped countries over the period 1971 to 2000, capital inflows per capita to developed countries exceeded those to undeveloped countries by a factor of approximately 5.<sup>146</sup>

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140 The derivative of Equation (2'') with respect to  $t_i$  is:  
 $dQ_i/dt_i = (1 - t_i) \cdot (A_i \cdot 4.854 / (4.854 \cdot t_i + 1.2899)) - A_i \cdot \log(4.854 \cdot t_i + 1.2899)$ ,  
 which reaches a value of zero when  $t_i$  is approximately 0.340. The second-order derivative is negative at this value of  $t_i$ , indicating the value is a local maximum in Equation (2'').

141. Note that Equation (1') is much less sensitive to variations in population size than tax rate.

142. Fraction of U.S. after-tax return in 1980 is given by the ratio to the pre-tax return, divided by one minus the 1980 U.S. amenity tax rate (expressed as a fraction), or 0.206. *See supra* note 135.

143. In 2008, the unweighted average effective tax rate for all OECD countries was 34.8 percent. OECD Tax Database, [http://www.oecd.org/document/60/0,3746,en\\_2649\\_34533\\_1942460\\_1\\_1\\_1\\_1,00.html#A\\_RevenueStatistics](http://www.oecd.org/document/60/0,3746,en_2649_34533_1942460_1_1_1_1,00.html#A_RevenueStatistics) (Table A). By contrast, the unweighted average effective tax rate for all non-OECD countries in 2011 was 19.0 percent. The Heritage Foundation, 2011 Index of Economic Freedom, <http://www.heritage.org/index/Explore.aspx?view=by-variables> (macro-economic data, all countries).

144. Alfaro et al., *Capital Flow*, *supra* note 133, at 352.

145. *Id.*

146. *Id.*

**Table 2: Selected Predicted After-Tax Rates of Return For a Country Having 25 Percent of U.S. Population (1980)**

<b>Tax rate (fraction)</b>	<b>After-tax return as fraction of 1980 U.S. pre-tax return</b>	<b>After-tax return as fraction of 1980 U.S. after-tax return</b>
0.1	0.597364416	75.23481315
0.2	0.754596793	95.03737951
0.3	0.817721901	102.9876450
0.4	0.813837148	102.4983814
0.5	0.759112991	95.60617013
0.6	0.664065935	83.63550823
0.7	0.535971298	67.50268242
0.8	0.380102232	47.87181768
0.9	0.200422488	25.24212698

The bias in favor of capital movements among developed countries does not imply, of course, that there will be no capital flows from developed to undeveloped countries; it implies only that those flows will be dwarfed by flows among developed countries, as indeed they are. In general, the quantity of capital inflows into developing countries appears to have grown steadily over the last fifty years.<sup>147</sup> In Alfaro's sample, from 1970 to 1974, net inflows per capita to developing countries were less than \$1,000 per year; in the five-year period from 1990 to 1994, they had risen to approximately \$2,500 per year; and by 1995 they had more than doubled again, to more than \$5,000 per year.<sup>148</sup> Flows per capita into developed countries in Alfaro's sample grew more quickly still, moving from approximately \$1,000 per year in 1975-79 to more than \$25,000 per year from 1995 to 2000.<sup>149</sup>

## *B. Comparisons of Systemic Effects*

### *1. Territorial Systems*

Even in a territorial system, investors will not automatically invest in low-tax jurisdictions once borders are lifted, for the reason just discussed that low taxes are highly correlated with lower productivity and lower after-tax returns, and investors seek the highest after-tax return, not the lowest tax rate.<sup>150</sup> The relationship between tax rate and population on one hand and

147. *Id.*

148. Alfaro, *Capital Flow*, *supra* note 133, at 352.

149. *Id.*

150. *See supra* Part IV.

productivity rate on the other illuminates the choices that countries face as borders become more open. In a world of territorial tax systems, the opening of borders would not be expected to result in massive net capital flows either into or out of developed countries, as most trading will occur with similarly situated partners and the tax advantages of low-tax jurisdictions would seem to be dominated by productive weakness there. Rather, the uneven distribution of resources, capabilities and factors of production worldwide (commonly referred to as “comparative advantage”<sup>151</sup>) means that supra-normal returns become available in all countries as borders are opened or, stated otherwise, that new opportunities for gains from trade are as likely to appear in one country as in another on a per capita basis.<sup>152</sup> The opportunities that emerge in developed countries, however, are more likely to be attractive than those emerging in developing countries (because of the higher productivity baseline). For a developed country, then, the optimal tax policy would be simply to ensure that neither double taxation nor opportunities for substantial tax avoidance materialize for investors. In the case of trade between developed countries, a territorial system ought not produce tax consequences much different from a worldwide system, as investments should, on balance, be as likely to flow in as out, and, since rates across developed jurisdictions are likely to be similar, forgone tax revenue (on outbound investment) should approximately equal new tax revenue on inbound investment.<sup>153</sup>

For a developing country, the situation is dramatically different. Developing countries will have trouble attracting capital, since productivity rates tend to be much lower. Lower productivity rates lead foreign investors to discount investment opportunities offering supra-marginal returns (they discount them, that is, relative to the value that host-country investors place on those opportunities as compared with other opportunities in the host). In a system of worldwide territorial taxation, developing countries theoretically have two ways to deal with the resulting disincentive to inbound investment.

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151. Paul A. Samuelson, *Where Ricardo and Mill Rebut and Confirm Articles of Mainstream Economists Supporting Globalization*, 18 J. ECON. PERSP. 135 (2004).

152. See, e.g., *id.* for an analysis of comparative advantage in the international setting. Samuelson notes that the comparative advantage story may be too rosy in some settings, but he does not question the basic theory. See also Desai & Hines, *Evaluating Int’l Tax Reform*, *supra* note 50, at 489.

153. See, e.g., Kleinbard, *Lessons*, *supra* note 27, (noting that taxes should have a minimal impact on choices between domestic and cross-border investment where rates are comparable and opportunities for earnings stripping and other tax avoidance strategies are unavailable); Shaviro, *Tax-Electivity*, *supra* note 3, at 391–92 (noting that reciprocal territorial and reciprocal worldwide taxation involving two countries “comes out exactly the same in the aggregate if the income amounts and applicable tax rates are identical.”).

They can increase taxes in order to develop infrastructure and improve the pre-tax rate of return, or they can cut taxes to reduce the after-tax cost of investment more directly. Table 2 demonstrates why, if no other considerations were in play, the former method ought to be vastly preferable. Over the range of average tax rates running from 10 to 30 percent, a one percent increase in average tax rates (measured as a fraction of GDP) is associated with approximately a 0.75 percent increase, on average, in after-tax return.

The difficulty with raising rates to improve infrastructure, of course, is that other considerations are in play. Higher rates do not directly translate to higher productivity but promote it when governments make effective use of tax revenues to build infrastructure — a time-consuming process.<sup>154</sup> Where net capital exporters adopt territorial systems, developing countries do not have the luxury of attracting capital by improving infrastructure with the aid of higher rates, because the prospect of improved investment returns materializing far in the future will not generally be attractive to investors whose time horizons typically are much shorter. By contrast, lower tax rates offer investors the opportunity for an immediately improved rate of return. The result is a prisoner's dilemma among underdeveloped countries: the option of competing on tax rates means that developing countries cannot compete on tax amenities, because investors will move their capital to obtain the more favorable after-tax return that is immediately available. From the perspective of an individual developing country that seeks to attract foreign capital, tax competition becomes the only rational strategy, but it leaves developing countries as a group worse off than if all could cooperate to increase rates.<sup>155</sup> Instead of improved infrastructure leading to greater capital investment (and still more improved infrastructure as taxes per capita rise), the result is stagnating levels of development in countries that lacked adequate infrastructure in the first place, as under-financed tax amenities continue to go under-financed — another widely observed phenomenon.<sup>156</sup>

The overall picture that emerges is not pretty. On one hand, developed countries as a group can expect to experience enhanced growth compared with the closed-economy world they leave behind as borders

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154. See Alfaro, *Capital Flow*, *supra* note 133, at 353–54, for a statement of the point as it relates to institutional quality (noting that the explanatory variables of institutional quality “are slowly changing over time.”).

155. The Stanford Encyclopedia of Philosophy has an extended discussion of the prisoner's dilemma. Steven Kuhn, *Prisoner's Dilemma*, THE STANFORD ENCYCLOPEDIA OF PHILOSOPHY, <http://plato.stanford.edu/entries/prisoner-dilemma>.

156. See, e.g., Eugene B. Gallagher, *Sociological Studies of Third World Health and Health Care: Introduction*, 30 J. HEALTH & SOC. BEHAV. 345, 345 (1989) (“[The ‘Third World’] is a world characterized economic underdevelopment.”).

become more open and group members reap gains from trade. On the other hand, developing countries that participate in the sweepstakes to attract foreign capital are likely to be mostly unsuccessful and to remain relatively infrastructure-poor to the extent they rely on international trade to fund growth. And, because seeking foreign capital means keeping tax rates low or lowering them compared with the rates they adopted in the system of closed economies, they do in fact increase reliance on foreign investment to fund growth. The result is that these countries all become less able to fund infrastructure from native economic activity and, consequently, more dependent on the vagaries of worldwide patterns of investment and trade to fund tax amenities. In some cases — the most likely candidates would seem to be developing countries that begin with relatively high tax revenues and GDPs per capita and then seek to attract additional capital by lowering rates — tax competition will prove ruinous and economic collapse will follow.

Again, these predictions are largely borne out by the facts. As contrasted with growth in OECD countries, growth in developing countries tends to be sporadic, volatile, and marked by periods of contraction.<sup>157</sup> Over the long run, it is only about half as large as growth in developed countries.<sup>158</sup> The lesson for developing economies in a world of tax competition would seem to be that it is better to stay out of the tax-driven competition to attract capital entirely and rely instead on domestic production and, perhaps, other sources of capital (such as foreign aid) to develop infrastructure.

## 2. *Worldwide Systems*

A universal worldwide system with a limited foreign tax credit differs from a territorial system most significantly in that tax rate competition over capital is largely eliminated. As economies become open, investors continue to have the choice to invest in low-tax or high-tax jurisdictions, but investors in capital exporting nations, who typically face high domestic rates, will derive no tax advantage from investment in low-tax jurisdictions because of the residual home-country tax liability on low-taxed foreign earnings.

This point is well understood;<sup>159</sup> it is simply a feature of worldwide systems. What has not been as widely appreciated is the generally salutary relationship between the absence of tax competition and developing country productivity. Developing countries compete for capital by offering the best

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157. Lant Pritchett, *Understanding Patterns of Economic Growth: Searching for Hills Among Plateaus, Mountains, and Plains*, 14 *THE WORLD BANK ECON. REV.* 221, 222 (2000).

158. *Id.* at 225.

159. *See, e.g.*, Kleinbard, *Stateless Income*, *supra* note 32.

after-tax return to foreign investors. In a territorial world, they theoretically can compete by improving the pre-tax rate of return or by lowering the actual tax rate. For the reasons explored in the last section, the former is superior over the long run, but as a practical matter only the latter is available, leading to a cycle of under-taxation and chronic underdevelopment. By contrast, in a worldwide system, residual taxation by the home country makes direct competition on rates impossible. Consequently, if states compete for foreign capital, they can be expected to do so by competing to provide better tax amenities, that is, by raising rates and improving infrastructure.

The residual character of an FTC system makes competition to provide tax amenities particularly attractive to developing countries, because it empowers home-country investors to finance the host-country fisc at the expense of the home fisc, rather than of the home-country investors themselves. That is, because home-country investors are reimbursed by the home-country government via the FTC, foreign taxes paid by home residents constitute a wealth transfer from home country to host country where the party in control of the amount of the transfer does not bear its cost. Consequently, host countries have access to a source of funding that is to some extent free. In practice, both nondiscrimination rules<sup>160</sup> and limits on residence jurisdictions' FTC largess<sup>161</sup> prevent source rates on foreign investors from going too high, but these limits merely blunt the effect; they do not eliminate it, especially since host jurisdictions can return some of the benefits of high rates on their own residents in the form of tax benefits or even direct transfer payments.

From a worldwide welfare perspective, it is hard to see how this incentive structure does not improve things, despite the apparent departure from "neutrality" — namely, tax-induced changes on the pre-tax rate of return in each jurisdiction. On one hand, as investment moves among jurisdictions having comparable tax rates, tax revenues should generally rise uniformly because of rising productivity or the reciprocal exploitation of comparative advantage. And, on the other, as investment moves from developed to developing countries, the siphoning of tax revenues to developing countries improves rates of productivity there and may or may not damage productivity in the home jurisdiction. (Recall that the effect on

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160. *See, e.g.*, Treaty Establishing a Constitution for Europe, Oct. 29, 2004, Art. I-4, 2004 O.J. (C 310)(establishing the "four freedoms," which, together, have been applied by the European Court of Justice to prevent member states of the EU from engaging in income tax discrimination). *See* Michael J. Graetz & Alvin C. Warren, Jr., *Income Tax Discrimination and the Political and Economic Integration of Europe*, 115 YALE L.J. 1186, 1194 (2006). In addition, treaty nondiscrimination provisions routinely require equal treatment of similarly situated citizens and foreign nationals. *See, e.g.*, U.S. Model Income Tax Convention of Nov. 15, 2006, art. 24(1).

161. *See, e.g.*, I.R.C. § 904.



home country productivity is ambiguous when both capital and some of the associated tax revenue leave the jurisdiction, since some of the tax amenities that the departing revenue finances were needed only to pay for amenities for the capital that has now left.) Indeed, even if developing countries respond to the opening of borders by raising their rates to the levels in developed countries, so that all tax revenue associated with exported capital goes to the developing country, worldwide productivity should increase, since the benefit from a marginal dollar of tax revenue in a low-tax jurisdiction will exceed the detriment from the loss of that dollar of tax revenue in the high-tax jurisdiction.<sup>162</sup>

### 3. *Mixed Systems*

The world, in fact, is populated mostly by jurisdictions that employ some version of territoriality and a handful of jurisdictions that employ some variant of worldwide taxation — the U.S. being the most prominent example of the latter.<sup>163</sup> A world of mixed regimes can change the calculation for any individual jurisdiction about which system it should adopt. For example, as discussed earlier, under standard neutrality models, a proponent of CON should be indifferent between a world of worldwide taxation and one of territorial taxation, because the relative prices of all investments will be the same for all residents in every jurisdiction in either world.<sup>164</sup> However, the competitive or neutrality properties of pursuing a worldwide regime will not necessarily be preserved if other countries are territorial, or vice-versa.<sup>165</sup> Also as previously discussed,<sup>166</sup> under the standard mode of neutrality analysis, residents of high-tax worldwide jurisdictions are at both an ownership neutrality and a competitive disadvantage when compared with residents of territorial jurisdictions. Further, if the most important comparative advantage stemming from international trade derives from the opportunity to allocate ownership to non-residents, the efficiency losses from tax-induced ownership changes (or non-changes) for residents of high-tax

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162. This result follows from the logarithmic property of Equation (1).

163. See Kleinbard, *Lessons*, *supra* note 27, (noting that territorial systems are overwhelmingly used to tax foreign direct investment). In light of opportunities for deferral and the use of disregarded entities, the U.S. system is more accurately characterized as worldwide lite or even quasi-territorial than as a true worldwide system. Kleinbard, *Stateless Income*, *supra* note 32, at 714–15 (describing the U.S. system as an ersatz territorial system).

164. Hines, *Reconsidering*, *supra* note 19, at 276–77.

165. *Id.* at 277.

166. See *supra* Part II.B.3.

worldwide jurisdictions are likely to be quite high given the ease with which ownership can be transferred from one person to another.<sup>167</sup>

Most of these worries would appear to be overstated if the theory offered here is accurate. The worry on competitive neutrality is that residents of high-tax worldwide systems will be unable to compete with investors in territorial jurisdictions for favorable investment opportunities in low-tax jurisdictions.<sup>168</sup> Tax competition among low-tax jurisdictions to attract foreign capital then will exacerbate the problem. The story rests on the view, implicitly ratified under the traditional mode of neutrality analysis, that advantageous investment opportunities in low-tax jurisdictions are likely to be prevalent as borders open because of the reduced tax burden there. Under the tax amenity theory, it would seem that low-tax jurisdictions are unlikely to offer many favorable investment opportunities for the same reason — the reduced tax burden.<sup>169</sup> And, as reported earlier in this Part, the evidence seems to support the theory. Capital moving across borders overwhelmingly flows into high-tax jurisdictions, not low-tax ones, even though most jurisdictions employ territorial systems of one sort or another.

The story is similar even if the dominant margin along which investors respond to cross-border tax incentives is ownership identity. Nothing about the CON story suggests that if ownership identity in fact is more tax-elastic and of greater import than the capital location or savings margins, favorable investment opportunities are more likely to arise in low-tax jurisdictions. Productivity still seems to require substantial infrastructure, a point that Desai and Hines themselves suggest:

[M]odern scholars view [foreign direct investment, or FDI] as arising from differential capabilities, and consequently differential productivity, among firms, and the extension of intangible assets across borders. This intuition squares well with empirical FDI patterns, which include the fact that most of the world's FDI represents investment from one high-income country into another, and the fact that a very high fraction of such investment takes the form of acquiring existing businesses.<sup>170</sup>

Desai and Hines frame their observation in terms of the movement of investment among high-income rather than high-tax jurisdictions, but the correlation between incomes and taxation is, as noted previously, itself quite

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167. Desai & Hines, *Evaluating Int'l Tax Reform*, *supra* note 50, at 491–92 (noting the sensitivity of ownership to tax considerations).

168. Kleinbard, *Lessons*, *supra* note 27.

169. *Id.* at 72.

170. Desai & Hines, *Old Rules*, *supra* note 4, at 956.

high. Apart from tax havens, there are not many high-income jurisdictions that do not have high taxes.<sup>171</sup>

## VI. CONCLUSION

Taking their cue from the theory of neutrality as developed in the domestic setting, the traditional modes of analyzing international tax neutrality downplay or disregard the link between tax revenues and productivity. Such a procedure has a surface plausibility in the domestic setting, where the connection between tax revenues and the provision of identifiable benefits can be disregarded by assuming that a revenue target implicitly associated with some level of productivity is exogenously set. Part III.C. discussed why the approach is theoretically unsatisfactory, but the objections raised there do not make the effort to model neutrality for closed economies in lump-sum terms an entirely unhelpful exercise.

The procedure is not available even as a theoretical ideal in the international setting, where tax rules inevitably affect both the magnitude of tax revenues and the identities of their recipients. In the international setting, the only way to make sense of the pre-tax rate of return is to suppose that states begin from a world of closed economies and then move to more open ones. But tax and non-tax investment incentives that arise as that movement takes place redirect tax revenues and alter the burdens on infrastructure, each of which phenomena is alone sufficient to cause the revenue raised to diverge from the exogenously set target and thereby to affect the quantity of tax amenities needed to maintain productivity at the originally chosen rate. Over time, as tax amenities exceed or fall short of the requisite amount, the rate of return that was supposed to be taken as the baseline against which to measure the distorting effects of tax rules is adjusted. As a result, what appeared to be a baseline turns out to be no baseline at all. In a final twist, the alterations themselves may well be productivity- and even efficiency-enhancing, even though they are “tax-motivated.” Where, for example, tax rules encourage low-productivity, low-tax source jurisdictions to compete on the supply of tax amenities (rather than on tax rate), the net effect over time would seem to be (at worst) a slight lowering of productivity in high-tax residence jurisdictions and a much larger increase in the productivity of the sources. On a worldwide basis, that would count as tax-motivated capital shifts leading to arrangements that are welfare-enhancing, not welfare-reducing.

One inference that may be drawn from these observations is that a more fruitful lens than neutrality through which to view the effects of international tax rules is the competitive, allocative, and distributional properties of various possible tax regimes. From a global welfare

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171. *See supra* Part IV.

perspective, the object of designing a tax regime is not to maximize neutrality but to promote overall welfare, which may require promoting tax “distortions” that improve total productivity.

A second inference is that sensitivity to the relationship between tax revenue and productivity suggests that the consequences of adopting various possible methods of double tax relief are likely to be quite different from those assumed under the traditional view. In particular, worldwide regimes are more likely than territorial regimes to promote welfare-enhancing improvements to infrastructure in low-tax jurisdictions. By contrast, territorial taxation tends to promote harmful tax competition among developing countries while yielding little competitive or savings benefit to high-tax jurisdictions.

## APPENDIX

Data for the regression in Equation (1):

$Y = \ln(p1+x1)*\ln(p2 + x2)$ , where:

p1: country population in 1980 as fraction of U.S. 1980 population.

p2: country tax revenue in 1980 as percentage U.S. tax revenue 1980,  
backing out all social security contributions.

x1, x2: parameters derived by the regression.

Y: Predicted GDP per capita as a fraction of U.S. GDP per capita, 1980.

Country*	p1	p2	Y	vc	Y-vc	SEest	YcLo	YcHi
Australia	0.0643	0.9621	0.8350	0.8899	-0.0549	0.0363	0.8145	0.9654
Austria	0.0332	1.1771	0.9191	0.9805	-0.0614	0.0430	0.8911	1.0699
Belgium	0.0433	1.1685	0.8925	0.9797	-0.0872	0.0425	0.8914	1.0681
Canada	0.1082	0.9807	0.9591	0.9109	0.0482	0.0361	0.8359	0.9859
Denmark	0.0225	1.7977	1.2836	1.2200	0.0636	0.0618	1.0915	1.3486
Finland	0.0210	0.8249	0.8514	0.8101	0.0413	0.0336	0.7402	0.8800
France	0.2425	0.8207	0.9032	0.8620	0.0412	0.0318	0.7960	0.9281
Germany	0.2713	1.0417	0.9105	0.9847	-0.0742	0.0351	0.9116	1.0577
Greece	0.0416	0.0444	0.5374	0.3139	0.2235	0.0540	0.2016	0.4263
Ireland	0.0150	0.4406	0.6190	0.5920	0.0270	0.0324	0.5247	0.6594
Italy	0.2484	0.2869	0.7960	0.5264	0.2696	0.0421	0.4388	0.6139
Japan	0.5141	0.5188	0.7947	0.7326	0.0621	0.0365	0.6568	0.8084
Korea	0.1678	0.0888	0.1685	0.3629	-0.1944	0.0535	0.2518	0.4741
Mexico	0.3008	0.1332	0.2382	0.4136	-0.1754	0.0531	0.3033	0.5240
Netherlands	0.0622	1.3235	0.9602	1.0524	-0.0922	0.0467	0.9553	1.1496
New Zealand	0.0140	0.7253	0.6463	0.7562	-0.1099	0.0319	0.6899	0.8225
Norway	0.0180	1.6240	1.4941	1.1557	0.3384	0.0569	1.0373	1.2741
Portugal	0.0430	0.0560	0.3748	0.3235	0.0513	0.0531	0.2131	0.4339
Spain	0.1650	0.1302	0.5679	0.3961	0.1718	0.0502	0.2916	0.5005
Sweden	0.0366	1.6330	0.9717	1.1658	-0.1941	0.0567	1.0480	1.2836
Turkey	0.1983	0.0564	0.1021	0.3390	-0.2369	0.0568	0.2208	0.4571
United Kingdom	0.2478	0.8674	0.8299	0.8886	-0.0587	0.0323	0.8214	0.9558
United States	1.0000	0.7810	1.0000	0.9961	0.0039	0.0345	0.9243	1.0678