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Technological Innovation, International Competition, and the Challenges of International Income Taxation

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TECHNOLOGICAL INNOVATION, INTERNATIONAL COMPETITION, AND THE CHALLENGES OF INTERNATIONAL INCOME TAXATION

Michael J. Graetz* & Rachael Doud**

Because of the importance of technological innovation to economic growth, nations strive to stimulate and attract the research and development (“R&D”) that leads to that innovation and to make themselves hospitable environments for the holding of intellectual property (“IP”). Tax policies have taken center stage in their efforts to accomplish these goals and to capture a share of the income from technological innovations.

Designing cost-effective methods of supporting technological innovations has, however, become substantially more difficult as the world economy has become more interconnected. Where R&D is performed and where income is earned change in response to the nature and level of government support. The capacity of multinational enterprises (“MNEs”) to shift their IP production, IP ownership, and IP income across national borders, along with their ability to establish new corporations in tax-favorable jurisdictions, makes designing cost-effective incentives exceptionally difficult. Devising appropriate tax rules for developing IP and for taxing IP income has become the central challenge for international income taxation.

This Article examines the three primary tax policies supporting innovation: (1) incentives for R&D, (2) “patent boxes,” and (3) tax benefits for “advanced manufacturing.” It then briefly describes common techniques MNEs use to lower their taxes on IP income. The Article then assesses the various incentives and offers recommendations about how the United States might respond to challenges it now faces in promoting technological innovation. Based on extensive examination of the economic evidence, the Article concludes that, at most, only R&D incentives are justified.

This Article also summarizes the current proposals for limiting opportunities for U.S. MNEs to shift IP income to low- or zero-tax jurisdictions. In that connection, it offers proposals for change that would more closely align U.S. taxes with U.S. sales.

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INTRODUCTION

Two things are clear and essentially uncontested among economists. First is the importance of technological innovations to economic growth. In a 1957 paper, Robert Solow advanced an economic growth model (for which he won a Nobel Prize in 1987) demonstrating that a large majority of economic growth per hour of labor in the United States between 1909 and 1949 could be attributed to technological advances.¹ The importance of technological development to economic growth has been accepted ever since.²

1. Robert M. Solow, *Technical Change and the Aggregate Production Function*, 39 *Rev. Econ. & Stat.* 312, 320 (1957). Solow's original estimate was 87.5%, but that was later corrected to 81%. Interview with Robert Solow, in Arnold Kling & Nick Schulz, *From Poverty to Prosperity* 66 (2009).

2. See, e.g., Joseph F. Brodley, *The Economic Goals of Antitrust: Efficiency, Consumer Welfare, and Technological Progress*, 62 *N.Y.U. L. Rev.* 1020, 1026 (1987) (asserting innovation “is the single most important factor in the growth of real output in . . . the industrialized world”); Herbert Hovenkamp, *Restraints on Innovation*, 29 *Cardozo L. Rev.* 247, 253 (2007) (“[T]oday no one doubts . . . that innovation and technological progress very likely contribute much more to economic growth than [other factors].”); Susan Hockfield, President, Mass. Inst. of Tech., *Keynote Address at the National Governors Association Annual Meeting: Restarting America's Job Creation Engine* (July 15, 2011), available at <http://web.mit.edu/newsoffice/2011/nga-conference-hockfield-0715.html>

Second, research and development (“R&D”), which is crucial to ongoing technological advances, is underproduced in the absence of government support.³ In the absence of government intervention, firms underinvest in R&D, despite its benefits, because R&D produces positive externalities—knowledge that “spills over” to others, preventing investors from reaping the full benefits of their R&D through profits.⁴ In addition to spurring innovation, R&D also creates good jobs and raises standards of living.⁵ But when investors cannot reap the full benefits of their R&D, they may not invest in projects that would produce substantial benefits to society. Economic studies have estimated that the public returns from R&D can be two to five times greater than the private returns.⁶ So while

(on file with the *Columbia Law Review*) (“Innovations that drive lasting economic growth emerge from the most advanced science, mathematics and technology.”).

3. See, e.g., Charles I. Jones & John C. Williams, Measuring the Social Return to R&D, 113 Q.J. Econ. 1119, 1133 (1998) (finding actual R&D investment in United States was only quarter to half of optimal amount); see also, e.g., OECD, Tax Incentives for Research and Development: Trends and Issues 6 (2002), available at http://www.metutech.metu.edu.tr/download/tax_incentives_for_R&D.pdf (on file with the *Columbia Law Review*) (“Both economic theory and empirical analysis underline the key role of research and development (R&D) in economic growth.”); Office of Tax Policy, U.S. Dep’t of the Treasury, Investing in U.S. Competitiveness: The Benefits of Enhancing the Research and Experimentation (R&E) Tax Credit 1 (2011), available at http://www.treasury.gov/resource-center/tax-policy/Documents/Research_and_Experimentation_report_FINAL.PDF (on file with the *Columbia Law Review*) (“Investments in research and experimentation produce technological advancements that drive productivity growth and improvements in U.S. living standards.”).

4. See, e.g., Chiara Criscuolo, The Effect of R&D Tax Incentives on Location of R&D Investment, in Expert Grp. on Impacts of R&D Tax Incentives, Design and Evaluation of Tax Incentives for Business Research and Development: Good Practice and Future Developments 32, 32 (Nov. 15, 2009) [hereinafter E.C. Report], available at http://ec.europa.eu/invest-in-research/pdf/download_en/tax_expert_group_final_report_2009.pdf (on file with the *Columbia Law Review*) (“[T]he returns to investment in knowledge and innovation cannot be fully appropriated by innovating firms as knowledge is a public good that can ‘spill over’ to others.”); Dep’t of Fin. Can. & Revenue Can., The Federal System of Income Tax Incentives for Scientific Research and Experimental Development: Evaluation Report, at vi–vii (1997), available at <http://publications.gc.ca/collections/Collection/F32-1-1997E.pdf> (on file with the *Columbia Law Review*) (noting “spillover benefits” of R&D “mean that, in the absence of government support, firms would perform less research and development than is desirable from the economy’s point of view”).

5. See, e.g., Nat’l Sci. Bd., Nat’l Sci. Found., Research and Development: Essential Foundation for U.S. Competitiveness in a Global Economy 1 (2008), available at <http://www.nsf.gov/statistics/nsb0803/nsb0803.pdf> (on file with the *Columbia Law Review*) (“The scientific and technological advances that have led to our Nation’s remarkable ability to create new industries and jobs, improve the standard of living for people, and provide sophisticated technology that ensures our national security can be traced back to the outcomes of basic research.”).

6. Ammon Salter et al., Sci. & Tech. Policy Research, Univ. of Sussex, Talent, Not Technology: Publicly Funded Research and Innovation in the UK 20 (2000), available at <http://www.sussex.ac.uk/Units/spru/nprnet/documents/talentshort.pdf> (on file with the *Columbia Law Review*) (finding social returns to R&D investment five times better than private); Laura Tyson & Greg Linden, Ctr. for Am. Progress, The Corporate R&D Tax

technological innovation—the development of intellectual property (“IP”)—has become the key element in building national wealth, the divergence between private and social returns may limit advancement in the absence of public subsidies for technological development.

It is not surprising, therefore, that substantial government support of technological advances is ubiquitous. Such support comes in many forms: legal protections for IP; government grants, loans, and loan guarantees to both for-profit firms and not-for-profit research institutions; and tax benefits for both R&D itself and the gains from innovation.⁷ Designing cost-effective methods of supporting technological innovations, however, has become substantially more difficult as the world economy has become more interconnected. National governments may also underinvest in R&D when they believe that much of the resulting benefit will occur outside their borders. Nations have great difficulty cooperating in such endeavors even when it would be in their interests to do so, and the creativity, mobility, and flexibility of multinational enterprises (“MNEs”) multiply the challenges that national governments face.

In a closed economy, a nation’s citizens and residents would fully reap the rewards of directing their tax dollars to spur and reward technological innovation. In an open economy, however, this will not be the case: There are too many potential moving pieces. For starters, with cross-border trade in goods and services, whenever R&D leads to new products, such as new drugs or medical diagnostic equipment, customers around the world may benefit from the technological innovation, regardless of where the R&D is performed. As another example, new technologies that enhance cost-competitive energy production with less or no greenhouse gas emissions will have benefits across the globe. But, since the risks are global, it would be foolhardy for any nation to try to confine such benefits within its borders.

Combining labor and capital mobility with cross-border trade complicates matters substantially: It allows the location where R&D is performed and the location where income is earned to change in response to the nature and level of government support. Adding to the mix, the flexibility of MNEs to shift across national borders the locations of production of their IP, ownership of their IP, and income from their IP,

Credit and U.S. Innovation and Competitiveness: Gauging the Economic and Fiscal Effectiveness of the Credit 7 (2012), available at http://www.americanprogress.org/wp-content/uploads/issues/2012/01/pdf/corporate_r_and_d.pdf (on file with the *Columbia Law Review*) (noting estimates for ratio are typically on order of two to one).

7. See, e.g., Tax Reform Options: Incentives for Innovation: Hearing Before the S. Comm. on Fin., 112th Cong. 57 (2011) (prepared testimony of Dirk Pilat, Head, Structural Policy Division, OECD Directorate for Science, Technology, and Industry) [hereinafter OECD, *The International Experience*], available at <http://www.finance.senate.gov/imo/media/doc/OECD%20SFC%20Hearing%20testimony%209%2020%2011.pdf> (on file with the *Columbia Law Review*) (proffering policy for and evidence of effectiveness of international R&D incentives).

along with their ability to establish new corporations resident in tax-favorable jurisdictions, renders designing cost-effective incentives even more difficult. For example, when technological innovation occurs within an MNE, it is quite possible for the firm to shift the location of the income from the innovation and, by doing so, minimize the firm's income taxes and also redirect the revenues from taxing such income to a country different from the one that provided financial support for the endeavor. In some instances, but not always, this may involve shifting the location of the ownership of the IP. MNEs are not indifferent to the scope, strength, location, and ownership of their IP. The deflection of income to a low-tax country often occurs through manipulation of intercompany prices, a practice that national governments have found extremely difficult to control.⁸

If one were concerned only with increasing worldwide welfare through technological advances, these location vagaries might be of little or no importance, but national governments care deeply about them. Typically, there are advantages to the citizens and residents of a particular nation if the R&D leading to such advances occurs within the nation's borders. Nearby geographic spillovers from R&D are significant. National governments also want the resulting IP to be governed by their laws, their citizens to be the principal beneficiaries of the economic growth resulting from technological innovations, their resident MNEs to own the resulting technology, and the tax revenues from such innovations to flow into their own treasury. But in today's global economy, achieving these goals has become a quixotic quest. Fashioning appropriate national policies to further technological innovation has become a herculean task for governments that support such advances primarily to increase the well-being of their own citizens and residents. It is hardly surprising, therefore, that the variety of public policies that have emerged from contests among nations to capture many or all of these benefits for their citizens and residents sometimes have beggar-thy-neighbor aspects. Devising appropriate tax rules for the costs of developing IP and for IP income, thus, has become a critical challenge for international income taxation.

The difficulties in evaluating such public policies are compounded because any such effort is fraught with empirical uncertainties. As Julian Alworth has observed, "[p]olicy prescription in a world with few empirical benchmarks is difficult."⁹ Tax policies have taken center stage in national policy efforts to stimulate and attract R&D and to capture a share of the income from technological innovations, so the inquiry here is limited to examining the three primary tax policies supporting innova-

8. See *infra* Part IV (describing how MNEs manipulate intercompany prices to reduce taxes).

9. Julian S. Alworth, Commentary on International Capital Taxation, *in* 1 Inst. for Fiscal Studies, *Mirrlees Review: Dimensions of Tax Design* 997, 1004 (2010), available at <http://www.ifs.org.uk/mirrleesreview/dimensions/ch10.pdf> (on file with the *Columbia Law Review*).

tion: (1) incentives for R&D, (2) so-called “patent boxes,” and (3) proposals for tax benefits for “advanced manufacturing.” This Article begins by describing the current smorgasbord of R&D incentives and the economic evidence concerning their efficacy. It then briefly describes common techniques that MNEs use to lower the taxes on income from IP. This Article then assesses the soundness of the various incentives and offers recommendations about how the United States might respond to the international income tax challenges it now faces in promoting technological innovation.

I. U.S. AND EUROPEAN TAX INCENTIVES FOR R&D

Tax incentives to promote research and development are not new. The United States adopted an R&D credit in 1981,¹⁰ and France’s research tax credit has been in place since 1983.¹¹ Ireland began exempting patent income in the 1970s.¹² Over time, more and more countries have adopted such incentives, and the countries that employ them have tended to make them more generous—despite the absence of clear evidence of their effectiveness.

A. *Tax Incentives for R&D*

There are two primary approaches to encouraging innovation through tax incentives: directly encouraging R&D by subsidizing it, and indirectly encouraging R&D by giving favorable treatment to income from IP. The United States has, to date, limited its tax benefits to the former, although there are now calls for the latter.¹³

10. See Francisco Moris, Nat’l Sci. Found., *The U.S. Research and Experimentation Tax Credit in the 1990s* 1 (2005), available at <http://www.nsf.gov/statistics/infbrief/nsf05316/nsf05316.pdf> (on file with the *Columbia Law Review*) (“The R&E tax credit, part of the U.S. Internal Revenue Code, was established by the Economic Recovery Tax Act of 1981.”).

11. See Benoît Mulkey & Jacques Mairesse, *Financing R&D Through Tax Credit in France* 3 (May 2008) [hereinafter *Mulkey & Mairesse, Financing*] (unpublished manuscript), available at http://ftp.zew.de/pub/zew-docs/veranstaltungen/innovation_patenting2008/papers/MulkeyMairesse.pdf (on file with the *Columbia Law Review*) (noting French R&D credit was established in 1983).

12. See Robert D. Atkinson & Scott Andes, Info. Tech. & Innovation Found., *Patent Boxes: Innovation in Tax Policy and Tax Policy for Innovation* 5 (2011), available at <http://www.itif.org/files/2011-patent-box-final.pdf> (on file with the *Columbia Law Review*) (listing Ireland’s tax credit inception date as 1973).

13. For example, House Committee on Ways and Means Chairman David Camp has proposed tax reforms that would include a 15% rate on certain IP income. See H. Comm. on Ways & Means, 112th Cong., *Technical Explanation of the Ways and Means Discussion Draft Provisions to Establish a Participation Exemption System for the Taxation of Foreign Income* 34 (2011) [hereinafter *Technical Explanation*], available at http://waysandmeans.house.gov/uploadedfiles/final_te_-_ways_and_means_participation_exemption_discussion_draft.pdf (on file with the *Columbia Law Review*) (observing effect of proposed tax provision would be “tax rate of [15] percent for the income from foreign

The United States first enacted an R&D credit in 1981.¹⁴ The R&D credit is a 20% nonrefundable income tax credit for qualifying R&D expenditures greater than those incurred in a specified base period, 1984–1988.¹⁵ Alternatively, taxpayers may elect a simplified credit of 14% of qualified research expenditures in excess of 50% of the qualified expenditures in the preceding three years.¹⁶ The U.S. R&D tax credit has frequently been limited to a duration of one year and thus has expired numerous times. However, with one exception, it has always been extended continuing from the previous expiration date.¹⁷ President Obama has proposed increasing the amount of the credit and making it permanent.¹⁸

European incentives initially focused on encouraging research and development by offering super deductions for R&D expenses or R&D tax credits: Austria adopted a 125% deduction of R&D expenses in 1988,¹⁹ Hungary adopted a double deduction in 1997,²⁰ the United Kingdom adopted a 150% deduction for small companies in 2000 and a 125% deduction for large companies in 2002,²¹ Denmark adopted a 150% deduction in 2002,²² Belgium adopted an R&D investment deduction in 2003,²³

exploitation of intangible property”). For a more detailed discussion of this proposal, see *infra* Part II.B (discussing patent box application to United States).

14. The R&D credit was established by the Economic Recovery Tax Act of 1981, Pub. L. No. 97-34, § 221, 95 Stat. 172, 241–47.

15. I.R.C. § 41 (2006).

16. I.R.C. § 41(c)(5).

17. The credit was allowed to lapse for a twelve-month period in 1995–1996. Tyson & Linden, *supra* note 6, at 25–26.

18. Office of Mgmt. & Budget, Exec. Office of the President, Budget of the United States Government, Fiscal Year 2003, 218 tbl.S-9 (2012), [hereinafter OMB, 2013 Budget], available at <http://www.whitehouse.gov/sites/default/files/omb/budget/fy2013/assets/budget.pdf> (on file with the *Columbia Law Review*); White House & Dep’t of the Treasury, The President’s Framework for Business Tax Reform 12 (2012) [hereinafter President’s Framework], available at <http://www.treasury.gov/resource-center/tax-policy/Documents/The-Presidents-Framework-for-Business-Tax-Reform-02-22-2012.pdf> (on file with the *Columbia Law Review*).

19. Scitax, Overview of Research & Development Tax Incentives in Selected Global Knowledge Economies 2 (2011) [hereinafter Scitax Overview], available at <http://www.scitax.com/pdf/Scitax.International.RD.Tax.Credit.Survey.Table.pdf> (on file with the *Columbia Law Review*).

20. Tax & Legal Servs., PricewaterhouseCoopers Czech Republic, Study on the Impact of R&D Tax Incentives on Investments of Private Companies into R&D 6 (2008) [hereinafter PricewaterhouseCoopers, R&D Tax Incentives], available at <http://www.pwc.com/cz/en/studie-analyzy/impact-of-r-end-d-tax-incentives-on-investments-of-private-companies-into-r-and-d.pdf> (on file with the *Columbia Law Review*).

21. *Id.* at 3.

22. Eduard Sporken & Edwin Gommers revised by Henrik Lund, Tax Treatment of R&D Costs in Denmark, 14 Int’l Transfer Pricing J. 11, 12 (2007).

23. PricewaterhouseCoopers, R&D Incentives in Belgium 1, 2 (2012) [hereinafter PricewaterhouseCoopers, R&D Belgium], available at <http://www.investinbrussels.com/>

and the Czech Republic adopted a double deduction in 2006.²⁴ France adopted a research tax credit in 1983,²⁵ Spain adopted an R&D credit in 1995,²⁶ Hungary adopted an R&D credit in 2003,²⁷ and Ireland adopted an R&D credit in 2004.²⁸

Some EU countries have also adopted various employment tax incentives for R&D workers. The Netherlands, for example, has offered a special payroll tax deduction since 1994.²⁹ In 2003, Belgium adopted a partial withholding tax exemption for remuneration paid to certain researchers.³⁰ In 2005, Hungary introduced a tax credit for salary costs related to R&D activities.³¹

Not only have more countries adopted R&D incentives, those that already had such incentives have made them more generous. In 2004, France changed its research tax credit from a purely incremental credit to one that was both incremental and volume-based.³² In 2008, a new French policy enhanced the previous scheme—a 10% volume-based rate and a 40% incremental rate—by eliminating the requirement that R&D be incremental and increasing the volume-based rate to 30%.³³ In 2008, France also eliminated a cap that had previously limited the amount of expenditures eligible for the credit.³⁴ In 2006, Belgium introduced an R&D tax credit as an alternative to the investment deduction.³⁵ The

en/?LinkServID=05D261AC-0196-F71E-ADE2AE94FDE7CB37 (on file with the *Columbia Law Review*).

24. PricewaterhouseCoopers, R&D Tax Incentives, *supra* note 20, at 2.

25. Mulkey & Mairesse, Financing, *supra* note 11, at 1.

26. Scitax Overview, *supra* note 19, at 7.

27. Eduard Sporken & Edwin Gommers revised by Csaba László, Tamás Mlinárik & Zsófia Pongrácz, Tax Treatment of R&D Expenses in Hungary, 14 *Int'l Transfer Pricing J.* 24, 25 (2007) [hereinafter Sporken et al., Hungary].

28. Eduard Sporken & Edwin Gommers revised by Tom Maguire, Tax Treatment of R&D Expenses in Ireland, 14 *Int'l Transfer Pricing J.* 27, 28 (2007) [hereinafter Sporken et al., Ireland].

29. Scitax Overview, *supra* note 19, at 5.

30. PricewaterhouseCoopers, R&D Belgium, *supra* note 23, at 1.

31. PricewaterhouseCoopers, R&D Tax Incentives, *supra* note 20, at 7.

32. Patrick Eparvier, Monitoring and Analysis of Policies and Public Financing Instruments Conducive to Higher Levels of R&D Investment—The “POLICY MIX” Project—Country Review FRANCE 19 (2007), available at http://ec.europa.eu/invest-in-research/pdf/download_en/france.pdf (on file with the *Columbia Law Review*).

33. PricewaterhouseCoopers, R&D Tax Incentives, *supra* note 20, at 5 (discussing 2008 simplification of incentive structure); Eduard Sporken & Edwin Gommers revised by Alan Katiya, Nathalie Cordier-Deltour & Vincent Berger, Tax Treatment of R&D Expenses in France, 14 *Int'l Transfer Pricing J.* 14, 18 (2007) (discussing previous scheme).

34. Invest in Fr. Agency, France Caters to Innovative Companies and Offers the Best Research Tax Credit in Europe 2 (2008), available at http://www.diplomatie.gouv.fr/en/IMG/pdf/ArguCIR_nov08_UK.pdf (on file with the *Columbia Law Review*).

35. Wim Eynatten, European R&D and IP Tax Regimes: A Comparative Study, 36 *Intertax* 502, 505 (2008) [hereinafter Eynatten, European R&D].

credit offers the same effective tax rate as the previous investment deduction, but it is refundable and also has financial reporting advantages.³⁶ Hungary started out with a super deduction in 1997,³⁷ added an R&D credit in 2003,³⁸ and introduced a 400% deduction of certain R&D expenses in 2004.³⁹ Ireland initially introduced a 20% R&D credit in 2004,⁴⁰ but subsequently increased it to 25%.⁴¹ In 2000, the United Kingdom started with a 150% super deduction for small and medium-sized enterprises (“SMEs”), added a 125% super deduction for large enterprises in 2002,⁴² and subsequently increased the rates to 225% and 130%, respectively.⁴³ European R&D incentives have thus become increasingly generous over time.

B. *How Well Do R&D Tax Incentives Work?*

Given the ongoing debates over the continuation and possible expansion of the U.S. Research and Experimentation (“R&E”) credit, recent suggestions for a U.S. “patent box,” and the proliferation of innovation tax incentives in the European Union and elsewhere, the effectiveness of these incentives is a central concern. There is scarce evidence, however, that even the most successful innovation tax incentives are cost-effective in accomplishing the goals of the countries that have adopted them. First, while there is substantial evidence that R&D tax incentives increase the level of R&D, the economics literature provides wide-ranging estimates of how large that increase is. Second, the question of whether R&D tax incentives lead to increased output and more jobs, or whether the incentives simply shift R&D among regions without creating more of it, remains largely unanswered. Third, it may be possible for companies to reclassify expenditures to qualify for R&D incentives and such reclassification will show up in data as an increase in R&D expenditures. A brief summary of the existing literature follows.

36. *Id.* at 505–06. Because the tax credit can be recorded as an above-the-line saving, it increases earnings before tax. *Id.* at 506.

37. PricewaterhouseCoopers, R&D Tax Incentives, *supra* note 20, at 6.

38. Sporken et al., Hungary, *supra* note 27, at 25.

39. Russel Thomson, Tax Policy and the Globalisation of R&D 50 (Intellectual Prop. Research Inst. of Austl., Working Paper No. 01/09, 2009).

40. Sporken et al., Ireland, *supra* note 28, at 28, 30.

41. IDA Ireland, Tax Guide Ireland 12 (2012), available at http://www.idaireland.com/news-media/publications/library-publications/ida-ireland-publications/IDA_Tax_2012.pdf (on file with the *Columbia Law Review*).

42. PricewaterhouseCoopers, R&D Tax Incentives, *supra* note 20, at 3.

43. PricewaterhouseCoopers, Global Research & Development Incentives Group 18 (2012), available at http://www.pwc.com/en_GX/gx/tax/assets/pwc-global-r-and-d-brochure-may-2012.pdf (on file with the *Columbia Law Review*).

A number of economic studies attempt to measure the effectiveness of R&D incentives in spurring additional R&D.⁴⁴ Two common measures are the benefit-cost ratio, which compares the increase in R&D spending to the loss in tax revenue from the tax incentive, and the price elasticity of R&D, which measures the percentage change in R&D in response to a 1% change in the user cost of R&D.⁴⁵ Because it is difficult to measure precisely the amount of R&D resulting from an incentive, a benefit-cost ratio greater than one still may not indicate that the incentive is cost-effective: Some of the measured “benefit” may consist of R&D that would have happened anyway.⁴⁶ Conversely, a small benefit-cost ratio may result in part from the fact that increased spending on R&D does not account for all of the benefits from the incentive.⁴⁷

Studies have found a wide range of benefit-cost ratios for R&D incentives, which is hardly surprising given the use of data from different countries in different time periods as well as the variation among the countries’ incentives.⁴⁸ Even among studies of a single country in similar time periods, however, estimates of the benefit-cost ratio of a given incentive vary significantly depending on the methodology of the study and the data set used. Studying a sample of roughly 1,000 U.S. manufacturing firms per year from 1980 to 1991, Bronwyn Hall found a benefit-

44. R&D tax incentives come in a variety of forms, and it therefore may not be obvious from direct comparison how various incentives rank in generosity. The B-index, which provides a measure of the present value of before-tax income required to cover the initial cost of R&D investment and pay corporate tax, is a commonly used and useful way of comparing the generosity of various countries’ R&D tax regimes. For a description of how the B-index works, see Jacek Warda, *Measuring the Value of R&D Tax Treatment in OECD Countries*, STI Rev., no. 27 at 185 (2001), available at <http://www.oecd.org/sti/37124998.pdf> (on file with the *Columbia Law Review*) (describing B-index as representing “a ratio of the after-tax cost (ATC) of one dollar of expenditure on R&D divided by 1 less the corporate income tax rate”).

45. See, e.g., HM Revenue & Customs, Report No. 107, *An Evaluation of Research and Development Tax Credits 14–15* (U.K.) [hereinafter *HM Revenue & Customs Report*], available at <http://www.hmrc.gov.uk/research/report107.pdf> (on file with the *Columbia Law Review*) (describing methods for measuring effectiveness of R&D incentives).

46. See *id.* at 14 (“If the ratio is greater than one, then the policy may in reality be ineffective due to a high transfer cost (or deadweight loss) as it subsidises R&D that would have been carried out anyway . . .”).

47. See *id.* at 14–15 (“[I]f the [benefit-cost] ratio is small it may only demonstrate that the total R&D expenditure generated does not fully reflect the total benefits from the tax policy . . .”); see also Mark Parsons & Nicholas Phillips, *An Evaluation of the Federal Tax Credit for Scientific Research and Experimental Development 8–13* (Canadian Dep’t of Fin., Working Paper No. 2007-08, 2007), available at http://publications.gc.ca/collections/collection_2008/fin/F21-8-2007-8E.pdf (on file with the *Columbia Law Review*) (discussing “spillover benefits” of R&D spending).

48. For a comparison of various estimates, see *HM Revenue & Customs Report*, *supra* note 45, at 16–17 tbl.2 (providing divergent estimates of benefit-cost ratios for R&D incentives).

cost ratio of 2.0 for the R&E credit.⁴⁹ In sharp contrast, looking only at the effect of the U.S. R&E credit on the pharmaceutical industry from 1982 to 1985, William McCutchen found a benefit-cost ratio of 0.293.⁵⁰ While these two studies are not directly comparable, their dramatically different estimates of the benefit-cost ratio of the U.S. R&E credit suggest that these ratios may not reliably assess whether R&D tax incentives are good policy.⁵¹

Moreover, any individual study may find a wide range for the benefit-cost ratio of a particular incentive, with estimates varying depending on firm size, how recently the incentive was introduced, and other factors. A study of the effectiveness of the WBSO (wage tax credit) program in the Netherlands, for example, found that the WBSO initially produced a benefit-cost ratio of about 6.4 for small firms but only 1.02 for large firms.⁵² However, the benefits diminished rapidly over time, moving to a ratio of 1.87 for small firms, 3.5 for medium-sized firms, and 0.37 for the largest firms.⁵³ The authors concluded that the WBSO stimulates R&D in all but the largest firms. Again, even though they do indicate that R&D tax incentives increase R&D spending, these results do not provide a clear answer to whether R&D tax incentives are cost-effective.

Econometric studies measuring the price elasticity of R&D also suggest that such incentives increase the level of R&D, but, again, the estimated elasticities vary widely. Daniel Wilson found that R&D tax credits offered by U.S. states increase R&D (specifically, he found that a 1% increase in a state's effective R&D credit rate leads to a 3%–4% increase in in-state R&D spending in the long run and a 1.7% increase in the short run).⁵⁴ Nicholas Bloom and his coauthors found that, in nine Organisation for Economic Co-operation and Development (OECD) countries (the G7, Australia, and Spain), R&D tax credits affect the level of R&D, with a short-run elasticity of 0.1 and a long-run elasticity of one.⁵⁵

49. Bronwyn H. Hall, R&D Tax Policy During the 1980s: Success or Failure?, *in* 7 *Tax Policy and the Economy* 1, 29 (James Poterba ed., 1993).

50. William W. McCutchen, Jr., Estimating the Impact of the R&D Tax Credit on Strategic Groups in the Pharmaceutical Industry, 22 *Res. Pol'y* 337, 344 (1993). McCutchen noted, however, that his low benefit estimate does not account for various secondary benefits, such as savings resulting from less need for surgery. *Id.*

51. See, e.g., Boris Lokshin & Pierre Mohnen, Measuring the Effectiveness of R&D Tax Credits in the Netherlands 25 (United Nations Univ., UNU-MERIT Working Paper No. 2007-025, 2007) (noting that complete cost-benefit analysis of R&D incentive would have to take account of external effects as well as administrative and implementation costs, all of which are difficult to measure accurately).

52. *Id.* at 23.

53. *Id.*

54. Daniel J. Wilson, Beggar Thy Neighbor? The In-State, Out-of-State, and Aggregate Effects of R&D Tax Credits, 91 *Rev. Econ. & Stat.* 431, 434–35 (2009).

55. Nick Bloom, Rachel Griffith & John Van Reenen, Do R&D Tax Credits Work? Evidence from a Panel of Countries 1979–1997, 85 *J. Pub. Econ.* 1, 14 (2000).

In an earlier survey of the econometric evidence on R&D tax incentives, Bronwyn Hall and John Van Reenen found that U.S. studies on the R&E tax credit suggest a long-term elasticity of around one and a lower elasticity in the early years of the credit.⁵⁶ They suggest that non-U.S. data, on average, yields a comparable result. A 1989 GAO study found that between 1981 and 1985 the U.S. R&D credit stimulated additional spending, but the gains in R&D spending were only a fraction of the cost of the credit.⁵⁷

These varying elasticities are hardly surprising, since the studies use different models and data and focus on different countries during different time periods. In an HM Revenue and Customs R&D report, U.K. researchers compiled evidence from numerous studies of price elasticities of R&D in the context of R&D tax incentives.⁵⁸ These studies, which examined data from different countries over various time periods, found price elasticities ranging from 0.07 (Canada, 1975–1992)⁵⁹ to between 2.68 and 2.78 (France, 1983–1997).⁶⁰ This is a large range of estimates. It does appear, nevertheless, that R&D tax incentives increase R&D spending, with an effect that is typically smaller in the short term than in the long term.

We know even less about how, and to what extent, R&D tax incentives affect firms' decisions about where to locate their R&D activities—an important question in today's global economy. Increased R&D spending may result from firms already performing R&D in a given state or country increasing their level of R&D or from firms changing locations to reap the benefits of a tax break. A study by Josh Cantwell and Ram Mudambi examined the effect of government investment incentives on the location of R&D activities by MNEs in the Midlands region of Britain.⁶¹ This analysis suggests that government investment incentives (including tax credits) increase R&D only on the margin, encouraging MNEs to “upgrade somewhat the technological role” delegated to a local

56. Bronwyn Hall & John Van Reenen, *How Effective are Fiscal Incentives for R&D? A Review of the Evidence*, 29 *Res. Pol'y* 449, 462 (2002). Hall and Van Reenan also found that the price elasticity was around one for the US R&E credit in the 1980s. *Id.*

57. U.S. Gov't Accountability Office, GAO/GGD-89-114, *Tax Policy and Administration: The Research Tax Credit Has Stimulated Some Additional Research Spending* 3 (1989), available at <http://archive.gao.gov/d26t7/139607.pdf> (on file with the *Columbia Law Review*).

58. HM Revenue & Customs Report, *supra* note 45, at 16–17.

59. Marcel Dagenais et al., *Do Canadian Firms Respond to Fiscal Incentives to Research and Development?* 7, 17 (Centre Interuniversitaire de Recherche en Analyse des Organisations, Working Paper No. 97s-34, 1997).

60. Jacques Mairesse & Benoît Mulkay, *Une Evaluation du Crédit d'Impôt Recherche en France, 1980–1997* [An Evaluation of the Research Tax Credit in France, 1980–1997] 18 (Centre de Recherche en Economie et Statistique, Working Paper No. 2004-43, 2004).

61. John Cantwell & Ram Mudambi, *The Location of MNE R&D Activity: The Role of Investment Incentives*, 40 *Mgmt. Int'l Rev.* 127 (2000).

affiliate.⁶² This study, which used firm-level data, suggests that investment incentives do not affect firms' location decisions. However, because the study was based on U.K. data only, it does not account for the possibility of cross-country choice. Firms may examine different factors when choosing where to locate R&D within a country than they do when choosing the country in which to locate. So, while this study is suggestive, its implications should not be exaggerated.

Most studies of the determinants of where R&D is located are based on surveys of MNE executives or analysis of data from single countries.⁶³ Thus, econometric evidence concerning whether R&D tax incentives affect location decisions is inconclusive.⁶⁴ Though the studies ask how the volume of R&D in one region responds to changes in R&D prices in competitor regions,⁶⁵ they lack the firm-level data that would be necessary to estimate the extent to which R&D tax incentives affect decisions whether to locate R&D in a given area in the first place or what amount of R&D to perform at an existing location.⁶⁶ In sum, there is currently no satisfactory answer to the question of the extent to which the introduction of R&D tax incentives causes firms to locate R&D in a given country or state.⁶⁷

Although there are not any persuasive cross-border econometric studies that identify whether and how much R&D tax incentives affect location decisions, there are some cross-border studies that attempt to ascertain whether and to what extent domestic and foreign R&D are complements or substitutes. A substitution effect might indicate that firms are relocating to take advantage of R&D incentives. However, even if there is a substitution effect, it remains unclear whether firms are simply adjusting the amount of R&D performed in various locations or are actually opening new labs and closing old ones in response to incentives.⁶⁸

Once again, the picture is hazy. James Hines analyzed aggregate data on the activities of U.S. and foreign MNEs and found that local R&D is a

62. Id. at 142.

63. E.C. Report, *supra* note 4, at 35.

64. See *id.* at 38. According to the E.C. Report, scholars are forced to rely on surveys and single-country studies because of a lack of microdata containing information on both the cross-country location of MNEs and the specifics of the tax regimes of different countries. *Id.* at 39.

65. See, e.g., Nicholas Bloom & Rachel Griffith, *The Internationalisation of UK R&D*, 22 *Fiscal Stud.* 337, 337 (2001); Wilson, *supra* note 54, at 431.

66. E.C. Report, *supra* note 4, at 42.

67. See *id.* ("The studies presented in this section show that still little is known about the importance of tax incentives for the location of R&D . . ."). Studies on the effect of grants and subsidies on location decisions similarly fail to establish a causal connection. *Id.* at 40.

68. See *id.* at 42 ("[Q]uestions on whether (the introduction of) R&D tax incentives can *cause* the location of R&D investment in a country/region or which design of the tax incentives is better for achieving such a policy goal cannot be answered.").

substitute for imported technology.⁶⁹ Using firm-level data, he, along with Adam Jaffe, subsequently came to the opposite conclusion—that decreases in domestic R&D directed at foreign markets result in decreases in foreign patenting, suggesting that domestic and foreign R&D are complements.⁷⁰ Contrarily, using aggregate data, Nicholas Bloom and Rachel Griffith found that domestic R&D increases as the tax price of doing R&D in competing economies increases, suggesting that domestic and foreign R&D are substitutes.⁷¹ Using state-level U.S. data, David Wilson found that in-state R&D is an increasing function of the out-of-state user cost of R&D in neighboring states, also suggesting that in-state and out-of-state R&D are substitutes.⁷²

Taken together, these studies may imply that domestic and foreign innovation are complements at the firm level but substitutes in the aggregate. However, the Hines and Jaffe study is the only one to find complementarity and is the only one that used firm-level data. So, it seems premature to presume this result, especially given the lack of available firm-level analysis. Additional uncertainty arises because the various studies evaluate the effects on local R&D of different measures of “foreign innovative activity.” Hines looked at the importation of foreign technology; Hines and Jaffe examined the number of foreign patents; and Bloom and Griffith used the foreign-user cost of R&D,⁷³ as did Wilson. Thus, the studies are not directly comparable.

Although the extant studies do not indicate whether R&D tax incentives drive firms’ decisions of where to locate R&D, studies focusing on the effect of taxes generally on firm location provide some insights. Michael Devereux and Rachel Griffith have found that average tax rates do not affect U.S. firms’ decisions whether to locate production in the European Union, but they do affect their decisions where in the European Union to locate (assuming that production will occur somewhere in the European Union).⁷⁴ Other studies on general tax rates and firm location suggest that firm affiliates engaged in different functions are affected differently by taxes. Sven Stöwhase, for example, concluded that the location of affiliates in the production sector is affected by average tax rates, while the location of affiliates in the service, finance,

69. James R. Hines, Jr., Taxes, Technology Transfer, and the R&D Activities of Multinational Firms, *in* *The Effects of Taxation on Multinational Corporations* 225, 226 (James R. Hines, Jr. et al. eds., 1995).

70. James R. Hines, Jr. & Adam B. Jaffe, International Taxation and the Location of Inventive Activity, *in* *International Taxation and Multinational Activity* 201, 203 (James R. Hines, Jr. ed., 2000).

71. Bloom & Griffith, *supra* note 65, at 353.

72. Wilson, *supra* note 54, at 434.

73. Bloom & Griffith, *supra* note 65, at 350–53.

74. Michael P. Devereux & Rachel Griffith, Taxes and the Location of Production: Evidence from a Panel of US Multinationals, 68 *J. Pub. Econ.* 335, 362–63 (1998).

and R&D sectors is affected more by statutory tax rates.⁷⁵ Other studies have confirmed that the characteristics of firms affect how they respond to taxes.⁷⁶ Obviously, countries providing incentives believe that they will attract more R&D by doing so, despite the dearth of evidence.⁷⁷

From a policy perspective, in addition to answers concerning whether and by how much R&D tax incentives increase R&D, as well as how they affect location decisions, it is necessary to consider what spillover effects are produced by R&D and the extent to which R&D incentives affect production and employment. Sergey Lychagin and his colleagues have addressed the question of the nature of R&D spillovers, persuasively finding that geographic spillovers are significant to firm productivity, but that such spillovers decay rapidly with distance.⁷⁸ This important finding suggests that government incentives aimed at attracting R&D may help produce valuable spillovers in nearby locations, but that the spillover effects are not likely to be felt outside the region or country.

Other studies have addressed the impact of increased R&D on productivity levels and on employment patterns. Rachel Griffith and her colleagues have found that an R&D tax credit increases productivity, though not to an extent great enough to justify its cost in the short term.⁷⁹ They concluded, however, that in the long run, the increases in productivity may make an R&D credit cost-effective.⁸⁰

Steven Machin and John Van Reenen found that technological change, measured by increased R&D, increases the demand for skilled

75. Sven Stöwhase, Profit Shifting Opportunities, Multinationals, and the Determinants of FDI 22–23 (Dep't of Econ., Univ. of Munich, Munich Discussion Paper No. 2002-11, 2002), available at http://epub.ub.uni-muenchen.de/29/1/0211_stoewhase.pdf (on file with the *Columbia Law Review*).

76. See, e.g., Harry Grubert & Joel Slemrod, The Effect of Taxes on Investment and Income Shifting to Puerto Rico, 80 *Rev. Econ. & Stat.* 365, 371–72 (1998) (finding that, among firms that invest in Puerto Rico, pharmaceutical companies are particularly likely to do so for income-shifting purposes, and providing wage subsidy would have least effect on curbing exodus of pharmaceutical companies from Puerto Rico were benefits of income-shifting eliminated); see also Mihir A. Desai, C. Fritz Foley & James R. Hines, Jr., The Demand for Tax Haven Operations, 90 *J. Pub. Econ.* 513, 529–30 (2006) (finding larger, more international firms with higher R&D intensity are most likely to use tax havens).

77. Cf. Pew Ctr. on the States, Evidence Counts: Evaluating State Tax Incentives for Jobs and Growth I (2012) (finding most states fail to effectively evaluate efficacy of their tax incentives, including R&D credits, and fail to use information to inform policy decisions).

78. Sergey Lychagin et al., Spillovers in Space: Does Geography Matter? 30 (Ctr. for Econ. Performance, Discussion Paper No. 991, 2010), available at <http://cep.lse.ac.uk/pubs/download/dp0991.pdf> (on file with the *Columbia Law Review*) (analyzing geographic spillover effect with econometric model based on firms' inventor locations).

79. Rachel Griffith, Stephen Redding & John Van Reenen, Measuring the Cost-Effectiveness of an R&D Tax Credit for the UK, 22 *Fiscal Stud.* 375, 390 (2001).

80. *Id.*

workers.⁸¹ On the other hand, Austan Goolsbee found that a significant fraction of the increased R&D spending that results from government incentives goes to increasing the salaries of R&D workers rather than to increasing the volume or quality of R&D performed.⁸² Russell Thomson and Paul Jensen estimated that both tax subsidies and direct grants are effective at increasing the number of R&D employees.⁸³ Kris Aerts has analyzed the effect of public R&D subsidies on R&D investment, employment, and wages in Flanders and found that the subsidies did cause companies receiving them to hire additional personnel and to increase wages, but that the companies did not increase their R&D budgets by the full amount of the funding, suggesting that some part of the subsidy merely substitutes for R&D spending that the companies would have done anyway.⁸⁴ In combination, these studies imply that R&D incentives create additional job opportunities, but they also may shift resources toward employment of skilled, rather than unskilled, workers and serve to increase the salaries paid to workers who are already employed.

In sum, the economic literature suggests that R&D tax incentives may increase the amount of R&D and the number of R&D employees but their cost effectiveness is less certain than their advocates claim. There is considerable evidence that such incentives often serve to shift the location where firms perform R&D and that positive spillovers from R&D are often concentrated geographically. The efficacy of R&D incentives often turns on their structure, size, and scope. Whether current incentives are cost effective, as well as what changes are necessary if they are not, remains uncertain. Nevertheless, as discussed in Parts II and III, there is more favorable evidence regarding R&D incentives than there is supporting “patent box” incentives or incentives for manufacturing activities.

II. PATENT BOXES IN EUROPE

A substantial number of European countries have recently implemented innovation tax incentives that focus on the income, rather than the development, side of IP by adopting “patent boxes,” or “innovation boxes.” A patent box offers a preferential tax rate for patent income; an innovation box offers a preferential rate for income from other intangi-

81. Stephen Machin & John Van Reenen, *Technology and Changes in Skill Structure: Evidence from Seven OECD Countries*, 113 *Q.J. Econ.* 1215, 1239 (1998) (explaining R&D “intensity” drives demand for skilled labor).

82. Austan Goolsbee, *Does Government R&D Policy Mainly Benefit Scientists and Engineers?*, 88 *Am. Econ. Rev.* 298, 298 (1998).

83. Russell Thomson & Paul H. Jensen, *The Effects of Public Subsidies on R&D Employment: Evidence from OECD Countries 23–24* (Intellectual Prop. Research Inst. of Austl., Working Paper No. 2/11, 2011), available at http://www.ipria.org/publications/wp/2011/WP2_2011.pdf (on file with the *Columbia Law Review*).

84. Kris Aerts, *Katholieke Universiteit Leuven, Who Writes the Pay Slip? Do R&D Subsidies Merely Increase Researcher Wages?* 33 (2008).

ble assets in addition to patents.⁸⁵ An important distinction between R&D incentives and patent and innovation boxes (hereafter both referred to as patent boxes) is their timing: R&D incentives are provided when the expenses are incurred; patent boxes, in contrast, reduce taxes when, and if, income is earned. Countries implement preferential patent box rates through any of three mechanisms: a deduction for a portion of the income, a reduced rate for IP income, or an exemption of a portion of such income. Patent boxes vary in terms of what kind of IP is eligible, whether the IP must be self-developed to qualify, and what types of income are benefitted. With the exception of Ireland, which exempted patent income starting in 1973,⁸⁶ most EU countries have adopted patent boxes only recently. Hungary, Belgium, France, the Netherlands, Luxembourg, Spain, and the Basque region of Spain all now offer patent boxes, and the United Kingdom will join their ranks in April 2013. A description of each follows.

A. Tax Benefits for IP Income

Hungary offers a deduction of up to 50% of gross royalties received on qualified IP and gains on the sale of qualified IP.⁸⁷ The deduction applies to up to 50% of a company's income before tax.⁸⁸ The Hungarian corporate tax rate is 10% for income up to HUF 500 million and 19% above that,⁸⁹ leading to effective tax rates of 5% and 9.5%. IP may be self-developed or acquired, and qualified IP includes patents, copyrights, know-how, trademarks, business names, and business secrets.⁹⁰ The incentive applies to IP developed both before and after its adoption in 2003.⁹¹ Starting in 2012, gains on the sale of qualifying IP may be exempt from corporate tax if the seller has held the property for at least one year.⁹²

Belgium offers a patent income deduction ("PID") of 80% of the gross patent income of Belgian companies or Belgian permanent estab-

85. Atkinson & Andes, *supra* note 12, at 3. There is considerable variation among the incentives in terms of the income that qualifies and how related expenses are treated. *Id.* at 3–4.

86. *Id.*

87. Peter R. Merrill et al., *Is It Time for the United States To Consider the Patent Box?*, 134 *Tax Notes* 1665, 1668 (2012).

88. *Id.*

89. Deloitte, *Hungary Highlights 2012*, available at http://www.deloitte.com/assets/Dcom-Global/Local%20Assets/Documents/Tax/Taxation%20and%20Investment%20Guides/2012/dttl_tax_highlight_2012_Hungary.pdf (on file with the *Columbia Law Review*).

90. Merrill et al., *supra* note 87, at 1668.

91. *Id.*

92. *Id.*

lishments of foreign companies.⁹³ This reduces the effective tax rate to a maximum of 6.8%.⁹⁴ Most expenses, though not license fees, are deductible at the normal corporate rate of 33.99%, which may further lower the effective rate and even make it negative.⁹⁵ However, the PID cannot be used to create a net operating loss.⁹⁶ The PID only applies to patents granted and extended patent certificates granted or first used commercially after 2007, when the incentive was enacted.⁹⁷ The patents do not have to be self-developed, but they must be improved if they are acquired, and the PID applies only to the improvement.⁹⁸ In order for patents to qualify, the R&D leading to the patents or improvements must take place in an R&D center that qualifies as a branch of activity, meaning that it is part of an entity that is able to operate autonomously.⁹⁹ The R&D center may be located abroad as long as it is owned by a Belgian entity.¹⁰⁰ The PID applies to income from licensing patents or patent certificates, as well as income from the use of patents or patent certificates in producing patented products or in the delivery of services.¹⁰¹ When the patent is used by the Belgian company or permanent establishment, the PID applies to 80% of the license fee that would have been received had the patent been licensed to an unrelated company.¹⁰² The PID does not apply to capital gains.¹⁰³

France offers a 15% reduced rate on net royalties from licensing of, and net capital gains from transfer of, patents, patentable inventions, improvements on patents and patentable inventions, some manufacturing processes, and certificates for plant-related inventions.¹⁰⁴ IP may be acquired, but it has to be owned by the company for two years to qualify.¹⁰⁵ The reduced rate applies to IP created before and after 2001, when the incentive was first adopted.¹⁰⁶

The Netherlands' innovation box offers a 5% reduced rate on net qualifying IP income from intangible assets that are patented or that result from R&D activities for which a qualifying R&D certificate has

93. Wim Eynatten & Patrick Brauns, *Benelux Tax Competition To Attract IP Income Is On Again*, *Int'l Tax Rev.*, Mar. 2010, at 43, 43; Merrill et. al, *supra* note 87, at 1666.

94. Twenty percent multiplied by Belgium's regular corporate tax rate of 33.99%. Merrill et. al, *supra* note 87, at 1666.

95. *Id.*

96. *Id.*

97. *Id.*

98. *Id.* at 1666–67.

99. *Id.* at 1666.

100. *Id.*

101. Eynatten & Brauns, *supra* note 93, at 43.

102. Merrill et al., *supra* note 87, at 1666.

103. *Id.*

104. *Id.* at 1666–68.

105. *Id.* at 1667.

106. *Id.* at 1668.

been received.¹⁰⁷ R&D certificates are available for IP such as software-related intangibles and trade secrets that cannot be patented.¹⁰⁸ In order to qualify, the IP must be self-developed or, if acquired, must be further developed.¹⁰⁹ The 5% rate applies to income that is reasonably linked with the intangible asset—applicability is not limited to capital gains or royalties.¹¹⁰ This means that IP remuneration embedded in the sales price of goods or services is also eligible, so long as certain requirements are met.¹¹¹ For patents, more than 30% of the income must be attributable to the patent right.¹¹² For an R&D certificate, firms must perform 50% of the R&D in the Netherlands or a Dutch entity must have a decisive coordinating role.¹¹³ The certificate requirement is obviously an effort by the Netherlands to ensure that it benefits from the R&D. Losses arising from the intangible assets can be deducted against the regular corporate income tax rate of 25%. The reduced rate applies to IP that has become a business asset since 2007, when the incentive was first adopted.

Luxembourg offers an 80% exemption on net income, including capital gains, derived from the use of and right to use software copyrights, patents, trademarks, brands, design, models, and domain names.¹¹⁴ This results in an effective tax rate of 5.84%.¹¹⁵ The exemption applies to IP that was acquired or developed in or after 2008, when the incentive was adopted.¹¹⁶ IP acquired from a directly related company, defined as a “10 percent direct patent, subsidiary, or sister company,” does not qualify.¹¹⁷

Spain exempts 50% of gross royalty income from qualifying IP, which includes certain technological IP rights such as patents, secret formulae and processes, designs, models, plans, and rights for information concerning industrial, commercial, or scientific experiments.¹¹⁸

107. *Id.* at 1668–69; see also Dutch IP Regime with a 5% Effective Tax Rate, Taxand (Jan. 28, 2010), http://www.taxand.com/news/newsletters/Dutch_IP_Regime_with_a_5_percent_Effective_Tax_Rate (on file with the *Columbia Law Review*) (describing Netherlands’ change from patent box to innovation box).

108. Merrill et al., *supra* note 87, at 1669.

109. *Id.*

110. *Id.*

111. *Id.*

112. *Id.*

113. *Id.*

114. *Id.* at 1668.

115. Twenty percent multiplied by Luxembourg’s regular corporate tax rate of 29.22%. See KPMG, Luxembourg Budget 2013/ Tax Package 2013 (Oct. 2012), available at <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/taxnews/flash/Documents/luxembourg-oct4-2012.pdf> (on file with the *Columbia Law Review*).

116. Merrill et al., *supra* note 87, at 1668.

117. *Id.*

118. *Id.* at 1669.

This results in a maximum effective tax rate of 15%.¹¹⁹ Expenses are deductible at the regular corporate tax rate.¹²⁰ The patent box applies only to self-developed IP used for business activities,¹²¹ and Spain further requires that the licensee company not be a resident of a listed tax haven or zero-tax jurisdiction.¹²² The incentive only applies until the tax year following the tax year in which cumulative IP income exceeds six times its cost of development.¹²³ It applies to IP developed before or after the incentive was adopted in 2008.¹²⁴

The Basque Country offers its own patent box. It offers a 60% exemption for gross revenue from licensing self-developed IP and a 30% exemption for gross revenue from licensing acquired IP.¹²⁵ This results in maximum effective rates of 11.2% and 19.6%, respectively.¹²⁶ Capital gains are not eligible.¹²⁷ The patent box applies to a wide range of IP including patents, utility models, industrial designs, domain names, plant variety rights, secret formulae and processes, semiconductor product topography, trademarks, trade names, and know-how.¹²⁸

Ireland exempted patent income until 2010.¹²⁹ The exemption applied to income—including royalties and capital gains—derived from patents when received by a company that was resident in Ireland and not elsewhere, and was initially limited to patents for which the underlying R&D took place in Ireland.¹³⁰ In 2006, the European Commission notified Ireland that the requirement that R&D be carried out in Ireland was incompatible with E.C. Treaty rules regarding freedom of establishment and free movement of services.¹³¹ In response, Ireland extended the ex-

119. Fifty percent multiplied by Spain's regular corporate tax rate of 30%. See *id.* at 1667.

120. *Id.* at 1669.

121. *Id.*

122. *Id.* at 1670.

123. *Id.* at 1669–70.

124. *Id.* at 1667.

125. Antonio Matute Nárdiz, *The Basque Patent Box Regime*, 50 *Eur. Tax'n* 37, 37 (2010).

126. The Basque Country's regular corporate income tax rate is 28%, so the effective rates are 40% multiplied by 28%, and 70% multiplied by 28%. See *id.* (comparing Basque Country's 28% corporate income tax rate to Spain's 30% rate).

127. However, they may be tax exempt "if the proceeds from the transfer are reinvested in certain qualifying assets." See *id.* at 38.

128. *Id.*

129. *The Irish Budget 2011 and Recent Tax Developments*, Taxand (Jan. 17, 2011), http://www.taxand.com/news/newsletters/The_Irish_Budget_2011_and_Recent_Tax_Developments (on file with the *Columbia Law Review*).

130. See Eynatten, *European R&D*, *supra* note 35, at 512.

131. Press Release IP/07/408, European Commission, *Direct Taxation: Commission Requests Ireland To End Discriminatory Rules on Tax Treatment of Patent Royalties* (Mar. 23, 2007), available at http://europa.eu/rapid/press-release_IP-07-408_en.htm#PR_metaPressRelease_bottom (on file with the *Columbia Law Review*).

emption to patents for which the underlying R&D was performed anywhere in the European Economic Area and made the exemption subject to a limitation of five million euros.¹³² Ireland then abolished the exemption with its National Recovery Plan of 2011–14.¹³³

The United Kingdom's new patent box will come into effect April 1, 2013.¹³⁴ The U.K. patent box will apply a reduced tax rate of 10% to profits from patents.¹³⁵ The United Kingdom noted that "some patent-rich UK businesses face a higher overall effective tax rate than their foreign competitors,"¹³⁶ and the patent box appears to be at least partially a response to the plans of some prominent MNEs to move to Ireland.¹³⁷ By lowering the rate on patent income, the patent box is explicitly intended to "improve the competitiveness of the UK corporate tax regime."¹³⁸ Because of the importance of the United Kingdom and its recent entry into the patent box competition, this section shall describe its structure in some detail.

The U.K. patent box will apply to patents granted by the U.K. Intellectual Property Office, the European Patent Office, and other EU Member States with patent regimes similar to that of the United Kingdom.¹³⁹ Companies can qualify if they own or hold exclusive licenses

132. See Eynatten, European R&D, *supra* note 35, at 512.

133. The Irish Budget 2011 and Recent Tax Developments, *supra* note 129.

134. Finance Act 2012, c. 14, sch. 2 (U.K.).

135. HM Revenue & Customs, The Patent Box: Technical Note and Guide to the Finance Bill 2012 Clauses, at 8 (2012) (U.K.) [hereinafter HM Revenue & Customs, Technical Note], available at <http://www.hmrc.gov.uk/budget-updates/march2012/patent-box-tech-note.pdf> (on file with the *Columbia Law Review*). The regular corporate tax rate is 23% for 2013. Corporation Tax Rates, HM Revenue & Customs (U.K.), <http://www.hmrc.gov.uk/rates/corp.htm> (on file with the *Columbia Law Review*) (last visited Feb. 9, 2013). The 10% rate will be implemented using a computational deduction. The amount of the deduction is the company's relevant IP profits multiplied by the difference between the regular corporate tax rate and the patent box rate (10%), divided by the regular rate. HM Revenue & Customs, Patent Box Consultation Draft 2 (2011) (U.K.), available at <http://www.hmrc.gov.uk/budget-updates/06dec11/patent-box-draft.pdf> (on file with the *Columbia Law Review*). This amount will be deducted from the company's profits, and the remainder will be taxed at the regular corporate tax rate. *Id.*; see Finance Act 2012 c. 14, § 357A(2), (3) (U.K.) (demonstrating how deduction is calculated).

136. HM Treasury, Corporate Tax Reform: Delivering a More Competitive System 51 (Nov. 2010) (U.K.) [hereinafter HM Treasury, Corporate Tax Reform], available at http://www.hm-treasury.gov.uk/d/corporate_tax_reform_complete_document.pdf (on file with the *Columbia Law Review*).

137. Lee A. Sheppard, News Analysis: What Hath Britain Wrought?, *Worldwide Tax Daily*, Dec. 22, 2010, at 7–8, available at LexisNexis, 2010 WTD 250-2.

138. HM Treasury, Corporate Tax Reform, *supra* note 136, at 51. See *infra* Part V.A for further discussion of "competitiveness" among nations.

139. HM Revenue & Customs, Technical Note, *supra* note 135, at 5, 9; HM Treasury, The Patent Box: Response to Consultation 5, 10 (2011) (U.K.) [hereinafter HM Treasury, Response to Consultation], available at http://www.hm-treasury.gov.uk/d/conduc_responses_patent_box.pdf (on file with the *Columbia Law Review*). The patent box will also apply to supplementary protection certificates (which extend the protection afforded

for the IP.¹⁴⁰ The patent box will apply to both acquired and self-developed IP, but if the IP is acquired, it must be further developed in order to qualify.¹⁴¹ To avoid subsidizing the passive holding of IP, the government has indicated that, in order to qualify, a company must create or significantly contribute to the creation of the IP, or perform a significant amount of activity to develop the IP or any process incorporating the IP.¹⁴²

The U.K. patent box will apply to the following types of income: license and royalty income, income from the sale of products incorporating the qualified IP, income from the sale of IP, infringement income, income from damages and insurance, and notional royalty income for the use of qualifying IP in processes or services.¹⁴³ Income received for up to six years between the application for a patent and its grant will qualify.¹⁴⁴

One major challenge for patent boxes is ensuring that the tax reduction applies only to income from the innovation. Simply making all income eligible while subtracting out a “routine” return will, for example, conflate gains from business risks with those attributable to innovations. In the new U.K. regime, for example, profits attributable to routine activities are deducted from IP income profits before qualifying.¹⁴⁵ Companies with marketing intangibles that contribute 10% or more to their residual profit will have to calculate an arm’s length royalty rate for the use of those intangibles in determining income qualifying for the patent box.¹⁴⁶ This arm’s length royalty, minus any royalty actually paid, will not be eligible for the patent box.¹⁴⁷ Setting the amount of such royalties necessarily implicates intercompany transfer pricing.¹⁴⁸ All com-

by qualifying patents for pharmaceutical and agrochemical products), plant breeders and variety rights, certain medicinal and veterinary products, and certain plant protection products. HM Revenue & Customs, Technical Note, *supra* note 135, at 19–20.

140. HM Revenue & Customs, Technical Note, *supra* note 135, at 15; HM Treasury, Response to Consultation, *supra* note 139, at 10. For groups that hold IP centrally, a company will be eligible if it has all rights in the IP, or all rights except rights to enforce, assign or license the IP. HM Revenue & Customs, Technical Note, *supra* note 135, at 17; HM Treasury, Response to Consultation, *supra* note 139, at 10.

141. HM Revenue & Customs, Technical Note, *supra* note 135, at 21; HM Treasury, Response to Consultation, *supra* note 139, at 10.

142. HM Revenue & Customs, Technical Note, *supra* note 135, at 21. This rule applies on a group level, so a company will qualify if it owns IP it developed itself or owns IP developed by another member of its group. *Id.* at 24.

143. *Id.* at 32–40; HM Treasury, Response to Consultation, *supra* note 139, at 6.

144. HM Revenue & Customs, Technical Note, *supra* note 135, at 57.

145. *Id.* at 46–48.

146. HM Revenue & Customs, Technical Note, *supra* note 135, at 50–51; HM Treasury, Response to Consultation, *supra* note 139, at 11 (describing allocation of residual profit to patent and nonpatent sources).

147. HM Revenue & Customs, Technical Note, *supra* note 135, at 50–51; HM Treasury, Response to Consultation, *supra* note 139, at 11.

148. For further discussion of transfer pricing, see *infra* Parts IV and V.B.

panies claiming the patent box benefits must comply with the United Kingdom's transfer pricing regime in transactions with affiliated companies.¹⁴⁹ Income from existing IP as well as newly commercialized IP will be eligible for the tax reduction.¹⁵⁰

The proliferation of patent boxes in the European Union raises the question whether the United States will follow suit, and if it does, what form its patent box will take. The next section discusses a prominent recent proposal.

B. *A Proposed Patent Box for the United States*

As part of a broad corporate income tax reform that would reduce the U.S. corporate income tax rate from 35% to 25% and provide a 95% exemption for overseas profits when they are repatriated to the United States as dividends, House Ways and Means Committee Chairman Dave Camp has proposed a limited patent box for the United States.¹⁵¹ The

149. HM Treasury, Consultation on the Patent Box 24 (2011) (U.K.) [hereinafter HM Treasury, Consultation], available at http://www.hm-treasury.gov.uk/d/consult_patent_box.pdf (on file with the *Columbia Law Review*). Compliance with transfer pricing is particularly important since the patent box will apply on a company-by-company basis, rather than to consolidated returns. *Id.* Small companies are usually exempt from the transfer pricing regime, but if they elect to receive a patent box deduction, they will have to forfeit that exemption. *Id.*; HM Revenue & Customs, Technical Note, *supra* note 135, at 79.

150. HM Treasury, Response to Consultation, *supra* note 139, at 8 (discussing U.K. government's proposals for IP inclusion). Because the government originally proposed that the patent box would not apply to existing IP, it decided to phase in the regime over five years in order to offset the cost of expanding its application. *Id.*; see HM Revenue & Customs, Technical Note, *supra* note 135, at 81 (reflecting five year phase-in period).

151. See Technical Explanation, *supra* note 13, at 1–2, 34–35 (discussing generally corporate income tax rate reduction and specific proposal to create limited patent box). Currently, U.S. persons—which includes all U.S. citizens and residents as well as domestic entities, I.R.C. § 7701(a)(1), (30) (2006)—are taxed on all income wherever earned, though U.S. companies can defer taxes on foreign income earned by foreign subsidiaries until the income is distributed as a dividend to the domestic parent corporation. Technical Explanation, *supra* note 13, at 3. In order to avoid double taxation of foreign-source income, a foreign tax credit is available for foreign taxes paid. *Id.* As an alternative to this system, the Camp proposal would allow a 95% deduction for the foreign-source portion of dividends received from a controlled foreign corporation (“CFC”) by a domestic corporation that is a 10% U.S. shareholder of the CFC. *Id.* at 18. The remaining 5% of the dividend would be taxed as a substitute for disallowing deductions for expenses incurred to generate exempt foreign income. *Id.* The deduction would be subject to a one-year holding period requirement for the CFC stock. *Id.* at 20.

Subpart F of the Internal Revenue Code, which provides for current taxation of certain categories of a CFC's foreign income, would remain largely in effect. *Id.* at 18. Thus, U.S. shareholders would still be taxed in the United States on passive or highly mobile income of the CFC that qualified for subpart F, and the exemption would apply only to income from the conduct of an active foreign trade or business. *Cf. id.* (“[T]he 10-percent U.S. shareholder remains taxable in the United States on a current basis under the discussion draft on its pro rata share of certain items of passive or highly mobile income of the CFC.”). Where the 95% deduction applies, foreign tax credits and deductions

patent box, which would apply only to income earned abroad, is one of three alternatives Camp has offered as responses to erosion of the U.S. tax base resulting from the shifting abroad of intangible property and its associated income.¹⁵² The third of these options would effectively create a patent box for sales abroad.¹⁵³ Under this proposal, a new category of income taxed currently in the United States (under subpart F of the Internal Revenue Code) would include controlled foreign corporations'

of foreign taxes paid would not be allowed. *Id.* A foreign tax credit would be available on income taxed under subpart F and for foreign taxes paid directly by a domestic corporation on foreign-source income. *Id.* Further, a foreign tax credit would be available for foreign withholding taxes imposed on royalties and interest. *Id.*

Shareholders of foreign corporations that are not CFCs but have 10% U.S. corporate shareholders ("10/50 companies") could elect to treat those 10/50 companies as CFCs. *Id.* at 20–21. The 95% exemption would then apply to dividends received by the 10% U.S. shareholders from the 10/50 companies. *Id.* at 21.

Under the proposal, foreign branches of domestic corporations would be treated as CFCs and the domestic corporations as 10% U.S. shareholders. *Id.* at 22. The domestic corporation would then be entitled to the 95% deduction on payments treated as dividends from the branch. *Id.*

In addition to the 95% deduction on the foreign-source portion of dividends, 95% of gains on the sale or exchange of the stock of a qualified foreign corporation by a domestic corporation that is a 10% U.S. shareholder would be exempt from tax. *Id.* at 23. No deduction would be allowed for a loss on the sale or exchange, and the domestic corporation would have to hold the stock for one year to qualify. *Id.* Also, in order to qualify, 70% of the assets of the CFC would have to be assets used in the active conduct of a trade or business. *Id.*

Upon transition to the participation exemption system, deferred foreign income would be taxed at a reduced rate of 5.25%, whether or not repatriated. *Id.* at 24–25. This rate could be further reduced by applying foreign tax credits. *Id.* at 24.

152. See Technical Explanation, *supra* note 13, at 32–35 (explaining specific terms of Camp's three alternatives). The first option is based on a proposal made by the Obama Administration in its budget recommendations for fiscal years 2011 and 2012. This option would treat excess income from the transfer of intangible property to low-taxed affiliates as subpart F income. It would apply where a U.S. person transfers intangible property from the United States to a related CFC. Income attributable to such intangibles that has not been subject to foreign tax above 10% would be taxed in the United States to the extent that the income exceeds 150% of costs. (A sliding scale would apply where foreign tax rates are between 10% and 15%, such that all income would be included in subpart F if the foreign rate is below 10% and none would be included if the foreign rate is above 15%.) *Id.* at 32–33.

Under the second option, income earned by a CFC that is not derived from the active conduct of a U.S. trade or business in the CFC's home country and is taxed at a rate below 10% would be included as subpart F income. In order to qualify for the "home-country exception," the CFC would have to maintain an office or fixed place of business in the jurisdiction in which it is organized, and the income would have to arise from activities serving the home country's local market. *Id.* at 33–34; see also *infra* Part V.B (explaining CFC rules require that specified categories of income earned by foreign subsidiaries must be taxed currently to domestic parent at home-country tax rate).

153. See Technical Explanation, *supra* note 13, at 34 (describing third alternative, "[f]oreign intangible income subject to taxation at reduced rate, intangible income treated as subpart F income").

(“CFCs”) worldwide income derived from intangibles.¹⁵⁴ The domestic parent corporation would be entitled to a deduction of 40% of its income from the foreign exploitation of intangibles.¹⁵⁵ This would result in an effective tax rate of 15% on such income (60% of the new top corporate tax rate of 25%).¹⁵⁶ Intangible income would consist of income from the sale, use, consumption, or disposition of property outside the United States, as well as income from the provision of services with respect to people or property used in or connected with the transactions or services.¹⁵⁷ Intangible income would qualify for an exemption from subpart F if subject to foreign tax at a rate equal to or greater than 60% of the maximum federal income tax rate.¹⁵⁸ With Chairman Camp’s proposed U.S. corporate rate of 25%, this exemption would apply to income taxed at a 15% rate or higher.

Chairman Camp couples this “patent box” proposal for income earned abroad with a proposal for a similar 15% rate on domestic exploitation of patents and certain domestic income from manufacturing. Before turning to the issue of incentives for domestic manufacturing, however, it is necessary to summarize what is known, to date, about the effectiveness of patent boxes.

154. *Id.* at 34–35.

155. *Id.* at 34. Apparently, given the large size of the U.S. market, Chairman Camp concluded that extending such a low tax rate to domestic sales would be too costly. Applying a lower rate to exports than to domestic sales may, however, create difficulties under our trade treaties. Applying a lower rate to exports than to domestic sales may, however, create difficulties under our trade treaties. See, e.g., Appellate Body Report, United States—Tax Treatment for “Foreign Sales Corporations,” WT/DS108/AB/RW (Jan. 14, 2002) (World Trade Organization document) (holding that an income tax benefit for exports violated the 1994 General Agreement on Trade and Tariffs); Appellate Body Report, United States—Tax Treatment for “Foreign Sales Corporations,” WT/DS108/AB/R (February 24, 2000) (World Trade Organization document) (same holding for an earlier variation).

156. See Technical Explanation, *supra* note 13, at 1 (“The provision reduces the maximum corporate tax rate from 35 percent to 25 percent.”).

157. *Id.* at 34.

158. *Id.* at 35. The Camp Proposal also includes a thin capitalization rule to mitigate income-stripping concerns. See *id.* at 35–36. The rule would impose a limit on the deductibility of the interest expense of a U.S. corporation that is a U.S. shareholder of a CFC and part of the same worldwide affiliated group (as defined in I.R.C. § 1504 (2006), but using an ownership threshold of 50% rather than 80%). The rule would disallow deduction of part of a U.S. company’s net interest expense (the excess of the interest expense over interest income) if the U.S. company fails two tests: 1) the U.S. group (consisting of U.S. members of the worldwide affiliated group) is overleveraged relative to the worldwide group, and 2) the U.S. company’s net interest expense exceeds a prescribed percentage of its adjusted taxable income. *Id.*

C. How Well Do Patent Boxes Work?

Because they are a relatively new phenomenon, there is much less economic evidence on the effectiveness of patent boxes than there is for R&D incentives. Nevertheless, it is worth summarizing what is known.

According to its Minister for Finance, Michael Noonan, Ireland decided to abolish its exemption for patent income after the Irish Tax Commission concluded that the exemption did not have the desired impact in stimulating innovation.¹⁵⁹ The Commission concluded that the relief was not well targeted and had not resulted in increased R&D.¹⁶⁰ Instead, according to the Commission, the exemption was being used by some companies simply “as a tax avoidance device to remunerate employees.”¹⁶¹

Other commentators have echoed Ireland’s concern that patent boxes are not well targeted to increasing domestic innovation.¹⁶² The Information Technology and Innovation Foundation (ITIF), for example, has observed, “[t]he lion’s share of economic value from innovation to society comes from R&D, a high-skilled workforce, and domestic high-value manufacturing, not simply housing a greater number of patents.”¹⁶³

Rachel Griffith, Helen Miller, and Martin O’Connell have recently estimated the effect of patent box regimes on the location of IP and on government revenues. Based on their model of firms’ location choices for IP, they find that patent box regimes are likely to significantly affect firms’ decisions concerning the location of new IP, but also reduce government revenue.¹⁶⁴ In their simulation of how IP location responded to the introduction of Benelux patent boxes, for example, the authors found an increase in the share of EU patents held by the Benelux countries and a reduction in the share of patents held by other European

159. 730 No. 2, Dáil Deb., Written Answers—Tax Code, at 296 (Apr. 14, 2011), <http://debates.oireachtas.ie/dail/2011/04/14/unrevised2.pdf> (Ir.) (on file with the *Columbia Law Review*).

160. *Id.*

161. *Id.*

162. See, e.g., Rachel Griffith & Helen Miller, Support for Research and Innovation, in *The IFS Green Budget: February 2010*, at 238, 240 (Robert Chote et al. eds., 2010), available at <http://www.ifs.org.uk/budgets/gb2010/gb2010.pdf> (on file with the *Columbia Law Review*) (“A policy of subsidizing income from patents is not well targeted at the market failures that typically justify government intervention in innovation markets.”); Martin A. Sullivan, Time for a U.S. Patent Box?, 133 *Tax Notes* 1304, 1305 (2011) (“[A] patent box does a particularly poor job of linking tax benefits to the activities that deserve subsidizing.”).

163. Atkinson & Andes, *supra* note 12, at 14.

164. Rachel Griffith, Helen Miller & Martin O’Connell, Corporate Taxes and the Location of Intellectual Property 3 (Ctr. for Econ. Policy Research, Discussion Paper No. 8424, 2011), available at <http://www.cepr.org/pubs/dps/DP8424> (on file with the *Columbia Law Review*).

countries, including the United Kingdom.¹⁶⁵ The authors suggest that when the United Kingdom introduces a patent box regime, the Benelux patent share will decrease (though it will still be greater than the initial share).¹⁶⁶ Therefore, the benefits to a nation of introducing a patent box are diminished as more countries adopt patent boxes. The authors conclude that the introduction of patent box regimes will decrease patent revenue for all affected countries.¹⁶⁷ However, the authors do not seek to measure the nontax benefits of patent boxes, which presumably are the primary motivation for adopting them.¹⁶⁸

Although reliable data on the extent to which patent boxes can be expected to increase R&D, employment, or sales of patented products, or to lead to new patents is lacking,¹⁶⁹ a recent ITIF report analyzed 2009 Eurostat data in an attempt to assess some of the potential effects of patent boxes.¹⁷⁰ The report found that between 2008 and 2009, R&D among European countries with patent boxes increased at a *slightly* higher rate than R&D among other European countries (4% compared to 3.8%).¹⁷¹ Patent box countries also had more high-tech exports and experienced greater growth in their numbers of European trademarks from abroad.¹⁷² On the other hand, patent box countries experienced smaller growth in venture capital and employment in knowledge-intensive sectors.¹⁷³ The report suggests that patent box countries may have lagged in these two areas prior to their adoption of patent boxes and that their deficiency in those areas may actually have induced them to adopt patent boxes.¹⁷⁴ However, the report does not suggest or assess any causality between the presence of patent boxes and these indicators, leaving it unclear to what extent, if at all, these effects are related to the patent box regimes.

165. See *id.* at 22–26 (“The share of new patents locating in the Benelux countries increases, with the proportional increase being largest in Belgium and Luxembourg and the absolute increase largest in the Netherlands. The shares elsewhere fall.”).

166. *Id.* at 24 tbl.5 (specifying percentage change in Benelux patent share when United Kingdom introduces patent box regime).

167. *Id.* at 32.

168. See, e.g., HM Treasury, Consultation, *supra* note 149, at 5 (indicating aim of U.K. patent box is to provide incentive for companies to locate high-value jobs in United Kingdom and to maintain United Kingdom’s position as world leader in patented technologies).

169. Atkinson & Andes, *supra* note 12, at 9–11 (noting that measuring effect of patent boxes on research, patents, and sales of patented products is difficult, given newness of incentives and fact that global recession coincided with their institution).

170. *Id.* at 11–12. Eurostat is a data source collected and maintained by the European Commission. For background information about Eurostat and access to Eurostat data, see generally Eurostat, epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home (on file with the *Columbia Law Review*) (last updated Nov. 13, 2012).

171. Atkinson & Andes, *supra* note 12, at 11.

172. *Id.*

173. *Id.* at 12.

174. *Id.*

A recent report by the Staff of the Joint Committee on Taxation also bears on the question of the effectiveness of patent boxes, though it does not discuss them directly.¹⁷⁵ Based on case studies of six U.S. MNEs, the committee staff concluded that locating income from intangible property in low-tax jurisdictions is a major way that MNEs lower their tax liability. According to this study, the companies “performed a significant portion of the product development, product specification, manufacturing process development and improvement, marketing, patent application process, regulatory approval, trade name development, development of customer relationship, and the creation of other valuable intangible property in the United States,” but transferred or licensed the rights to exploit the IP to an affiliate in a low-tax jurisdiction as a way to shift income and thereby lower their income tax.¹⁷⁶ In such circumstances, providing a low tax rate on IP may attract IP income without producing any shift in the location of the underlying R&D or other inputs.

As Ireland’s experience demonstrates, under the European treaties, EU countries cannot limit patent boxes to IP for which the underlying R&D takes place in the country.¹⁷⁷ And, as discussed below, IP ownership is quite mobile.¹⁷⁸ This makes it difficult to ensure that patent boxes actually promote domestic R&D, manufacturing, or other productive activities. Nevertheless, as described, patent and innovation boxes are very popular with EU countries.

D. *Summary of the Evidence on R&D and Patent Boxes*

In sum, despite the popularity of innovation tax incentives and the numerous studies that have sought to evaluate them, the effectiveness of such incentives remains unclear. R&D tax incentives do appear to stimulate additional R&D, and patent boxes apparently do attract additional IP income. There is some evidence that R&D tax incentives increase employment and production. And there is also considerable evidence that, at least to some degree, the additional R&D and IP income resulting from innovation tax incentives is moved from other jurisdictions. On

175. Staff of Joint Comm. on Taxation, 111th Cong., JCX-37-10, Present Law and Background Related to Possible Income Shifting and Transfer Pricing 105–06 (2010) [hereinafter Joint Comm. Pamphlet], available at <https://www.jct.gov/publications.html?func=startdown&id=3692> (on file with the *Columbia Law Review*) (discussing various scenarios through which companies perform “a significant portion” of their manufacturing and research work in United States “but the rights to exploit the intangible property are either transferred to or licensed by an affiliate in a low-tax jurisdiction”); see also *infra* notes 304–322 and accompanying text (explaining Joint Committee on Taxation’s findings in depth).

176. Joint Comm. Pamphlet, *supra* note 175, at 105.

177. See text accompanying *supra* notes 129–133 and accompanying text (discussing conflict between Ireland’s patent income exemption for domestic companies and E.C. Treaty rules regarding freedom of establishment and movement of services).

178. See *infra* Part IV (describing income-shifting techniques that shift IP ownership).

balance, such incentives may or may not result in a net increase in innovative activity.

All in all, the extant data is too limited to adequately assess the effectiveness of patent boxes. For some of the nations that have adopted tax reductions for IP income through patent boxes, the goal seems to be to increase the likelihood that the R&D attendant to technological innovation will occur within their borders. However, some other nations seem to be simply endeavoring to capture at least a small slice of the tax revenue from such innovation—tax revenue that is exceptionally mobile in today's economy, given some tax planning. The Netherlands and the United Kingdom offer examples of the former, Luxembourg of the latter.¹⁷⁹ For countries in the former category, there are reasons to doubt the efficacy of patent boxes; it appears that they affect the location of IP ownership and income, but that the IP may not be accompanied by any significant increase in underlying R&D. Given the mobility of IP income, one cannot help but conclude that firms are more likely to shift income eligible for patent box treatment to low-tax jurisdictions than to increase local R&D in response to patent box tax breaks.¹⁸⁰

Our description of the current state of econometric research on the effectiveness of tax incentives for R&D and patent boxes illustrates the difficulty of assessing their efficacy and the uncertainties about the cost-effectiveness of these incentives. Nevertheless, the absence of convincing evidence of cost-effectiveness has proven no bar to the proliferation of such incentives, nor to their expansion and enhancement. Nor has the lack of convincing evidence about the effectiveness of these incentives diminished calls for additional incentives, for example, to promote “advanced manufacturing.” Discussion of these proposals follows.

III. INCENTIVES FOR “ADVANCED MANUFACTURING”

As stated earlier, nations choose to subsidize technological innovation because, in the absence of such subsidies, crucial research and development would be underproduced. However, it is difficult to design cost-effective subsidies. To complicate matters further, a number of important countries seem now to also be endeavoring to attract manufacturing, especially “advanced technology manufacturing,” within their borders.

179. See *supra* Part II.A (providing overview of European countries' approaches to IP income taxation).

180. Simon Loretz has done some preliminary work finding colocation between firms' tangible and intangible assets, suggesting that the locations of IP and actual activity are not divorced from each other. See Simon Loretz, *Taxes and the Co-Location of Intangibles and Tangibles* 24 (Apr. 27, 2012) (unpublished presentation), available at <http://www.etpf.org/papers/CEPS2012/CEPS2012Loretz.pdf> (on file with the *Columbia Law Review*) (“Evidence suggests that in the long run tangible and intangible assets colocate.”). The results, however, are far from conclusive.

A. U.S. Manufacturing Incentives

U.S. manufacturers benefit from various tax provisions, some general and some aimed specifically at manufacturing.¹⁸¹ First, taxpayers are entitled to annual depreciation deductions to account for the deterioration of property used in their trade or business or for the production of income.¹⁸² Accelerating such depreciation deductions is a time-honored response to fiscal downturns, one that has been repeated during the past decade.¹⁸³ The Job Creation and Worker Assistance Act of 2002 instituted a first-year bonus depreciation deduction for 30% of the adjusted basis of qualified property in the year the property was placed in service.¹⁸⁴ Most depreciable property qualified for this benefit. In 2003, Congress substituted a 50% first-year bonus depreciation deduction for the 30% deduction, with slightly modified rules.¹⁸⁵ Responding to the Great Recession, Congress extended the 50% bonus depreciation deduction for a year in 2009,¹⁸⁶ and again in 2010.¹⁸⁷ In 2010, Congress increased the additional first-year depreciation deduction to 100% for qualified property acquired

181. For a comprehensive description and analysis of U.S. income tax provisions affecting manufacturing, see generally Staff of Joint Comm. on Taxation, 112th Cong., JCX-61-12, Background and Present Law Relating to Manufacturing Activities within the United States (2012), available at <https://www.jct.gov/publications.html?func=startdown&id=4473> (on file with the *Columbia Law Review*) (describing federal income tax rules related to manufacturing sector).

182. For a discussion of cost recovery, see generally Staff of Joint Comm. on Taxation, 112th Cong., JCX-19-12, Background and Present Law Relating to Cost Recovery and Domestic Production Activities (2012) [hereinafter Joint Comm. on Taxation, Cost Recovery], available at <https://www.jct.gov/publications.html?func=startdown&id=4401> (on file with the *Columbia Law Review*) (describing federal income tax law relating to cost recovery).

183. See Michael J. Graetz & Deborah H. Schenk, *Federal Income Taxation: Principles and Policies* 339–40 (6th ed. 2009) (describing history of depreciation methods from introduction of corporate tax in 1909 through Congress's adoption of Accelerated Cost Recovery System in 1981).

184. Pub. L. No. 107-147, § 101, 116 Stat. 21, 22 (2002) (codified as amended at I.R.C. § 168). The basis of the property and the subsequent depreciation deductions were adjusted to account for the first-year bonus deduction. However, there were no adjustments to the allowable amount of depreciation for purposes of calculating the alternative minimum tax. See Joint Comm. on Taxation, Cost Recovery, *supra* note 182, at 25 (describing history and extent of bonus depreciation).

185. Jobs and Growth Tax Relief Reconciliation Act of 2003, Pub. L. No. 108-27, § 201, 117 Stat. 752, 756 (codified as amended at I.R.C. § 168). The American Jobs Creation Act of 2004 expanded the definition of qualified property to include certain restaurant property and leasehold improvements. Pub. L. No. 108-357, § 211, 118 Stat. 1418, 1429 (codified as amended at I.R.C. § 168 (2006)).

186. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, § 1201, 123 Stat. 115, 333 (codified as amended at I.R.C. § 168).

187. Small Business Jobs Act of 2010, Pub. L. No. 111-240, § 2022, 124 Stat. 2504, 2558 (codified as amended at I.R.C. § 168).

and placed in service after September 8, 2010, and before January 1, 2012.¹⁸⁸

The American Jobs Creation Act of 2004 enacted a new deduction to benefit “domestic production activities.”¹⁸⁹ This provision allows taxpayers to deduct from taxable income 9% of the lesser of their taxable income and their “qualified production activities income.”¹⁹⁰ Qualified income includes income derived from property manufactured, produced, grown, or extracted in the United States, and also includes income from the production of electricity, natural gas, potable water, and film, and income from domestic construction projects and associated engineering and architectural activities.¹⁹¹ At the current corporate rate of 35%, this provision essentially provides a reduction of three percentage points in the tax rate applicable to qualified manufacturing and other activities.

Congress enacted this tax break in the aftermath of a WTO decision striking down a U.S. tax incentive for exports and described it as supporting domestic manufacturing, but the incentive applies quite broadly to a variety of corporate activities.¹⁹² One-third of domestic corporate activities qualify for the deduction.¹⁹³ Only two-thirds of this provision’s

188. Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010, Pub. L. No. 111-312, § 401, 124 Stat. 3296, 3304 (codified at I.R.C. § 168). The deduction is reduced to 50% for property placed in service after January 1, 2012. Congress recently extended the deduction again, so property placed in service before January 1, 2014 (2015 for certain property) will qualify for the 50% rate. American Taxpayer Relief Act of 2012, Pub. L. No. 112-240, § 331, 126 Stat. 2313 (codified at I.R.C. § 168). Corporations can elect to claim additional research and minimum tax credits instead of claiming bonus depreciation. Such an election increases the limitation on either the research or minimum tax credit and the increase is refundable. Additional benefits are provided to small businesses. For tax years beginning before 2014, a taxpayer can expense up to \$500,000 of the cost of qualifying property placed in service that year, but the \$500,000 is reduced by the amount by which the cost of the property exceeds \$2,000,000. See I.R.C. § 179(b), as amended by the American Taxpayer Relief Act of 2012 § 315(a). For tax years beginning in 2014 or later, taxpayers can elect to deduct up to \$25,000 of the cost of qualifying property placed in service that year. The \$25,000 is reduced by the amount by which the cost exceeds \$200,000. *Id.* The amount to be expensed in a tax year cannot exceed the taxable income for that year that is derived from the active conduct of a trade or business. I.R.C. § 179(b)(3)(A).

189. § 102, 118 Stat. at 1424–29.

190. I.R.C. § 199. For taxpayers with income from oil-related production activities, the rate is 6% of the least of oil-related production activities income, qualified production activities income, and taxable income.

191. See Molly F. Sherlock, Cong. Research Serv., R41988, *The Section 199 Production Activities Deduction: Background and Analysis 5–6* (2011). The deduction may not exceed 50% of wages allocable to domestic production gross receipts paid by the taxpayer in a given year. Joint Comm. on Taxation, *Cost Recovery*, *supra* note 182, at 61.

192. See Kim Dixon, *Manufacturing Tax Break Goes Wide*, *Fiscal Times* (Mar. 9, 2012), <http://www.thefiscaltimes.com/Articles/2012/03/09/Manufacturing-Tax-Break-Goes-Wide.aspx> (on file with the *Columbia Law Review*).

193. Sherlock, *supra* note 191, at 5.

revenue costs are attributable to manufacturing; 12% are from the information sector, and 7% from mining.¹⁹⁴ Its many beneficiaries include such companies as Starbucks and Time Warner Cable, not generally thought to be engaged in manufacturing.¹⁹⁵ In the case of Starbucks, for example, its food processing qualifies for the deduction, but its retail activities do not. So, companies like Starbucks can treat a portion of their gross receipts from the sale of brewed coffee as qualified receipts to the extent that the income is attributable to the roasting of the coffee beans used to brew the coffee. This tax reduction is also available for a variety of other activities that do not fit our notions of manufacturing, including mining, fishing, cultivating soil,¹⁹⁶ and oil extraction, though oil-related income receives only a 6% deduction (or a two percentage point reduction in the current corporate tax rate).¹⁹⁷

For a time, certain alternative energy manufacturers also benefitted from an Advanced Manufacturing Tax Credit (“MTC”), adopted in the American Recovery and Reinvestment Act of 2009.¹⁹⁸ The MTC provided a 30% credit for investments in clean energy manufacturing facilities built in the United States, but reached its cap of \$2.3 billion in 2010.¹⁹⁹

In 2012, the Obama Administration released its *Framework for Business Tax Reform*, recommending further changes intended to boost domestic manufacturing.²⁰⁰ In addition to making the R&E credit permanent, the Administration would increase the domestic production activities deduction from 9% to 10.7% for regular manufacturing activities and allow a larger deduction for unspecified “advanced manufacturing activities.”²⁰¹ Under the Administration’s proposal, income from the production of oil, gas, coal, and other hard mineral fossil fuels, as well as income from other activities not considered to be manufacturing

194. *Id.* at 13.

195. See Dixon, *supra* note 192.

196. See Treas. Reg. § 1.199-3(e) (2012).

197. See I.R.C. § 199(d)(9) (2006).

198. Pub. L. No. 111-5, 123 Stat. 115 (codified at I.R.C. § 48C).

199. I.R.C. § 48C (Supp. IV 2011). The Clean Energy Jobs Act of 2012 would have reauthorized the credit with a cap of \$5 billion. HR 4108, 112th Cong. (2012).

200. See President’s Framework, *supra* note 18. Other proposals to benefit manufacturing have been proposed in Congress. See, e.g., Rebuilding American Manufacturing Act of 2012, H.R. 5795, 112th Cong. (2012) (introduced by Rep. Ron Kind) (proposing to reduce domestic manufacturing tax rate to 20%).

201. President’s Framework, *supra* note 18, at 12. Combined with the Administration’s proposed 28% corporate tax rate, the 10.7% deduction would result in a 25% rate for regular manufacturing activities, thereby maintaining the three percentage point reduction of current law. *Id.*; see also Dep’t of the Treasury, General Explanations of the Administration’s Fiscal Year 2013 Revenue Proposals (2012) [hereinafter Dep’t of the Treasury, General Explanations 2013], available at <http://www.treasury.gov/resource-center/tax-policy/Documents/General-Explanations-FY2013.pdf> (on file with the *Columbia Law Review*).

activities, would no longer qualify for the deduction.²⁰² In July 2012, the House Ways and Means Committee held hearings on tax reform and the manufacturing sector. In his opening statement, Chairman Camp emphasized the importance of the manufacturing sector to the U.S. economy and asked how tax reform might make U.S. manufacturers more competitive in today's global economy,²⁰³ thereby showing that political support for manufacturers is bipartisan. And support for manufacturing is not limited to the United States; some European nations also offer manufacturing incentives.

B. *European Manufacturing Incentives*

A few European countries offer or have offered manufacturing tax incentives. In 1981, Ireland enacted a special 10% corporate tax rate that applied to manufacturing activities carried out in the country.²⁰⁴ That incentive was eliminated in December 2002, but manufacturing companies that had benefitted from it before July 1998 continued to receive the special rate until December 31, 2010.²⁰⁵ As the incentive was eliminated, Ireland lowered its regular corporate tax rate from 32% to 12.5% between 1998 and 2003.²⁰⁶ The Irish manufacturing incentive, like the one in the United States, had applied quite broadly, including activities such as fish farming, certain shipping activities, film production, and meat processing.²⁰⁷

The Czech Republic offers incentives for investors who introduce new production or expand existing production in the country.²⁰⁸ Newly

202. Sherlock, *supra* note 191, at 2. This change is predicted to generate \$18.2 billion in revenues from 2011 to 2021, and those revenues would be used to fund the increased deduction on advanced manufacturing activities. *Id.* at 18.

203. Dave Camp, Chairman, House Comm. on Ways & Means, Opening Statement at House Ways and Means Committee Hearing on Tax Reform and the U.S. Manufacturing Sector (July 19, 2012) [hereinafter Camp Opening Statement], available at <http://waysandmeans.house.gov/news/documentsingle.aspx?DocumentID=303688> (on file with the *Columbia Law Review*).

204. Martin Chapman, Why Ireland Is Getting a Bad Reputation for Its Low Corporation Tax Rate, *Helium* (May 23, 2011), <http://www.helium.com/items/2161740-ireland-and-its-low-corporation-tax-rate> (on file with the *Columbia Law Review*).

205. Office of the Revenue Comm'rs, 10% Rate of Corporation Tax for Manufacturing Enterprises, Irish Tax & Customs, <http://www.revenue.ie/en/business/incentives/tax-incentives-investors-ireland.html> (on file with the *Columbia Law Review*) (last visited Jan. 25, 2013).

206. Ireland: Domestic Corporate Taxation, *Lowtax*, <http://www.lowtax.net/lowtax/html/jirdctx.html> (on file with the *Columbia Law Review*) (last visited Nov. 14, 2012) (tracking decrease in Ireland's corporate tax rate from 1998 to 2003).

207. Ireland: Offshore Legal and Tax Regimes, *Lowtax*, <http://www.lowtax.net/lowtax/html/jiroltr.html#manu> (on file with the *Columbia Law Review*) (last visited Nov. 14, 2012).

208. See CzechInvest, Investment Incentives 1 (July 2012), available at <http://www.czechinvest.org/data/files/fs-04-investment-incentives-68-en.pdf> (on file with the *Columbia Law Review*) (noting that tax incentives support introduction or expansion of

established companies may qualify for full tax relief for up to ten years, while expanding companies may qualify for partial tax relief for up to ten years.²⁰⁹ These incentives apply until the ceiling on “state aid” permissible under the European treaties has been reached.²¹⁰ Manufacturing operations in areas with significant unemployment may also qualify for job-creation grants and grants for training and retraining employees.²¹¹

Hungary provides several incentives for manufacturing.²¹² The government awards individually determined cash subsidies, and a development tax allowance provides an exemption for 80% of corporate tax for up to ten years for investments of certain amounts that create jobs.²¹³ Hungary also offers a subsidy for training new employees and a job creation subsidy.²¹⁴

Before 1999, Albania provided a four-year tax holiday to domestic and foreign-owned enterprises that engaged in manufacturing activities, followed by an exemption of 60% of profits after the four-year period.²¹⁵ The manufacturing activities had to continue for an additional six years after the holiday or they would be subject to tax retroactively.²¹⁶

So, it is clear that incentives for manufacturing are extensive; the question is whether they are sound.

C. *The Justifications for Manufacturing Incentives*

President Obama’s proposals for advanced manufacturing are partially a response to well-founded criticisms that the current U.S. domestic production deduction is not well targeted to actual manufacturing activities.²¹⁷ The idea that roasting coffee constitutes manufacturing is laughable, although line-drawing problems between manufacturing and

production in manufacturing industry); Investment Incentives, BusinessInfo.cz (July 24, 2012), <http://www.businessinfo.cz/en/articles/text-investment-incentives-8263.html> (on file with the *Columbia Law Review*) (same).

209. CzechInvest, *supra* note 208.

210. *Id.*

211. *Id.*

212. See Hungarian Inv. and Trade Dev. Agency, Incentives for Investments in Manufacturing Industry, available at <http://www.mfa.gov.hu/NR/rdonlyres/4190D433-6F46-4723-BCE9-72C354CEB7A4/0/manuf1025.pdf> (on file with the *Columbia Law Review*) (last visited Nov. 14, 2012).

213. *Id.* at 5.

214. *Id.* at 6.

215. See OECD Tax Ctr. for Tax Policy & Admin. et al., Tax Policy Assessment and Design in Support of Direct Investment: A Study of Countries in South East Europe 178 (2003), available at <http://www.oecd.org/investment/investmentfordevelopment/34466352.pdf> (on file with the *Columbia Law Review*).

216. *Id.*

217. See, e.g., Dixon, *supra* note 192 (characterizing tax deduction as overly broad and noting that “it may be nearly impossible to keep it focused on manufacturing”).

other activities loom large.²¹⁸ The more important question, of course, is whether a tax incentive for domestic manufacturing is sound policy. President Obama's February 2012 *Framework for Business Tax Reform* offers the affirmative argument:

The manufacturing sector plays an outsized role in the U.S. economy with significant spillovers to other sectors that make it particularly important to future job creation, innovation, and economic growth. Furthermore, the United States is in a global competition for manufacturing investment, and both existing and emerging manufacturing industries are subject to more intense international competition than other sectors.

Encouraging manufacturing investment and production supports higher wage jobs. Manufacturing contributes disproportionately to U.S. innovation; manufacturing firms conduct more than two-thirds of the private sector research and development (R&D) in the United States and employ the majority of scientists and engineers in the private sector. Investment in new production capacity and proximity to the manufacturing process create spillovers across firms and industries, leading to the ideas, capabilities, and technologies that enable innovation. In this way, investments in manufacturing increase innovation and economy-wide productivity growth.²¹⁹

The *Framework* thus offers three primary justifications for encouraging manufacturing investment: (1) job creation, (2) the link between manufacturing and R&D, and (3) spillovers from manufacturing. Other proponents of special tax benefits for manufacturing offer the same justifications.²²⁰ On inspection, however, these justifications are not persuasive.²²¹

218. See David Cay Johnston, Obama's Hamburger Problem, Reuters (Mar. 8, 2012), <http://blogs.reuters.com/david-cay-johnston/2012/03/08/obamas-hamburger-problem/> (on file with the *Columbia Law Review*) (discussing line-drawing problem inherent in defining manufacturing and noting that making hamburgers does definitionally seem like manufacturing).

219. President's Framework, *supra* note 18, at 11 (footnotes omitted).

220. See, e.g., Camp Opening Statement, *supra* note 203 ("[T]he manufacturing industry is a cornerstone of our economy that provides high-paying and high-quality jobs Manufacturing is closely connected with research and innovation [M]anufacturing companies contribute to the American economy every day."). For a description of current manufacturing incentives, current legislative proposals, and a summary of the arguments in favor of and against manufacturing incentives, see generally Gary Guenther, Cong. Research Serv., R42742, *Federal Tax Benefits for Manufacturing: Current Law, Legislative Proposals, and Issues for the 112th Congress 19–25* (2012), available at <http://www.fas.org/sgp/crs/misc/R42742.pdf> (on file with the *Columbia Law Review*). In addition to the arguments discussed here, some proponents justify manufacturing incentives to support energy production from renewable sources. *Id.* at 21–22. That argument is not discussed in this Article since it is actually a justification for targeted subsidies for green energy, not for broad manufacturing incentives. For a discussion of subsidies for green energy, see Michael J. Graetz, *The End of Energy: The Unmaking of*

1. *The Link Between R&D and Manufacturing.* — Detail is absent concerning what would qualify as “activities involving the manufacture of certain advanced technology property,”²²² but President Obama’s *Framework* makes clear that this tax benefit is being proposed largely because of the linkage between manufacturing and R&D. The *Framework* notes, “R&D is especially important for manufacturing, which is a technology-intensive sector,” and today, “many nations provide far more generous tax incentives for research than does the United States.”²²³

Indeed, the move to enhance the deduction for domestic production is motivated in large part by fears that manufacturing is moving offshore and taking R&D with it. In a 2011 report, the President’s Council of Advisors on Science and Technology expressed concern that the United States is losing manufacturing and, as a result, R&D.²²⁴ The report observed that manufacturing as a fraction of U.S. GDP has declined by more than 50% over the past fifty years,²²⁵ and that the number of U.S. manufacturing jobs has declined even more rapidly in recent years.²²⁶ The report suggests that as manufacturing moves offshore so does R&D, noting that between 1999 and 2007, U.S. firms’ spending

America’s Environment, Security, and Independence 187–95 (2011) [hereinafter Graetz, Energy].

221. Indeed, in a recent survey of academics on whether government policies should focus on manufacturing employment over employment in other sectors, only 5% supported such policies. Initiative on Global Mkts., Manufacturing, IGM Forum (Oct. 30, 2012, 11:18 AM), http://www.igmchicago.org/igm-economic-experts-panel/poll-results?SurveyID=SV_bf1N9m71c1yF6jr (on file with the *Columbia Law Review*). By contrast, 64% supported an R&D tax incentive. *Id.*

222. Dep’t of the Treasury, General Explanations 2013, *supra* note 201, at 30.

223. See President’s *Framework*, *supra* note 18, at 11; see also Dep’t of the Treasury, General Explanations 2013, *supra* note 201, at 30 (proposing doubling special deduction for domestic “advanced manufacturing activities”).

224. See President’s Council of Advisors on Sci. & Tech., Exec. Office of the President, Report to the President on Ensuring American Leadership in Advanced Manufacturing I (2011) [hereinafter Advisors’ Report to the President], available at <http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-advanced-manufacturing-june2011.pdf> (on file with the *Columbia Law Review*) (“Historically, the manufacturing sector has been tightly linked with the nation’s R&D activities. . . . Despite this historic strength, the U.S. manufacturing sector faces enormous challenges, and American leadership and competitiveness in manufacturing is at risk.”).

225. See *id.* at 1 & n.11 (“As a fraction of U.S. GDP, manufacturing declined from 27% in 1957 to about 11% by 2009.”).

226. See *id.* at 1 & n.12 (“Manufacturing employment declined from 17.6 million jobs in 1998 to just 11.6 million jobs at the end of 2010.” (footnote omitted) (citing Bureau of Labor Statistics, Table B-1. Employees on Nonfarm Payrolls by Industry Sector and Selected Industry Detail, Data Retrieval: Employment, Hours, and Earnings, <http://www.bls.gov/webapps/legacy/cesbtab1.htm> (on file with the *Columbia Law Review*) (last modified Feb. 5, 2010))).

on foreign R&D grew three times as quickly as their spending on domestic R&D.²²⁷

Senator Joe Lieberman has echoed these concerns, stating that “[i]f our engineering, design, and research and development (R&D) capabilities continue to follow the manufacturing and services facilities going abroad, our competitiveness will be weakened, putting our economic prosperity and national security at risk.”²²⁸ Noting that R&D spending by U.S. corporations in China has increased markedly in recent years, Senator Lieberman suggested that “U.S. corporations are moving sophisticated design and R&D overseas to their own subsidiaries abroad or contracting the work to third parties to assist product development in existing manufacturing facilities abroad.”²²⁹

Of course, the fact that firms are shifting both manufacturing and R&D to China does not necessarily indicate that the location decisions are driven by the need to colocate R&D and manufacturing. Location choices for R&D and manufacturing are sometimes influenced by different considerations. Paul Krugman has observed that increasing returns to scale, combined with higher transaction costs arising from cross-border trade, may result in a home-market effect—firms locating a disproportionately large fraction of their manufacturing in their home country.²³⁰ Other scholars have pointed out that the location choices of MNEs will also be influenced by the advantages of having production located near consumers.²³¹ Thus, decisions of where to locate manufacturing frequently involve a tradeoff between home country advantage and locating near consumers. There are also, of course, advantages to locating manufacturing where labor and land are cheap. However, firms also often want to locate their R&D labs near other firms’ R&D labs in order to benefit from geographical spillovers.²³² Thus, while it may be advantageous to locate manufacturing in rural areas, where land is

227. See *id.* at 5 & n.27 (“Between 1999 and 2007, foreign R&D funded by U.S. manufacturing firms grew 191% and their funded R&D performed domestically grew 67%” (citing Gregory Tasse, *Rationales and Mechanisms for Revitalizing U.S. Manufacturing R&D Strategies*, 35 *J. Tech. Transfer* 283 (2010))).

228. Office of Sen. Joseph I. Lieberman, *Offshore Outsourcing and America’s Competitive Edge: Losing Out in the High Technology R&D and Services Sectors* 5 (2004), available at <http://www.econlineservices.com/lieberman.pdf> (on file with the *Columbia Law Review*).

229. *Id.* at 14.

230. Paul Krugman, *Scale Economies, Product Differentiation, and the Pattern of Trade*, 70 *Am. Econ. Rev.* 950, 955–58 (1980) (explaining how “home market” effect results in countries exporting products for which they have large domestic demand).

231. See, e.g., Karolina Ekholm & Katarina Hakkala, *Location of R&D and High-Tech Production by Vertically Integrated Multinationals*, 117 *Econ. J.* 512, 518 (2007) (modeling consumer preferences and firm location decisions).

232. Cf. Adam B. Jaffe et al., *Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations*, 108 *Q.J. Econ.* 577, 585–97 (1993) (providing evidence that spillovers from R&D are geographically localized).

cheaper, firms may want to perform R&D in large cities to be close to other R&D facilities.²³³

So, the locations of manufacturing and R&D are often influenced by different factors, but collocation of R&D and manufacturing is advantageous when it facilitates the testing of ideas and designs.²³⁴ Thus, manufacturing and R&D are often colocated, with the likelihood of collocation depending on the type of R&D performed at a given lab. As the economics literature discussed below attests, basic research is less likely than applied R&D to be colocated with production.

Several economic studies describe the conditions for collocation of manufacturing and R&D, the kinds of R&D most often colocated with manufacturing, and, in some cases, the advantages of such collocation. In a study of large U.S. firms in the chemicals and allied products industry, for example, Isabel Tecu found that manufacturing and R&D were significantly colocated. Specifically, using patent activity as a measure of R&D, she found that a firm's R&D productivity in that industry is 2.5 times as high in a metropolitan statistical area where one of its manufacturing facilities is located than in one where no facility is located.²³⁵

In a survey of forty-nine German MNEs, Björn Ambos found that 79% of research laboratories were colocated with production.²³⁶ Based on the companies' responses regarding the activities of each lab, Ambos classified the labs as "capability exploiting" ("CBE") or "capability augmenting" ("CBA"), with CBE labs focused on exploiting existing technology and CBA labs focused on acquiring new knowledge and capabilities. The CBE and CBA categories closely correspond to applied and basic research, respectively. Of the 130 research facilities in the survey, 103 were colocated with a production facility.²³⁷ Seventy-seven of the ninety-one CBE labs (about 85%) were colocated with production facili-

233. See, e.g., Isabel Tecu, *The Location of Industrial Innovation: Does Manufacturing Matter?* 1–2 (Sept. 2011) (unpublished manuscript), available at <http://www.econ.brown.edu/econ/events/Tecu.pdf> (on file with the *Columbia Law Review*) (noting that manufacturing generally takes place in small cities or rural areas, where land is cheaper, while research institutions are more likely to be found in large metropolitan areas); see also Gerald A. Carlino et al., *The Agglomeration of R&D Labs* 1–2 (Research Dep't, Fed. Reserve Bank of Phila., Working Paper No. 11-42, 2011), available at http://www.seas.upenn.edu/~tesmith/R&D_Clustering_Paper.pdf (on file with the *Columbia Law Review*) (finding that R&D labs are much more geographically concentrated than are manufacturing facilities and attributing concentration of R&D to localized spillover effects).

234. See, e.g., Advisors' Report to the President, *supra* note 224, at 11–12 ("When different aspects of manufacturing—from R&D to production to customer delivery—are located in the same region, they breed efficiencies in knowledge transfer that allow new technologies to develop and businesses to innovate.").

235. Tecu, *supra* note 233, at 3.

236. Björn Ambos, *Foreign Direct Investment in Industrial Research and Development: A Study of German MNCs*, 34 *Res. Pol'y* 395, 403 (2005).

237. *Id.* at 404 tbl.6.

ties, while twenty-six of the thirty-nine CBA labs (about 67%) were colocated.²³⁸ Therefore, while Ambos found a significant degree of colocation overall, CBE labs were somewhat more likely to be colocated with production.

In a study of 156 foreign R&D sites of MNEs, Walter Kuemmerle also concluded that CBE labs were more likely to be colocated with production.²³⁹ Kuemmerle found that forty-six of the ninety-six CBE labs (about 48%) were located near factories, while twenty (about 21%) were located near universities and seventy-nine (about 82%) were located near important markets.²⁴⁰ Of the sixty CBA labs, eleven (about 18%) were located near factories, fifty-two (about 87%) near universities, and twenty-two (about 37%) near important markets.²⁴¹ Thus, CBE labs were more likely to be colocated with manufacturing and marketing facilities, while CBA labs were more likely to be located near universities. In total, about one-third of labs were located near production facilities. Kuemmerle's results are consistent with other studies that have found that applied research facilities are the most likely to be colocated with manufacturing facilities.²⁴²

There is some evidence that high-tech companies, which are defined as those that perform the most R&D overall,²⁴³ are less likely to collocate R&D and production. Based on a study of Japanese operations in Europe, Myriam Mariani found a significant degree of colocation but

238. *Id.*

239. Walter Kuemmerle, *Foreign Direct Investment in Industrial Research in the Pharmaceutical and Electronics Industries—Results from a Survey of Multinational Firms*, 28 *Res. Pol'y* 179, 185–86 (1999).

240. *Id.* at 186 tbl.5.

241. *Id.*

242. Lars Håkanson and Robert Nobel surveyed Sweden's twenty largest manufacturing companies in the chemical and engineering industries regarding their 151 foreign R&D establishments. Lars Håkanson & Robert Nobel, *Determinants of Foreign R&D in Swedish Multinationals*, 22 *Res. Pol'y* 397, 398–99 (1993). The authors found that, overall, most of the establishments were geographically linked to producing subsidiaries. *Id.* at 402. However, most of the units that were dedicated exclusively to long-range basic research were not. *Id.* at 400. By contrast, R&D establishments that were intended primarily to support local production or adapt products to local market conditions tended to be colocated with production facilities. *Id.* at 399–400.

Martin Kenney and Richard Florida also suggest that applied research facilities are more likely to be colocated with production. Martin Kenney & Richard Florida, *The Organization and Geography of Japanese R&D: Results from a Survey of Japanese Electronics and Biotechnology Firms*, 23 *Res. Pol'y* 305, 316 (1994). Based on a mail survey and interviews with R&D managers of large Japanese electronics and biotechnology firms, the authors found that the managers believed it necessary to collocate applied research and production engineering with manufacturing. *Id.* at 307–08, 316. However, the managers indicated that basic research facilities have substantial locational flexibility and need not be colocated with manufacturing, though they may still be. *Id.* at 314.

243. *Cf.*, e.g., Ekholm & Hakkala, *supra* note 231, at 542 (defining high-technology goods as those produced by industries that rank in top ten according to R&D expenditures).

also observed that high-tech businesses were less likely to collocate.²⁴⁴ The study divided affiliates based on whether they performed only R&D, only manufacturing, or both. Affiliates that performed only R&D tended to be located in the same region with other operations. R&D was clustered in particular locations—around London, Frankfurt, and Paris in particular—while manufacturing and combined R&D and manufacturing operations were located in those areas and others. While her data suggests that R&D is often collocated with production, Mariani found that high-tech businesses were less likely to collocate manufacturing and R&D.²⁴⁵

Mariani's results conflict somewhat, however, with a more recent survey by Mikko Ketokivi and Jyrki Ali-Yrkkö.²⁴⁶ Ketokivi and Ali-Yrkkö surveyed CEOs of Finnish companies in an effort to determine the factors that might affect the likelihood of R&D and manufacturing collocation. The CEOs were asked about 1) their collocation needs, 2) the complexity of their products and the degree of R&D-manufacturing interaction required, 3) the complexity of their process, 4) how quickly they introduced new products, and 5) their R&D intensity.²⁴⁷ The authors found that companies with higher product complexity, process complexity, and frequency of developing new products tended to consider collocation of R&D and manufacturing to be more important.²⁴⁸ But, unlike Mariani, Ketokivi and Ali-Yrkkö found that R&D intensity was not significantly correlated with likelihood of collocation.²⁴⁹

In sum, the economics literature suggests that R&D and manufacturing are often collocated, and that such collocation may in some cases improve productivity, although the degree of collocation varies from study to study. The literature also indicates that collocation is less likely for R&D facilities that perform basic research than for those that perform applied research.

The level of R&D performed by manufacturing firms varies substantially by industry. A National Science Foundation report, *Science and Engineering Indicators 2012*, provides data on the R&D intensity of various

244. Myriam Mariani, *Next to Production or to Technological Clusters? The Economics and Management of R&D Location*, 6 J. Mgmt & Governance 131 (2002).

245. She classified pharmaceuticals and electronics as high-tech industries; chemicals, electrical machinery, and motor vehicles as medium-tech industries; and food, drink and tobacco, and paper and printing as low-tech industries. *Id.* at 36. She found that 37% of R&D affiliates in the high-tech sector were independent from production, while 16.7% were independent in the medium-tech sector and 5.6% were independent in the low-tech sector. *Id.* at 138.

246. Mikko Ketokivi & Jyrki Ali-Yrkkö, *Determinants of Manufacturing-R&D Co-Location* (Research Inst. of the Finnish Econ., Discussion Paper No. 1082, 2007).

247. *Id.* at 13.

248. *Id.* at 15.

249. *Id.*

industries.²⁵⁰ Business R&D intensity is defined as the ratio of domestic R&D performed and paid for by the company to domestic net sales. The report found that in 2008, the ratio across all industries was 3.0.²⁵¹ The ratio for manufacturing as a whole was 3.5.²⁵² Certain manufacturing industries, like semiconductor machinery and semiconductor and electronic components of computers, have exceptionally high ratios—28.8 and 20.2, respectively.²⁵³ Pharmaceuticals and medicines also have a high ratio of 12.2, while computer and electronic products as a whole have a ratio of 10.1.²⁵⁴ However, primary metals, food, beverage, tobacco products, textiles, apparel, leather, and wood products all have ratios below 1.²⁵⁵ And certain nonmanufacturing industries have exceptionally high ratios, well above the manufacturing average. For example, software publishing has a ratio of 10.6, and electronic shopping and retail of mail-order houses has a ratio of 13.4.²⁵⁶ Therefore, the link between R&D and manufacturing varies greatly by industry, and such a link is not limited to manufacturing. In general, chemicals, computer and electronics products, and information industries have particularly strong links to R&D. Yet these high-tech industries also seem to be less likely to colocate their manufacturing with their R&D.

2. *Other Justifications for Manufacturing Incentives.* — In addition to the claim that manufacturing incentives will indirectly promote R&D, proponents justify such incentives on the grounds that manufacturing generates crucial, well-paying employment and that manufacturing produces important spillovers.²⁵⁷ However, it is not at all clear that providing manufacturing incentives is a sound or cost-effective way to generate employment. President Obama's *Framework*, quoted above, emphasizes the substantial number of scientists and engineers employed by manufacturing firms.²⁵⁸ Yet, as discussed above, manufacturing may take place in the United States without generating R&D or science and engineering jobs in the United States.

250. Nat'l Sci. Found., *Science and Engineering Indicators 2012*, ch. 4, (2012), available at <http://www.nsf.gov/statistics/seind12/pdf/c04.pdf> (on file with the *Columbia Law Review*).

251. *Id.* app. tbl.4-16, at 2, available at <http://www.nsf.gov/statistics/seind12/append/c4/at04-16.pdf> (on file with the *Columbia Law Review*).

252. *Id.* at 1.

253. *Id.*

254. *Id.*

255. *Id.*

256. *Id.* at 2.

257. E.g., Gene Sperling, Dir., Nat'l Econ. Council, Remarks at the Conference on the Renaissance of American Manufacturing 1 (Mar. 27, 2012), available at http://www.whitehouse.gov/sites/default/files/administration-official/sperling_-_renaissance_of_american_manufacturing_-_03_27_12.pdf (on file with the *Columbia Law Review*) (stating that manufacturing produces high-wage jobs and spillover).

258. President's Framework, *supra* note 18, at 11 (“[M]anufacturing firms . . . employ the majority of scientists and engineers in the private sector.”).

Nor is it likely that U.S. manufacturing jobs lost in recent decades can be recaptured.²⁵⁹ Productivity has increased, reducing the number of employees required to produce similar output.²⁶⁰ The average American factory worker now produces \$180,000 worth of goods a year, which is more than three times what he would have produced in 1978 in today's dollars. Further, while the number of U.S. manufacturing jobs has decreased from twenty million in 1979 to twelve million today, value added in U.S. manufacturing increased by more than two-thirds during that period.²⁶¹ And the recent expansion of manufacturing capabilities in China and other developing countries has contributed to the decline in the United States' relative share of manufacturing.²⁶²

Nevertheless, in remarks before the Conference on the Renaissance of Manufacturing, Gene Sperling, Director of President Obama's National Economic Council, argued that the decline in U.S. manufacturing is not irreversible.²⁶³ Sperling emphasized evidence that increased productivity does not necessarily lead to job loss, pointing out that productivity increased significantly in the 1990s, yet manufacturing employment increased by 700,000 jobs from 1993 to 1999.²⁶⁴ Of course, economic growth was especially robust between 1993 and 1999—U.S. GDP increased by 40%.²⁶⁵

Sperling also pointed to a study by William Nordhaus that found that, within a given industry, increases in the rate of productivity growth were generally associated with increases in the rate of job growth over the

259. See, e.g., Eduardo Porter, *The Promise of Today's Factory Jobs*, N.Y. Times, Apr. 4, 2012, at B1 ("Most of the factory jobs lost over the last three decades in this country are gone for good."); see also Josh Boak, *White House's Manufacturing Math May Not Add Up*, Politico (Feb. 14, 2012, 11:04 PM), <http://www.politico.com/news/stories/0212/72875.html> (on file with the *Columbia Law Review*) (noting that job loss caused by automation and cheap foreign labor is irreversible trend).

260. See Enrico Moretti, *The New Geography of Jobs 10–17* (2012) (discussing effects of increased productivity, including decline of traditional manufacturing jobs).

261. Porter, *supra* note 259.

262. See Bruce Bartlett, *Does Manufacturing Deserve Special Tax Breaks?*, 134 Tax Notes 1561, 1562 (2012) (attributing decline in U.S. manufacturing to growth of China).

263. Sperling, *supra* note 257, at 6. Before 1999, the percentage of the U.S. workforce engaged in manufacturing was decreasing but the absolute number of manufacturing employees was relatively constant, though the trend toward increased productivity was under way before 1999. See William Nordhaus, *The Sources of the Productivity Rebound and the Manufacturing Employment Puzzle 1* (Nat'l Bureau of Econ. Research, Working Paper No. 11354, 2005), available at http://www.nber.org/papers/w11354.pdf?new_window=1 (on file with the *Columbia Law Review*) (charting productivity growth since 1970s).

264. Sperling, *supra* note 257, at 5.

265. See US Real Gross Domestic Product History: US from FY 1993 to FY 1999, U.S. Gov't Spending, http://www.usgovernmentspending.com/spending_chart_1993_1999_USb_13s1li0111cn_US_Real_Gross_Domestic_Product_History#view (on file with the *Columbia Law Review*) (last visited Jan. 2, 2013) (charting GDP from 1993 to 1999).

1948–2003 period.²⁶⁶ According to Nordhaus, the decline in U.S. manufacturing employment is not due to increased productivity in the United States. He emphasizes that higher productivity leads to lower prices, which leads to increased demand and therefore increased employment. According to Nordhaus, the U.S. decline is attributable to the fact that gains in productivity and decreases in costs have been larger in other countries, such as China.²⁶⁷ However, Nordhaus’s findings do not necessarily support Sperling’s claim that the decline in U.S. manufacturing is reversible or merits special incentives.

The 425,000 new manufacturing jobs created in the past two years²⁶⁸ hardly compensate for the millions lost over past decades.²⁶⁹ To take just one example, Intel is building a new U.S. factory that will add 1,000 jobs, but the company reduced its U.S. employment by about 5,000 jobs from 2000 to 2010.²⁷⁰ There is little reason to believe that, even with tax incentives, MNEs would prove willing to move all or even most of their foreign manufacturing employees back to the United States. As General Electric CEO Jeff Immelt said, “We see the opportunity to bring certain jobs, not every job, back.”²⁷¹

President Obama’s final justification for manufacturing tax incentives is the claim that manufacturing causes valuable spillovers. There is some support for this assertion. A study by Michael Greenstone and his colleagues, for example, considered the impact of opening a large manufacturing plant on the productivity of plants in the same county.²⁷² The study compared the county in which a new plant chose to locate (the “winning county”) to one or two other counties that were at the top of the new plant’s list but ultimately were not chosen (the “losing counties”). Before the opening of the new plant, winning and losing counties were similar in terms of most economic variables. However, five years after the new plant opened, the total factor productivity of plants in winning counties was 12% higher than in losing counties, suggesting

266. Nordhaus, *supra* note 263, at 16–17. This study was updated with similar results by the Brookings Institute. See Susan Helper, Timothy Krueger & Howard Wial, *Why Does Manufacturing Matter? Which Manufacturing Matters?* (2012), available at http://www.brookings.edu/~media/research/files/papers/2012/2/22%20manufacturing%20helper%20krueger%20wial/0222_manufacturing_helper_krueger_wial.pdf (on file with the *Columbia Law Review*) (stating that manufacturing has high potential for increasing employment).

267. Nordhaus, *supra* note 263, at 17.

268. Sperling, *supra* note 257, at 6.

269. See, e.g., Boak, *supra* note 259 (discussing “three-decade-long slide” in manufacturing employment).

270. *Id.* (stating Intel’s employment rates from 2000 to 2010).

271. *Id.*

272. Michael Greenstone, Richard Hornbeck & Enrico Moretti, *Identifying Agglomeration Spillovers: Evidence from Winners and Losers of Large Plant Openings*, 118 *J. Pol. Econ.* 536 (2010).

benefits to agglomeration.²⁷³ The study found that “[e]stimated spillovers are larger between plants that shared labor pools and similar technologies.”²⁷⁴ Greenstone and his coauthors suggest that “[t]his is consistent with intellectual externalities, to the extent that they occur among firms that use similar technologies or are embodied in workers who move between firms.”²⁷⁵

Christina Romer, on the other hand, argues that large clustering effects among manufacturers have in fact been hard to find and suggests that spillovers may not be significant after all.²⁷⁶ Glenn Ellison and Edward Glaeser have also examined the concentration of U.S. manufacturing and found that, in many industries, clustering is minimal.²⁷⁷ Further, as Romer points out, clustering benefits are not exclusive to manufacturing; entertainment industries, for example, exhibit significant clustering, suggesting the presence of positive externalities.²⁷⁸

Thus, it is not at all clear whether manufacturing produces substantial spillovers, and even if it does, whether they are any greater than spillovers produced by other industries. This contrasts sharply with the widespread agreement among economists that R&D produces significant spillovers and tends to be underprovided by the market in the absence of government incentives.²⁷⁹

In a recent paper, Michael Spence and Sandile Hlatshwayo divide the economy into an internationally tradable sector, which operates in a global market and is subject to competition from foreign firms, and a nontradable sector, which they claim is comprised of industries that by their nature are confined to operation within the United States.²⁸⁰ These divisions are based on geographic concentration—the more geographically concentrated an industry, the more tradable the authors consider it.²⁸¹ According to their methodology, industries like health care and construction are geographically dispersed and therefore nontradable, while

273. *Id.* at 589.

274. *Id.* at 592.

275. *Id.*

276. Christina D. Romer, *Do Manufacturers Need Special Treatment?*, N.Y. Times, Feb. 5, 2012, at BU4.

277. See Glenn Ellison & Edward L. Glaeser, *Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach*, 105 *J. Pol. Econ.* 889, 909 (1997) (finding “slight” concentration to be norm).

278. Romer, *supra* note 276.

279. See *supra* notes 3–6 and accompanying text (discussing underinvestment in R&D).

280. Michael Spence & Sandile Hlatshwayo, *The Evolving Structure of the American Economy and the Employment Challenge 1* (Mar. 2011) (Council on Foreign Rel., unpublished working paper), available at http://cfr.org/content/publications/attachments/CGS_WorkingPaper13_USEconomy.pdf (on file with the *Columbia Law Review*).

281. *Id.* at 11.

mining is geographically concentrated and therefore tradable.²⁸² The authors found that most manufacturing is tradable, though certain categories of manufacturing, such as those consisting largely of capital-intensive manufactured goods like heavy machinery, are said to include a substantial nontradable component.²⁸³

The authors found that over the 1990–2008 period, most U.S. job growth was in the nontradable sector.²⁸⁴ They project, however, that job growth in the nontradable sector is not sustainable.²⁸⁵ After the financial crisis, nontradable industries like health care and real estate have not continued to grow at their precrisis pace.²⁸⁶ The authors argue that, unless we can generate tradable sector jobs, the United States is going to face a long-term employment problem.²⁸⁷ The authors find no market failure, since MNEs are functioning efficiently, but conclude that the outsourcing of tradable sector jobs has disquieting implications for the United States.²⁸⁸ Therefore, they urge incentives designed to change the behavior of tradable sector firms.²⁸⁹ Specifically, they suggest tax reform favoring “investment in a broad range of productive assets of all kinds, including hard and soft infrastructure and human capital.”²⁹⁰

While Spence and Hlatshwayo suggest that some kinds of tax incentives might be beneficial, a broad tax incentive for domestic manufacturing fails to meet their criteria. Their concern is the loss of jobs in the tradable sector, and to address that concern an incentive should focus on the tradable sector. However, some manufacturing activities are nontradable, and many nonmanufacturing activities are tradable.²⁹¹ For example, in a recent report, the Congressional Research Service (CRS) indicated that the most highly mobile jobs include computer program-

282. *Id.* at 9.

283. *Id.* at 14–15.

284. *Id.* at 12 (finding almost all job growth in nontradable sector). At the same time, the tradable sector experienced a slightly greater increase in value added, the difference between a company’s final sales and its purchase inputs. *Id.* at 19. The authors suggest that value added of the tradable sector increased despite loss of jobs because low-value-added jobs were outsourced abroad while the higher-value-added jobs stayed in the United States. See *id.* at 24 (noting movement of low-value jobs out of United States).

285. *Id.* at 31 (“In our view, it is unlikely that this pattern will continue.”).

286. *Id.*

287. *Id.* at 31–32.

288. See *id.* at 33–34 (acknowledging lack of market failure but identifying difficulties middle-class Americans face in obtaining employment); see also Michael Spence, *The Next Convergence: The Future of Economic Growth in a Multispeed World* 262–64 (2011) (describing difficulties for middle-class Americans due to job migration to other countries).

289. Spence & Hlatshwayo, *supra* note 280, at 35–36.

290. *Id.* at 36.

291. See, e.g., Spence, *supra* note 288, at 200 (describing services that are outsourced to India, including information technology services, business processes, expert medical services, film editing for television, grading exams, and writing political speeches).

mers, systems analysts, telemarketers, and bookkeeping, accounting, and auditing clerks.²⁹² Machine operators, team assemblers, and production worker helpers are less likely to move offshore.²⁹³

Many analysts have suggested that it would be better policy to repeal the special deduction for domestic production income. For example, President Obama's Fiscal Commission and the Debt Reduction Task Force both proposed the repeal of corporate tax expenditures, including the domestic production deduction, in exchange for a lower overall corporate tax rate.²⁹⁴ Another report by the CRS suggests that the revenues generated by repealing the current domestic manufacturing deduction might be used to lower the regular corporate tax rate by 1.2 percentage points.²⁹⁵ The CRS report also suggests that any special benefit should be limited to activities—such as R&D—that tend to produce positive externalities and are therefore underprovided by the market.²⁹⁶

Before turning to an overall evaluation of the incentives for technological innovation, this Article will provide important context by briefly describing some of the techniques MNEs are now using to reduce their taxes on income from IP. The success of MNEs in shifting IP income to low- or zero-tax countries compounds the difficulties of fashioning sound tax policy in support of technological innovation.

IV. TAX-MINIMIZING GAMES MULTINATIONALS PLAY

Large MNEs influence the scope, shape, and efficacy of tax incentives for technological innovation in two ways. The first, and most obvious, is through their political sway. It is now a cliché in the political science literature that democratic legislative bodies are especially responsive to exhortations from business interests.²⁹⁷ In the United States, for

292. Linda Levine, Cong. Research Serv., RL32292, Offshoring (or Offshore Outsourcing) and Job Loss Among U.S. Workers 9 (2011); see also J. Bradford Jensen & Lori G. Kletzer, Tradable Services: Understanding the Scope and Impact of Services Outsourcing 1 (Inst. for Int'l Econ., Working Paper No. 05-9, 2005) (finding a significant number of service occupations tradable); Eric B. Figueroa & Rose A. Woods, Bureau of Labor Statistics, Employment Outlook: 2006–2016—Industry Output and Employment Projections to 2016, Monthly Lab. Rev., Nov. 2007, at 53, 56–57, 63, 65, 72, available at <http://www.bls.gov/opub/mlr/2007/11/art4full.pdf> (on file with the *Columbia Law Review*) (projecting offshore outsourcing would slow rate of employment growth in professional and business services, computer systems design and related services, information services, and software publishing).

293. Levine, *supra* note 292, at 9.

294. Sherlock, *supra* note 191, at 1.

295. Jane G. Gravelle, Cong. Research Serv., R41743, International Corporate Tax Rate Comparisons and Policy Implications 20 (2011); see also Sherlock, *supra* note 191, at 1.

296. See Sherlock, *supra* note 191, at 18 (arguing one policy option would be “to allow the deduction for activities that tend to be associated with positive externalities” such as R&D).

297. See, e.g., Jeffrey H. Birnbaum, *The Lobbyists: How Influence Peddlers Work*

example, the R&D Credit Coalition has become legendary for its ability to maintain R&D tax incentives.²⁹⁸ Indeed, the annual game of threatened expiration and extension of these incentives has become a well-known fundraising gambit for members of Congress who serve on the tax-writing committees.²⁹⁹ And as a particularly powerful example from abroad, a few companies—including GlaxoSmithKline—played a significant role in shaping recent U.K. tax reforms, including the patent box and new corporate tax rate, by threatening to relocate jobs.³⁰⁰

Second, whenever local law fails to conform to the interests of powerful multinational interests, the option of shifting funding and operations, and therefore income, to a more favorable jurisdiction is always present. Although Adam Smith, writing more than two centuries ago, could not have foreseen today's interconnected world economy, he was prescient when he observed:

The proprietor of stock is properly a citizen of the world, and is not necessarily attached to any particular country. He would be apt to abandon the country in which he was . . . assessed to a burdensome tax, and would remove his stock to some other country where he could either carry on his business or enjoy his fortune more at his ease. By removing his stock he

Their Way in Washington 3 (1993) (noting reluctance of government to crack down on businesses).

298. See generally R&D Credit Coalition—Invest in America's Future, <http://www.investinamericasfuture.org> (on file with the *Columbia Law Review*) (last visited Feb. 1, 2013) (stating Coalition's objectives). Between its initial enactment and January 2012, the credit was amended or extended fifteen times, see Tyson & Linden, *supra* note 6, at 26 tbl.5, and the R&D Credit Coalition has played an active role in the process. E.g., Certain Expiring Tax Provisions: Hearing Before the Subcomm. on Select Revenue Measures of the H. Comm. on Ways and Means, 112th Cong. (2012) (statement of R&D Credit Coalition).

299. Cf. Edward J. McCaffery & Linda R. Cohen, Shakedown at Gucci Gulch: A Tale of Death, Money & Taxes 6 (USC Law & Econ. Research Paper No. 04-20, 2004), available at <http://ssrn.com/abstract=581084> (on file with the *Columbia Law Review*) (arguing similar phenomenon has occurred with estate tax reform).

300. See GlaxoSmithKline Threatens to Move Investment out of U.K. in Tax Debate, WRAL Tech Wire (Dec. 11, 2009, 1:30 PM), http://wraltechwire.com/business/tech_wire/news/blogpost/6597968/ (on file with the *Columbia Law Review*) (discussing GSK's threat to move investments out of United Kingdom); see also Press Release, GlaxoSmithKline, GSK Confirms Significant Investment in UK Manufacturing: Ulverston in Cumbria Selected as Site of New Biopharmaceutical Factory (Mar. 22, 2012), <http://www.gsk.com/media/press-releases/2012/gsk-confirms-significant-investments-in-uk-manufacturing-ulverston-in-cumbria-selected-as-site-of-new-biopharmaceutical-factory.html> (on file with the *Columbia Law Review*) (quoting GSK CEO Andrew Witty as saying, "The introduction of the patent box has transformed the way in which we view the UK as a location for new investments, ensuring that the medicines of the future will not only be discovered, but can also continue to be made here in Britain." (internal quotation marks omitted)).

would put an end to all the industry which it had maintained in the country which he left.³⁰¹

MNEs obviously have an incentive to locate profits in low-tax jurisdictions to reduce their tax burdens. And they are quite formidable in doing so—deploying tax-minimizing strategies that have made taxing IP income especially difficult. The facility of MNEs in locating IP income in low-tax jurisdictions limits the ability of national governments to achieve their preferred policy outcomes and clearly has influenced the tax incentives for technological innovation considered here. Some of the incentives described above—Luxembourg’s patent box, for example—simply reflect a nation’s attempt to capture for its treasury a larger share of revenues from MNEs’ worldwide income resulting from their innovative activity, regardless of where the innovative activity itself actually occurs. Income from IP is much more mobile than the highly skilled workers and entrepreneurs who create it. In order to understand the challenges national governments now face, it is necessary first to briefly describe some of the common income-shifting techniques.³⁰²

One way that MNEs shift IP income is by concentrating certain expenses, functions, or IP ownership in a related corporation in a low-tax jurisdiction. Then, through advantageous intercompany transfer pricing, the MNE may allocate a large share of profits to the low-tax entity. The key element making such transactions valuable to MNEs, of course, is large differences in corporate income tax rates.³⁰³

301. 2 Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* 375–76 (Edwin Cannan ed., Univ. of Chi. 1976) (1776).

302. Much has been written about these strategies, and proposals for reform are ubiquitous. See, e.g., Dep’t of the Treasury, *General Explanations 2013*, supra note 201, at 88–89 (describing President Obama’s proposal to tax currently excess returns associated with transfer of intangibles offshore); Elizabeth Chorvat, *Forcing Multinationals to Play Fair: Proposals for a Rigorous Transfer Pricing Theory*, 54 *Ala. L. Rev.* 1251, 1254 (2003) (proposing use of modern valuation pricing theories such as capital asset pricing model to better allocate income among parties); Charles McClure Jr., *U.S. Federal Use of Formula Apportionment to Tax Income from Intangibles*, 14 *Tax Notes Int’l* 859, 860 (1997) (discussing coordinated multilateral adoption of formulary apportionment); Reuven S. Aviyonah & Kimberly A. Clausing, *Reforming Corporate Taxation in a Global Economy: A Proposal to Adopt Formulary Apportionment 2* (Brookings Inst., Hamilton Project Discussion Paper No. 2007-08, 2007), available at http://www.brookings.edu/~media/research/files/papers/2007/6/corporatetaxes-clausing/200706clausing_aviyonah (on file with the *Columbia Law Review*) (proposing system of formulary apportionment); infra Part V (reviewing proposals).

303. See Joint Comm. Pamphlet, supra note 175, at 105 (“Shifting income from high-tax to low-tax jurisdictions increases the after-tax earnings of multinational companies.”); Rachel Griffith, James Hines & Peter Birch Sørensen, *International Capital Taxation*, in 1 *Mirrlees Review: Dimensions of Tax Design*, supra note 9, at 914, 929–31, available at <http://www.ifs.org.uk/mirrleesreview/dimensions/ch10.pdf> (on file with the *Columbia Law Review*) (analyzing effects of tax rates on corporate and government behavior); Edward D. Kleinbard, *Stateless Income’s Challenge to Tax Policy*, 132 *Tax Notes* 1021, 1021 (2011) (describing how MNEs capture “tax rents” by moving income from high-tax to low-tax jurisdictions).

However, concentrating profits in a low-tax jurisdiction often requires an MNE to restructure its operations. The OECD has identified four common mechanisms for accomplishing such restructuring, and the staff of the Joint Committee on Taxation (“JCT”) has presented to Congress six case studies of U.S. MNEs’ income-shifting in several different industries.³⁰⁴ All of the companies in the JCT study had effective tax rates of less than 25% on their worldwide income, and all had a much greater ratio of U.S. sales to worldwide sales than of U.S. income to worldwide income—in some cases five or six times greater.³⁰⁵ Indeed, the JCT selected the companies it examined based on these criteria.³⁰⁶ In each of these cases, the MNE designated an entity in a low-tax jurisdiction as a “principal” and then transferred a significant portion of its IP to that principal.³⁰⁷ Once the IP had been transferred to the principal, the low-tax jurisdiction taxed the IP income, even when the underlying R&D took place in a higher-tax country. The benefits of these kinds of transfers are enhanced whenever the principal pays an artificially low price for the higher-taxed entity’s IP. There are four basic methods of transferring IP to a principal, which are described below.

In general, the low-taxed principal takes over some of the MNE’s high-value functions, while low-value functions are allocated to higher-taxed affiliates.³⁰⁸ Even though all the risks are borne by the MNE’s consolidated group, this allocates a greater share of the MNE’s profits to the principal. The functions taken on by the principal may include developing marketing strategies and organizing research for entities in other countries. The principal may then oversee the development, production, and sale of goods in certain regions, or, in some cases, globally. Alternatively, a foreign affiliate might be in charge of regional distribution for its area. The fact that the affiliate is subject to the oversight of such a principal may allow it to book a smaller portion of the MNE’s profits, while the exercise of oversight by the principal and the funding of expenses may let it book a larger portion. If so, more of the MNE’s profits will be taxed in lower-tax jurisdictions.

304. OECD, *Transfer Pricing Aspects of Business Restructurings: Discussion Draft for Public Comment* 19 September 2008 to 19 February 2009, ¶ A.1, at 6, available at <http://www.oecd.org/tax/transferpricing/41346644.pdf> (on file with the *Columbia Law Review*); Joint Comm. Pamphlet, *supra* note 175, at 51–102.

305. Hearing on Transfer Pricing Issues Before the H. Comm. on Ways and Means, 111th Cong. 2, 4–5 (2010) (prepared testimony of Thomas A. Barthold, Chief of Staff, J. Comm. on Taxation).

306. *Id.* at 2 (“Each of the six cases selected had an effective (i.e., average) tax rate on worldwide income of less than 25 percent during at least one multi-year period since 1999.”).

307. Joint Comm. Pamphlet, *supra* note 175, at 16–17.

308. This can occur by having the low-tax principal incur expenses related to production, enhancement, or exploitation of IP. *Id.* at 15–16.

At the same time, foreign subsidiaries may be converted into low-risk distributors, or new entities may be created for that purpose. While a traditional sales subsidiary would purchase inventory from the parent corporation and assume the risks as well as the responsibility for sales and advertising, a low-risk distributor does not assume risk, but instead, in effect, merely acts as a commissioning agent of the principal.³⁰⁹ In such a case, advantageous intercompany pricing may allocate a lower proportion of the MNE's profits to entities that bear little risk. The MNE wants to sell its products in high-tax jurisdictions, but it also wants to minimize its tax burden in those jurisdictions. So, the low-tax principal bears the risk and receives a high proportion of the profits, while performing sales through the low-risk distributors, which are allocated a smaller portion of the MNE's profits.³¹⁰

In addition, manufacturing subsidiaries may be converted into low-risk service providers (contract manufacturers) acting at the direction of the principal.³¹¹ Or the principal may enter into contracts with unrelated (usually low-cost) contract manufacturers. The principal then does not perform the MNE's manufacturing itself, but by bearing risk and exercising oversight over contract manufacturers, the principal may retain a substantial share of the MNE's profits, even as the contract manufacturers produce the products that will be sold. In such arrangements, in addition to exercising oversight, the principal may own raw materials and goods, as well as the IP related to the product being manufactured, further enhancing its profit share. As with low-risk distributors, contract manufacturers are allocated smaller portions of the profits than full-risk manufacturers would be since they bear little risk and are subject to the control of the principal.

In each of these cases, the IP is owned or licensed by an entity in a low-tax nation. Generally, there are four methods by which an MNE can transfer IP from an entity in a high-tax jurisdiction to an affiliate in a low-tax jurisdiction.³¹² First, the entity may simply transfer all of the rights in the IP. This can be achieved by selling the rights. To the extent that the entity in a high-tax jurisdiction receives an artificially low price for the IP, the MNE reduces its tax burden.

Alternatively, the entity may license the IP to its affiliate. The staff of the JCT has said that licensing is the favored method of transferring IP out of the United States.³¹³ With a licensing agreement, the entity transfers less than all of the substantial rights in the IP and, in return, receives royalties from the affiliate. While the IP may have been developed in the

309. Robert J. Misy, Jr. & Michael S. Schadewald, *Practical Guide to U.S. Taxation of International Transactions* ¶ 805.04, at 251 (7th ed. 2009).

310. Joint Comm. Pamphlet, *supra* note 175, at 14.

311. *Id.* at 14–15.

312. *Id.* at 20–22.

313. *Id.* at 115.

United States, U.S. international tax rules source royalty income where the IP is used rather than where it is developed.³¹⁴ So, royalties received by a U.S. corporation that licenses IP to a foreign affiliate will be classified as foreign source income, even though there may be little or no foreign income tax imposed on the royalties, and the U.S. corporation may offset the U.S. tax that would otherwise be due on the royalties through the use of foreign tax credits from high-taxed income elsewhere.³¹⁵ The U.S. tax question then becomes an issue of transfer pricing, prompting an inquiry whether the royalties adequately compensate the licensor. Resolving such transfer pricing questions is often complicated by the fact that licensing agreements are bundled with agreements for related services or to fund additional research.³¹⁶ This may allow royalties to be lower than they should be.

As a third alternative, instead of the U.S. company transferring the IP itself to a low-tax jurisdiction, it may provide services using the IP, for which it is compensated by the low-tax affiliate.³¹⁷ Again, the tax question becomes whether such services are appropriately compensated, since underpricing the services will result in tax savings for the MNE.

As a fourth variation, the U.S. entity and its affiliate may enter into a cost-sharing arrangement for the development of a new intangible asset. Typically, the entity in the high-tax jurisdiction contributes the right to use its existing IP for R&D to develop the new product. The entity may also contribute other resources or rights to be used in the development process. The IP and any other contributed resources and rights constitute the “platform” contribution. The affiliate in a low-tax jurisdiction makes a “buy-in payment” in return for the rights and resources and often agrees to fund a share of future R&D expenses. The ownership of the newly developed intangible asset is then divided between the entities in proportion to their contributions, with the total value of the IP based

314. See I.R.C. §§ 861(a)(4), 862(a)(4) (taxing U.S. royalty income based on IP location within United States).

315. Because the United States now has a higher statutory corporate tax rate than other developed countries, some companies may not now have sufficient credits from high-tax countries to shelter their royalties this way. Most European nations in recent years have broadened their corporate income tax bases by slowing depreciation allowances and eliminating or reducing other special provisions to help fund lower corporate income tax rates. See OECD, Policy Brief, Reforming Corporate Income Tax 3 & fig.2 (2008), available at www.oecd.org/dataoecd/30/16/41069272.pdf (on file with the *Columbia Law Review*) (noting most countries have broadened their corporate tax bases in line with reductions in corporate tax rates and providing data on Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom). The top statutory corporate tax rates in Europe have been reduced from an average of 31.9% in 2000 to 23.2% in 2010. Press Release, Eurostat, EU27 Tax Ratio Fell to 39.3% of GDP in 2008 (June 28, 2010), available at epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/2-28062010-BP/EN/2-28062010-BP-EN.PDF (on file with the *Columbia Law Review*).

316. Joint Comm. Pamphlet, *supra* note 175, at 115.

317. *Id.* at 20.

on projected profits. Because the new asset is jointly owned, no royalties flow between the two entities when the product is sold to customers. A critical issue, of course, is whether the cost-sharing buy-in is appropriately priced at an arm's length rate. This inquiry is generally impossible to resolve with any confidence since comparable transactions do not occur between unrelated parties. Whenever the price is artificially low, income will be shifted from the high-tax to the low-tax jurisdiction.³¹⁸

In 2010, the JCT published a detailed study illustrating how six U.S. MNEs take advantage of the structures and IP-shifting techniques discussed above to move income to low-tax foreign jurisdictions.³¹⁹ Two of these illustrations are summarized below. In one example, "Bravo," a U.S. MNE that sells industrial technology products, utilizes a cost-sharing agreement between U.S. and Swiss entities.³²⁰ Bravo's Swiss subsidiary is responsible for the manufacture and sale of certain existing and yet-to-be-developed product lines worldwide. Bravo and its domestic affiliates (collectively Bravo U.S.) and the Swiss entity (Bravo Switzerland), which is itself owned by a wholly owned Bravo subsidiary, enter into a cost-sharing agreement, which makes preexisting IP owned by Bravo U.S. available to Bravo Switzerland. In return, Bravo Switzerland makes a buy-in payment of several billion dollars in the form of a declining royalty adjusted to zero over the useful life of the IP, set at four years. Bravo U.S. includes these royalties in its U.S. income upon receipt, but Bravo Switzerland recovers the costs of its buy-in payment within three years. If the useful life of the IP is in fact greater than three years, the cost-sharing agreement allows Bravo to shift income to Switzerland, where it is subject to much lower tax rates than in the United States.

In another example, "Delta," an MNE that manufactures and markets technology-based consumer products, uses a licensing agreement to shift income.³²¹ Delta U.S. (Delta and its domestic affiliates) is primarily responsible for product-related R&D and the development of new products. Once a new product is nearly fully developed, Delta U.S. licenses the rights to exploit the IP to Delta Netherlands, a wholly owned CFC, in exchange for a royalty. Delta Netherlands then exploits the IP globally. Delta Netherlands finances the minimal amount of R&D that is necessary to complete the development of the product, allowing it to

318. In 2008, the Treasury Department and IRS issued temporary regulations that sought to temper the tax reduction benefits of cost-sharing arrangements. In 2011, the temporary regulations were replaced with final regulations. T.D. 9568, 2012-12 I.R.B. 499, available at <http://www.irs.gov/pub/irs-irbs/irb12-12.pdf> (on file with the *Columbia Law Review*). The regulations apply an investor model to determine buy-in payments. Under this investor model, participants that contribute only cash are viewed as making a low-risk investment (because they do not share in the risk of developing the contributed IP in the first place) and are thus required to pay more to the entity that contributes the IP.

319. Joint Comm. Pamphlet, *supra* note 175, at 51-102.

320. *Id.* at 62-72.

321. *Id.* at 77-83.

lower the royalty rate it pays to Delta U.S. After licensing the IP, Delta Netherlands or one of its manufacturing affiliates manufactures the product and sells it to Delta U.S. and other distribution affiliates. A substantial share of the IP profits remains in the Netherlands, where it is taxed at the 5% patent box rate. Virtually all of the R&D costs are incurred in the United States, where they are deducted on Delta's U.S. tax return, offsetting income that would otherwise be taxed at a much higher rate, even though profits from the resulting IP are shifted to the Netherlands.³²²

All six businesses profiled in the JCT study concentrated their "profitable" functions in low-tax foreign jurisdictions while relegating less profitable functions to higher-tax jurisdictions.³²³ All six of the MNEs also performed a substantial portion of their R&D in the United States but transferred or licensed their IP to affiliates in low-tax jurisdictions. Moreover, the U.S. portions of all these companies' worldwide sales were much greater than the U.S. portions of their worldwide income.

In many instances, complex tax planning structures are used by U.S. MNEs to reduce taxes to the low single digits or even zero on a substantial portion of their IP income. Some of these arrangements have been given clever names. Google, for example, which together with Apple has become a poster child for these arrangements in the press, uses a complicated structure known as the Double Irish Dutch Sandwich.³²⁴ The

322. In another example, "Alpha," a company that manufactures and markets consumer products makes extensive use of contract manufacturing to shift a significant portion of its profits to a jurisdiction where it pays no tax. *Id.* at 54–61. Alpha Asia, a 99.9%-owned subsidiary, manufactures many of Alpha's products through hundreds of contract manufacturers. Alpha Asia oversees production and bears substantial risk and responsibility, but its Asian office has fewer than fifty employees. Alpha U.S. (Alpha and its domestic affiliates) conducts R&D for Alpha Asia and then licenses technical information and IP to Alpha Asia and its contract manufacturers for a license fee equal to 3% of the standard cost of production for manufactured products or 3% of the purchase price for purchased products. Alpha U.S. also receives a 2% commission on sales to certain U.S. customers of products developed by Alpha U.S. Then, Alpha Asia sells its products to Alpha U.S., other foreign distributors, and U.S. customers. Sixty-five percent of Alpha Asia's sales are made to Alpha U.S. This structure shifts to Alpha Asia a substantial portion of Alpha's profits, including profits from U.S. sales. Alpha Asia is located in a jurisdiction where it is not taxed (such as Singapore). Alpha U.S. receives only a 3% license fee, perhaps some reimbursement for costs of product development, and potentially a 2% sales commission despite the fact that it provides product development and most of the engineering and manufacturing technology used by Alpha Asia. In this case, almost 60% of Alpha's sales are to U.S. customers, but less than 30% of its pretax earnings are reported as U.S. earnings. *Id.* at 54–61.

323. *Id.* at 105. The locations of contract manufacturers and limited-risk distributors were typically chosen for nontax business or historical reasons, often in higher-tax jurisdictions. *Id.*

324. See Charles Duhigg & David Kocieniewski, How Apple Sidesteps Billions in Taxes, *N.Y. Times*, Apr. 29, 2012, at A1 (discussing Apple's use of "Double Irish with a Dutch Sandwich" to funnel earnings to low-tax regions); Jesse Drucker, Google 2.4% Rate Shows How \$60 Billion Lost to Tax Loopholes, *Bloomberg* (Oct. 21, 2010),

details of these kinds of income-shifting techniques are less important for the purposes of this Article than their consequences. They allow MNEs to

<http://www.bloomberg.com/news/2010-10-21/google-2-4-rate-shows-how-60-billion-u-s-revenue-lost-to-tax-loopholes.html> [hereinafter Drucker, Google Tax Loopholes] (on file with the *Columbia Law Review*) (detailing Google's use of "Double Irish" and "Dutch Sandwich" strategies to move foreign profits through Ireland and the Netherlands to tax haven Bermuda). For a detailed description of Google's use of the Double Irish Dutch Sandwich structure, see Edward D. Kleinbard, *Stateless Income*, 11 Fla. Tax Rev. 699, 706–13 (2011) [hereinafter Kleinbard, *Stateless Income*]. Google makes use of cost-sharing agreements and licensing agreements between its foreign subsidiaries to reduce its tax burden. Basically, the "Double Irish" involves two Irish subsidiaries, one of which ("S1") has been given ownership of IP created by the U.S. parent corporation. J. Bryan Lowder, *The Double Irish and the Dutch Sandwich*, Slate (Apr. 14, 2011, 6:00 PM), http://www.slate.com/articles/news_and_politics/explainer/2011/04/the_double_irish_and_the_dutch_sandwich.html (on file with the *Columbia Law Review*). Alternatively, S1 may enter into a cost-sharing arrangement with the parent corporation to develop the relevant IP. Joseph B. Darby III & Kelsey Lemaster, *Double Irish More Than Doubles the Tax Savings*, Prac. US/Int'l Tax Strategies, May 15, 2007, at 2, 13. S1 transfers its headquarters to Bermuda, which has no income tax, thus becoming a Bermuda resident. Because of their different tax laws, the United States views the subsidiary as Irish but Ireland views the subsidiary as nonresident. S1 then licenses the IP to a wholly owned Irish subsidiary, "S2," which is not recognized as a corporation by the United States but is recognized by Ireland. The United States allows certain entities to elect to be classified as a corporation, partnership, or disregarded entity by "checking the box" on IRS Form 8832. Partnerships and disregarded entities are not recognized for U.S. tax purposes, and their assets and income are instead attributed to their parent corporation. S2 collects the income from the IP in Ireland, where it experiences a low tax rate, and is able to deduct the royalties it pays to S1 under Irish tax laws. This transaction is not taxed by the United States, as under U.S. law it is viewed as a transfer within a single Irish corporation. Thus, the royalties are untaxed but are deductible, and the IP income is taxed at a low rate. U.S. taxes are avoided. Google is able to attribute the income from the IP to Ireland, despite the fact that it is developed in the United States. Google may further minimize U.S. tax liability by setting an artificially low price on the IP in the first place. See Jesse Drucker, *Google Has Made \$11.1 Billion Overseas Since 2007. It Paid Just 2.4% in Taxes. And That's Legal.*, Bloomberg Businessweek, Oct. 25–Oct. 31, 2010, at 43, 44 [hereinafter Drucker, *Tax Haven*] (discussing Google's incentive to set licensing price as low as possible to further shift profits overseas in "transfer pricing" arrangement). Alternatively, if Google initially made use of a cost-sharing arrangement between S1 and the parent corporation, the parent corporation's contribution might be undervalued, lowering the U.S.-taxed buy-in payment from S1. Such schemes have allowed Google to avoid billions of dollars in taxes. Drucker, *Google Tax Loopholes*, *supra*.

Google apparently also makes use of a slightly more complex scheme building on the Double Irish, the so-called Dutch Sandwich. Kleinbard, *Stateless Income*, *supra*, at 706–13 (detailing development and structure of Google's "Double Irish Dutch Sandwich" scheme); Lowder, *supra* (providing overview of Double Irish and Dutch Sandwich schemes). In addition to the two Irish subsidiaries (one of which has its headquarters in Bermuda), Google sets up a third subsidiary ("S3") in the Netherlands. Instead of licensing the U.S. parent's IP directly to S2, S1 grants it to S3, which then passes the IP along to S2. Thus, S3 serves as an intermediary between S1 and S2. Ireland does not tax money moved between EU countries, and the transfer from S3 to S2 is taxed at a very low rate by the Netherlands. The benefit of this agreement is that the royalties on the IP basically go untaxed. Apparently Apple uses similar arrangements. See Duhigg & Kocieniewski, *supra* (describing Apple's use of Double Irish Dutch Sandwich and other tax strategies).

deflect IP income to low- or zero-tax countries even in circumstances where the value of the IP was created in the United States and the resulting products are sold in the United States. Structures such as those used by Google and Apple also often involve further shifting of IP income from low-tax countries like Ireland to even lower- or zero-tax countries like Bermuda and the Cayman Islands.³²⁵

In September 2012, the Senate Permanent Subcommittee on Investigations held a hearing entitled “Offshore Profit Shifting and the U.S. Tax Code,” which explored techniques Microsoft used to shift IP income to low-tax countries and to minimize its U.S. taxable income. In his opening statement, the subcommittee’s chairman, Carl Levin, said that although 85% of Microsoft’s R&D is conducted in the United States, Microsoft USA shifted \$8 billion offshore to subsidiaries in Ireland and Singapore and, during the three years examined by the subcommittee, saved over \$4.5 billion of taxes on goods sold in the United States by selling its rights to market its IP in the United States to a Puerto Rico subsidiary.³²⁶ Chairman Levin said:

Microsoft U.S. avoids U.S. taxes on 47 cents of each dollar of sales revenue it receives from selling its own products right here in this country. The product is developed here. It is sold here, to customers here. And yet Microsoft pays no taxes here on nearly half the income.³²⁷

The United States, of course, is not the only country losing revenue to these income-shifting techniques. Two months after Senator Levin’s hearings, Parliament’s Public Accounts Committee grilled executives from Starbucks, Google, and Amazon on their techniques for avoiding U.K. income taxes on their large U.K. operations.³²⁸ The Parliamentary

325. See *supra* note 324 (providing details of Google and Apple’s strategies).

326. Offshore Profit Shifting and the U.S. Tax Code: Hearing Before the Permanent Subcomm. on Investigations of the S. Comm. on Homeland Sec. & Governmental Affairs, 112th Cong. 2 (2012) (statement of Sen. Carl Levin, Chairman, Permanent Subcomm. on Investigations of the S. Comm. on Homeland Sec. & Governmental Affairs), available at <http://www.hsgac.senate.gov/subcommittees/investigations/hearings/offshore-profit-shifting-and-the-us-tax-code> (follow “Chairman, Permanent Subcommittee on Investigations CARL LEVIN D (MI) — Download Statement” hyperlink) (on file with the *Columbia Law Review*).

327. *Id.* at 2–3. For more detail, also see the exhibits prepared by the subcommittee’s staff for this hearing. *Id.* at 8–10. William J. Sample, Corporate Vice President for Worldwide Tax at Microsoft, described Microsoft’s contributions to the U.S. economy, especially in the state of Washington, pointed out that Microsoft had complied with U.S. tax law and paid billions in U.S. taxes in connection with royalties and cost-sharing buy-in payments from its subsidiaries, emphasized that Microsoft’s Ireland and Singapore subsidiaries served foreign markets, and urged that U.S. tax law be reformed “to support the ability of worldwide American businesses to compete in global markets and invest in the U.S.” *Id.* at 1–10 (testimony of William J. Sample).

328. See Gonzalo Vina, U.K. Lawmakers Accuse Starbucks, Amazon, Google of Tax Avoidance, *Bloomberg Businessweek* (Nov. 12, 2012), available at <http://www.businessweek.com/news/2012-11-12/u-dot-k-dot-lawmakers-accuse-starbucks-amazon->

Report that followed concluded (in the British style): “[W]e were not convinced that [these three companies’] actions, in using the letter of tax laws, both nationally and internationally, to immorally minimize their tax obligations are defensible.”³²⁹ In response to this report and consumer pressures, Starbucks announced it would voluntarily pay an additional £20 million to the U.K. Treasury.³³⁰

In a joint statement at about the same time, Germany’s Finance Minister Wolfgang Schäuble and Britain’s Chancellor of the Exchequer George Osborne called on the G20 countries to coordinate efforts to prevent profit-shifting by MNEs.³³¹ Through a combination of IP-shifting and entity creation and structuring, MNEs are able to allocate a large amount of income offshore. As Julie Roin has said, “At best, taxing authorities have found themselves engaged in a never-ending game of ‘whack-a-mole’; more often they appear to be looking on helplessly as the moles eat the produce in the garden and move inexorably closer to the foundations of the house.”³³²

No one really knows how much income-shifting costs the United States annually; estimates range as high as \$60 to \$90 billion.³³³ The mobility of IP and of some of the functions associated with exploiting it, coupled with the inadequacy of mechanisms used by governments to combat transfer pricing, allow the shifting of much IP income to low-tax countries. When such shifting is done from the United States, it depletes

google-of-tax-avoidance (on file with the *Columbia Law Review*) (describing Committee hearing).

329. Committee of Public Accounts, HM Revenue & Customs: Annual Report and Accounts 2011–12, 2012–13, H.C. 716, at 10 (U.K.), available at <http://www.publications.parliament.uk/pa/cm201213/cmselect/cmpubacc/716/716.pdf>.

330. Simon Neville & Jill Treanor, Starbucks To Pay £20M in Tax Over Next Two Years After Customer Revolt, *Guardian* (U.K.) (Dec. 6, 2012), <http://www.guardian.co.uk/business/2012/dec/06/starbucks-to-pay-10m-corporation-tax>.

331. Press Release, HM Treasury, Statement by the Chancellor of the Exchequer, Rt. Hon. George Osborne MP, Britain & Germany Call for International Action to Strengthen Tax Standard (Nov. 5, 2012), http://www.hm-treasury.gov.uk/chx_statement_051112.htm (on file with the *Columbia Law Review*). The OECD has also begun a multilateral project to combat “base erosion and profit shifting,” the preliminary findings of which it recently reported to the G-20. OECD, *Addressing Base Erosion and Profit Shifting* (2013), available at http://www.oecd-ilibrary.org/taxation/addressing-base-erosion-and-profit-shifting_9789264192744-en.

332. Julie Roin, Can the Income Tax be Saved? The Promise and Pitfalls of Adopting Worldwide Formulary Apportionment, 61 *Tax L. Rev.* 169, 182 (2008).

333. See Kimberly A. Clausing, The Revenue Effects of Multinational Firm Income Shifting, 130 *Tax Notes* 1580, 1585 (2011) (estimating revenue loss of \$90 billion in 2008 from corporate profit-shifting alone); Drucker, *Tax Haven*, supra note 324, at 44 (using estimate of \$60 billion provided by Kimberly Clausing, economics professor at Reed College). For additional estimates and further analysis of profit-shifting by U.S. MNEs, see Mark P. Keightly, Cong. Research Serv., R24927, *An Analysis of Where American Companies Report Profits: Indications of Profit Shifting 1* (2013) (concluding that profits in tax havens are far greater than either employment or capital investment there and that profit-shifting has increased in recent years).

the U.S. tax base and also undermines the nation's innovation incentives. The United States subsidizes R&D performed in the United States by allowing the deduction of R&D costs and through the R&D tax credit on the assumption that this nation will recoup some of those revenue losses through taxes on profits from sales of the resulting products.³³⁴ Other countries have made similar assumptions, but have also experienced disadvantageous income-shifting.³³⁵ In such cases, the R&D may create benefits wherever it occurs, but income-shifting makes R&D incentives more costly because a nation's costs of subsidizing the R&D will not be recouped through taxation of the income that results.

Because of the ubiquity of intercompany transfer pricing issues in MNE arrangements of these sorts, it is tempting to regard the tax-motivated structures described here as presenting a problem only of designing an effective transfer pricing regime or an appropriately constraining alternative. Suggestions for the latter frequently involve the allocation of an MNE's international income using a formula based on its property, payroll, or sales, but, as discussed in the next Part, this is not an obvious solution.³³⁶ Others have urged that the United States tighten its CFC rules, as several OECD countries have recently done.³³⁷ The Obama Administration has also advanced related proposals. The Obama

334. Joint Comm. Pamphlet, *supra* note 175, at 110. Because I.R.C. § 41 treats all members of a group under common control as a single entity, the regulations allow R&D credits even when a foreign affiliate funds the R&D, which will serve in shifting the resulting income abroad. I.R.C. § 41(f)(1) (2006); Treas. Reg. § 1.41-6(i) (2011).

335. See sources cited *supra* note 331 and Dhammika Dharmapala & Nadine Riedel, *Earnings Shocks and Tax-Motivated Income-Shifting: Evidence from European Multinationals 2* (Ill. Program in Law, Behavior & Soc. Sci., Working Paper No. LBSS11-09, 2012), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1629792 (on file with the *Columbia Law Review*) (finding evidence of significant income-shifting by European multinationals and noting income-shifting is seen as problem for high-tax countries worldwide).

336. See James R. Hines Jr., *Income Misattribution Under Formula Apportionment*, 54 *Eur. Econ. Rev.* 108, 110 (2010) [hereinafter Hines, *Income Misattribution*] (discussing proposals implementing formulas based on employment, sales, and property); McClure, *supra* note 302, at 860 (proposing coordinated multilateral adoption of formula apportionment with formula potentially including some weighting of payroll, property, and sales); Roin, *supra* note 332, at 235–39 (identifying two potential solutions: countries extending jurisdictional claim over business profits or proceeds from wider variety of agency relationships and extending reach of gross basis taxation of income derived from nonresident taxpayers); see also *infra* notes 401–410 and accompanying text (discussing proposals to adopt formula apportionment and assessing their shortcomings).

337. See, e.g., Jason Goringe, *OECD Members Tighten Up Their CFC Rules*, *Tax-News* (Apr. 11, 2001), available at http://www.tax-news.com/news/OECD_Member_States_Tighten_Up_Their_CFC_Rules___3080.html (on file with the *Columbia Law Review*) (describing efforts of OECD countries to tighten CFC rules).

Administration's *Framework* suggests, for example, a "minimum tax" on international income.³³⁸

Unfortunately, the problems of international income taxation that these kinds of transactions bring to the surface are much more fundamental. First, by demonstrating the flexibility MNEs enjoy to create and operate new entities resident in low-tax countries, they expose the tenuous foundations that ground international income taxation of corporations based on their residence. These kinds of income-shifting examples also expose the fragility and manipulability of relying on the "source" of income as the second foundation block of international income taxation.³³⁹ But, despite their shortcomings, the world is, for now at least, stuck with both. Of course, the ultimate question then is, given these strictures, current knowledge about the efficacy of these tax incentives, and the ability—and success—of MNEs to shift their IP income to low- or zero-tax jurisdictions, what are the most sensible policy responses? That is the challenge to which this Article now turns.

V. RESOLVING THE TAX POLICY CHALLENGES

This Article has described the three most important types of tax incentives that have been adopted in the United States and Europe to support and stimulate technological innovation in an effort to enhance economic growth: (1) tax credits and super deductions for R&D, (2) patent (or innovation) boxes—the latest European fashion—and (3) special deductions or lower income tax rates for "advanced manufacturing."³⁴⁰ The economic evidence estimating the efficacy of such incentives, however, is sparse and often conflicting—only R&D incentives garner anything like passing marks on a cost-benefit basis. Nevertheless, serious proposals for all three continue to be put forward in the United States.

A. *Evaluating the Incentives*

R&D incentives predate the successful techniques now used by MNEs to shift IP profits to low-tax jurisdictions. They were also generally enacted before the recent expansion of global economic activities.³⁴¹ As a

338. See President's Framework, *supra* note 18, at 14 (describing minimum tax on foreign earnings to protect U.S. tax base and strengthen international corporate tax system).

339. For a discussion of the fragility of both the "residence" and "source" concepts, see Michael J. Graetz, The David R. Tillinghast Lecture, Taxing International Income: Inadequate Principles, Outdated Concepts, and Unsatisfactory Policies, 54 *Tax L. Rev.* 261, 320 (2001) [hereinafter Graetz, *Inadequate Principles*].

340. *Supra* Parts I, II, III.

341. A credit for R&D, for example, was adopted in the Economic Recovery Tax Act of 1981, more than thirty years ago. Pub. L. 97-34, § 221, 95 Stat. 172, 241–47. The credit was then located in section 44F of the Internal Revenue Code. § 221(a), 95 Stat. at 241.

result, their international implications have been little explored. Patent boxes are of more recent vintage and not only take international developments into account, but seem to have been enacted by various European nations in an effort to capture a share of mobile innovative activity or at least some revenue from such especially mobile income. Manufacturing incentives exhibit a somewhat similar finger-in-the-dike quality, as they are promoted principally as a way to keep manufacturing jobs from moving abroad.

All three of these categories of tax incentives now reflect competition among nations to retain and attract activities that are thought by many to have especially high value for the countries that house them. Advocates and detractors may debate whether this competition reflects a race to the top or to the bottom, but no one denies that the race exists.³⁴² Unfortunately, when nations compete over such tax policies, there is no governmental equivalent to Adam Smith's "invisible hand," which produces economic efficiency in competitive markets.³⁴³ Nevertheless, cooperation among nations to harmonize income tax policies is quite limited—even within Europe, where the EU treaties have served to create an economic, but not a fiscal, union.³⁴⁴

Talk about "winning" this kind of international competition has become ubiquitous in today's political discourse, but there is surprisingly little consensus, or even analysis, of what the competition entails.³⁴⁵ Needless to say, technological innovation should not be viewed as a zero-sum game; the economic growth it generates may enhance living standards around the world. The economist Eric Toder has offered the most

342. Cf., e.g., Atkinson & Andes, *supra* note 12, at 15 (referring to race for global innovation advantage).

343. See Ian Roxan, *Limits to Globalization: Some Implications for Taxation, Tax Policy, and the Developing World* 23–24 (LSE Law, Soc'y & Econ., Working Paper No. 3/2012, 2012), available at <http://ssrn.com/abstract=1995633> (on file with the *Columbia Law Review*) ("In the case of tax competition, governments actively set tax rates, so this does not look like the result of perfect competition.").

344. See Michael P. Devereux, Ben Lockwood & Michela Redoano, *Do Countries Compete over Corporate Tax Rates?*, 92 *J. Pub. Econ.* 1210, 1211 (2008) (stating that "[b]oth the European Union and the OECD introduced initiatives in the late 1990s designed to combat what they see as 'harmful' tax competition"); Michael J. Graetz & Alvin C. Warren, Jr., *Income Tax Discrimination and the Political and Economic Integration of Europe*, 115 *Yale L.J.* 1186, 1228 n.143 (2006) (explaining "the Commission's ongoing efforts to harmonize member states' corporate income taxes"); Michael J. Graetz & Alvin C. Warren, Jr., *Income Tax Discrimination: Still Stuck in the Labyrinth of Impossibility*, 121 *Yale L.J.* 1118, 1122 (2012) ("[I]ncome tax rates and bases differ markedly throughout the EU."); Roxan, *supra* note 343, at 21–32 (discussing question of whether tax competition is desirable).

345. For a good summary of the statements of U.S. politicians about the need for the United States to "compete," see Eric Toder, *Urban-Brookings Tax Policy Ctr., International Competitiveness: Who Competes Against Whom and for What?* 1–2 (2012), available at <http://tpcprod.urban.org/UploadedPDF/412477-international-competitiveness.pdf> (on file with the *Columbia Law Review*).

compelling analysis of inter-nation tax competition to date.³⁴⁶ Toder nods to the longstanding economic consensus that firms compete but nations do not³⁴⁷—a consensus dating back to David Ricardo, who demonstrated that international trade was a “win-win” proposition among nations,³⁴⁸ and a conclusion shared by Paul Krugman, who regards “the obsession with competitiveness [as] both wrong and dangerous.”³⁴⁹ But then Toder asks how one might think about tax competition among nations if it were a “zero-sum game” and analyzes five potential objects of such international competition: (1) labor supply, (2) financial and physical capital, (3) intangible capital, (4) tax revenues, and (5) natural resources.³⁵⁰ This Article adds to that list nationally based firms, especially headquarters activities of MNEs, given the mobility of corporate residence coupled with the home country bias in portfolio investment.³⁵¹ All of these factors, except for natural resources, are implicated in the policies addressed here. R&D incentives are intended to attract and benefit high-value workers, especially scientists and engineers; to lure the physical and financial capital essential for technological innovation; to reward national MNEs’ activities; and to create valuable intangible capital. Patent boxes are an effort to garner tax revenues from highly mobile IP and, in some cases at least, to attract R&D with its attendant benefits.³⁵² Manufacturing incentives are intended to increase labor supply, manufacturing jobs in particular; to attract and retain the physical capital used in manufacturing; and, when R&D and manufacturing are colocated, to attract and retain R&D.³⁵³ The critical questions, of course, are how well designed these tax policies are to accomplish these goals and, ultimately, whether they are cost effective.

As mentioned earlier, one major difference between R&D incentives and patent boxes is their timing. R&D incentives are provided when ex-

346. See generally *id.*

347. See *id.* at 2–3 (“[I]s there an economic competition between nations that is analogous to this zero-sum competition between . . . companies? The basic premise of most economic theory says no.”).

348. *Id.* at 2; see also David Ricardo, *On the Principles of Political Economy and Taxation* 146 (London, John Murray, Albermale Street, 1817) (“No extension of foreign trade will immediately increase the amount of value in a country, although it will powerfully contribute to increase the mass of commodities, and therefore sum of enjoyments.”).

349. Toder, *supra* note 345, at 3 (quoting Paul Krugman, *Competitiveness: A Dangerous Obsession*, *Foreign Affairs*, March/April 1994, at 28, 41).

350. Toder, *supra* note 345, at 3.

351. See Rosanne Altshuler & Harry Grubert, *The Three Parties in the Race to the Bottom: Host Governments, Home Governments and Multinational Companies*, 7 *Fla. Tax Rev.* 153, 155 (2005) (discussing international competition to attract mobile companies); Eric Solomon, *Corporate Inversions: A Symptom of Larger Tax System Problems*, 67 *Tax Notes Int'l* 1203, 1211 (2012) (describing proliferation of corporate inversions, which rearrange corporate structures to locate parent corporation in lower-tax jurisdiction).

352. See *supra* Part II.D (summarizing data on benefits of R&D tax incentives).

353. For more information on the justifications for manufacturing incentives, see *supra* Part III.C.

penses are incurred, at the front end of the innovation process. Patent boxes, in contrast, are provided at the back end, when income is earned. If capital markets were complete (making liquidity of no concern), and if returns from R&D expenditures were certain, one might be indifferent to this choice.³⁵⁴ But the argument for subsidizing innovation is grounded in our inability to measure the amount and location of returns to innovation, and the economic evidence concerning the spillover benefits from R&D emphasizes their geographic proximity, implying that beneficial spillovers turn more on the location of R&D than on where IP income is earned.³⁵⁵ A lower tax rate on innovation income may affect where mobile IP income is reported, but there is little reason today to believe that the decision regarding where to locate such income turns on where the related R&D is performed or where the spillovers occur. National desires to capture beneficial spillovers now favor R&D incentives over patent boxes.

Some national benefits may also accrue when IP is owned by the nation's MNEs, regardless of where the IP is developed or exploited. If, for example, a U.S. MNE owns IP developed or enhanced in China and exploited there, the rents from that IP and the benefits of further enhancements to it may accrue predominately to U.S. shareholders, even when China captures the income taxes on such rents and the geographic spillovers.³⁵⁶ This potential benefit also favors R&D incentives over patent boxes, even when the R&D takes place outside of a nation's borders, so long as the resulting IP is owned by a U.S. MNE.

Practical problems plague all three types of these incentives. Designing R&D tax incentives requires that the government define where R&D ends and where production or commercialization begins. Whenever the incentives are aimed at applied, as well as basic, research, disputes over

354. See Staff of J. Comm. on Taxation, 110th Cong., Present Law and Analysis Relating to Individual Retirement Arrangements 5–7 (Comm. Print 2008), available at <https://www.jct.gov/publications.html?func=startdown&id=1286> (on file with the *Columbia Law Review*) (noting that traditional IRAs, which allow for immediate deduction of contributions but require inclusion of distributions in income, and Roth IRAs, which do not allow for deduction of contributions but do not require taxation of distributions, are economically equivalent if taxpayer's marginal tax rate remains constant); Graetz & Schenk, *supra* note 183, at 298–301 (demonstrating that, under certain conditions, immediate deduction is equivalent to yield exemption).

355. For more discussion of the geographical scope of spillovers from R&D, see *supra* note 78 and accompanying text.

356. This is because of the “home country bias,” which disproportionately concentrates ownership of home-country MNEs in residents and citizens of the home country. See generally, e.g., Kenneth R. French & James M. Poterba, Investor Diversification and International Equity Markets, 81 *Am. Econ. Rev.* 222 (1991) (discussing why investors invest disproportionately in domestic stocks compared to optimally diverse portfolio); Piet Sercu & Rosanne Vanpée, Home Bias in International Equity Portfolios: A Review (Aug. 8, 2007) (unpublished manuscript), available at https://lirias.kuleuven.be/bitstream/123456789/175483/1/AFI_0710.pdf (on file with the *Columbia Law Review*) (same).

such line drawing become inevitable and especially difficult. But drawing appropriate lines is important because the scope of the tax incentives clearly affects what research will be undertaken.³⁵⁷

As already described, the U.S. R&D credit is available only for incremental R&D that exceeds a base-period level.³⁵⁸ This structure is not unique, but it is unusual. Most foreign R&D tax incentives turn simply on the volume of annual R&D expenditures.³⁵⁹ In principle, an incremental credit has advantages: It will reduce subsidies to R&D that would be performed without an incentive, and the size of the subsidy can be greater per dollar of revenue cost than one applicable to all R&D expenditures. On the other hand, defining an appropriate base period for an incremental R&D incentive is hardly trouble-free. The 1984–1988 base for the current U.S. R&D credit surely makes little sense now, nearly three decades later. But a rolling base period creates a disincentive for a company to rapidly expand its R&D, since, as a company's R&D spending grows, it becomes more difficult to qualify for the credit going forward.³⁶⁰

Finally, there is the question of whether an R&D credit should be refundable. Generally, nations have answered this question “no,”³⁶¹ which disfavors start-up companies, companies with losses (whose number increases during economic downturns), and companies that are liquidity-constrained.

R&D tax incentives are inevitably overbroad, rewarding spending that would have occurred without the tax break, and subsidizing R&D that produces little or no positive spillover. Direct government aid in the form of grants, loan guarantees, and purchases, in principle, can be more narrowly targeted. It is difficult, however, at least in the United States, to eliminate political rewards to constituents and contributors

357. See generally Nirupama Rao, *Do Tax Credits Stimulate R&D Spending?: Revisiting the Effect of the R&D Tax Credit in its First Decade* (Sept. 2010) (unpublished manuscript), available at <http://economics.mit.edu/files/5540> (on file with the *Columbia Law Review*) (last visited Jan. 25, 2013) (finding R&D credit has had substantial effect on qualified research spending but not necessarily total spending).

358. See *supra* notes 15–16 and accompanying text (discussing R&D tax credit's base-period requirements).

359. See, e.g., OECD, *The International Experience*, *supra* note 7, at 16 (“The most common scheme used by countries is a volume-based tax incentive with current R&D . . . or current and machinery and equipment (M&E) R&D as eligible expenditures . . .”).

360. From 1981 until 1989, the base period was a rolling three-year period, but in 1989, the base period was set at 1984–1989, where it has remained ever since. Omnibus Budget Reconciliation Act of 1989, Pub. L. No. 101-239, § 7110, 103 Stat 2106, 2322.

361. See Deloitte, *2012 Global Survey of R&D Tax Incentives* 38 (2012), available at http://www.nam.org/~media/0C454F85FE324C678330C1CCA0E92168/Global_RD_Survey_September_2012_FINAL.pdf (on file with the *Columbia Law Review*) (noting only eight of twenty-eight countries surveyed offer some form of refundable credit).

when Congress determines where and to whom such direct subsidies will go.³⁶²

Patent boxes create different, but equally daunting, problems, as the discussion of the United Kingdom's recent patent box legislation illustrates.³⁶³ First, patent boxes subsidize only those companies whose R&D proves profitable, without regard to the size and scope of any spillovers from the R&D. Of course, subsidies are less necessary the more profitable the IP, at least when viewed *ex post*.

Second, as described above, the scope of IP income eligible for reduced tax rates varies significantly among countries, creating controversial definitional problems and making meaningful cross-country comparisons difficult. If patent boxes applied only to royalty income, eligible income would be comparatively easy to identify (although, even here, one would have to eliminate royalties for marketing intangibles). However, companies often realize their IP income through sales of their products, and patent and innovation boxes generally apply to such income. This is the case in, for example, Belgium, Luxembourg, and the Netherlands, as well as in the United Kingdom.³⁶⁴ Identifying the income attributable to the IP may be accomplished by subtracting out some level of "routine" returns, on the ground that these relate to production, distribution, and marketing, with excess returns deemed attributable to IP (even though some non-routine returns may instead result due to positive results from taking business risks).³⁶⁵ A formula can be used to make this division. Differences in the size of "routine returns" across industries may be ignored,³⁶⁶ and whenever different countries define eligible income differently, gaps in taxation or double taxation may occur.

Third, patent box tax reductions apply in the country where the income is earned, usually without regard to where the IP is legally protected or where the IP is owned. In Europe, the EU treaties make it impossible to limit income eligible for the tax break to situations where the IP was developed locally,³⁶⁷ but the United States would face no such barrier.

362. See Graetz, *Energy*, *supra* note 220, at 188–95 (describing inadequacies of congressional subsidies and earmarks for green energy projects).

363. See *supra* notes 134–150 and accompanying text (describing structure of U.K.'s patent box).

364. See *supra* Part II.A (describing tax benefits for IP income in various EU countries).

365. See, e.g., HM Revenue & Customs, *Technical Note*, *supra* note 135, at 9–11 (describing calculation of income, including subtracting routine return, for operation of U.K. patent box).

366. For example, the U.K. patent box calculates the routine return as a fixed 10% markup above costs. *Id.* at 11.

367. For a discussion of the European Commission's decision to prevent Ireland from limiting its patent income exemption to IP for which the R&D took place in Ireland, see *supra* notes 131–132 and accompanying text.

As we have seen, it is common for countries to offer *both* R&D incentives and patent boxes. However, doing so without requiring that the income eligible for the patent box rate reduction be offset by the R&D costs (which is required, at most, only by the Netherlands³⁶⁸) opens up the potential for negative tax rates that may serve to shelter unrelated income from tax. The following example, developed by PricewaterhouseCoopers analysts, illustrates the potential problems.

A patent is developed at a cost of \$100 and generates a stream of licensing income with a present value of \$200. Under the Belgian patent box, the present value of the taxable income will be *negative* \$60 (20 percent of \$200 license income less \$100 of R&D expense) because only 20 percent of the license income is subject to tax due to the 80 percent patent income deduction. At the Belgian CIT rate of 33.99 percent, the present value of tax liability on patent income in this example is *negative* \$20.4 (negative \$60 times 33.99 percent), corresponding to an ETR of *negative* 20.4 percent.³⁶⁹

Negative tax rates can also occur, of course, when the R&D tax incentive is used to reduce taxes on high-taxed income in one country and the resulting IP income is shifted to a low-tax jurisdiction—whether the jurisdiction is low-tax because of a patent box or otherwise.³⁷⁰ Combining manufacturing incentives in the form of accelerated deductions or tax credits with a patent box may also produce negative taxes. On balance, as between R&D incentives and a patent or innovation box, the case for the former is more compelling.

Based on the economic evidence described in Part III, a broadly applicable manufacturing incentive does not seem a sensible way to encourage R&D. Generally, basic research produces larger spillover effects than applied R&D.³⁷¹ Because spillovers are the fundamental reason to provide an R&D incentive, the incentive should focus primarily on basic research, yet the literature suggests that basic research is rarely colocated

368. See Merrill et al., *supra* note 87, at 1673 (“Other than the Netherlands, EU countries with patent box regimes generally do not require that development costs be deducted from IP box income.”).

369. *Id.* at 1673 (emphasis in original). “Determined as the present value of tax liability (-\$20.4) divided by the present value of net patent income (\$100).” *Id.* at 1673 n.6.

370. For examples and some estimates for U.S. MNEs, see Harry Grubert & Rosanne Altshuler, *Fixing the System: An Analysis of Alternative Proposals for the Reform of International Tax* 21–25, 55 tbl.1 (June 7, 2012) [hereinafter Grubert & Altshuler, *Fixing the System*] (unpublished manuscript), available at <http://www.sbs.ox.ac.uk/centres/tax/symposia/Documents/2012/Grubert%20Altshuler%20Fixing%20the%20System%20Oxford%20Version.pdf> (on file with the *Columbia Law Review*). For a discussion of income-shifting techniques, see *supra* Part IV.

371. See Cong. Budget Office, *Federal Support for Research and Development* 10 (2007), available at <http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/82xx/doc8221/06-18-research.pdf> (on file with the *Columbia Law Review*) (comparing benefits of research simpliciter with research and development).

with manufacturing.³⁷² If the goal is to stimulate more applied R&D, expanding the category of R&D eligible for incentives would be a more targeted approach than a manufacturing incentive. As shown earlier, while manufacturing companies on average perform somewhat more R&D than other types of companies, many types of manufacturing require little R&D.³⁷³ Therefore, if the goal of a manufacturing incentive is to encourage R&D, a broad incentive for domestic manufacturing is very difficult to justify. The other justifications offered by proponents of manufacturing incentives are no more availing.

While some have argued that manufacturing jobs are a particular source of well-paying jobs for less educated workers, others dispute this. Whether manufacturing jobs appear especially well-paying depends on exactly what is counted and how comparisons are made. Laura Tyson, an advocate of government subsidies for manufacturing, says that in 2009 “the average manufacturing worker earned \$74,447 in annual pay and benefits compared with \$63,122 for the average non-manufacturing worker.”³⁷⁴ In contrast, J. Bradford Jensen, who argues that the United States should be promoting business services rather than manufacturing, points out that “[t]he average business-service job pays about \$56,000 a year—more than 20 percent better than the average manufacturing job.”³⁷⁵ He also observes that “[b]usiness services employ 25 percent of U.S. workers, more than twice as many as the manufacturing sector,” and that “over the past 10 years, business-service employment grew by more than 20 percent, while manufacturing employment decreased by more than 20 percent.”³⁷⁶

Christina Romer, who served as President Obama’s first chair of the Council of Economic Advisers, agrees with Jensen that the manufacturing sector is no longer a special source of well-paying jobs.³⁷⁷ Because of technological innovation, many manufacturing jobs now require greater education, and there are many nonmanufacturing industries in which educated workers may get well-paying jobs.³⁷⁸ Romer points out that while manufacturing has been in decline for the past thirty years, unem-

372. See *supra* Part III.C.1 (describing link between R&D and manufacturing).

373. See *supra* notes 250–256 and accompanying text (discussing R&D performed by manufacturing firms).

374. Laura D’Andrea Tyson, *Why Manufacturing Still Matters*, *Economix Blog*, N.Y. Times, (Feb. 10, 2012, 6:00 AM), <http://economix.blogs.nytimes.com/2012/02/10/why-manufacturing-still-matters> (on file with the *Columbia Law Review*).

375. J. Bradford Jensen, *Op-Ed.*, *Think Services, Not Manufacturing*, *Wash. Post*, Feb. 24, 2012, at A15.

376. *Id.*

377. Romer, *supra* note 276, at BU4 (“Increased international competition has forced American manufacturers to reduce costs. As a result, the pay premium for low-skilled workers in manufacturing is smaller than it once was.”).

378. *Id.*

ployment was less than 6% for most of that period.³⁷⁹ Therefore, she insists that manufacturing should not receive special treatment when other industries offer just as much promise for job creation.³⁸⁰ The Bureau of Labor Statistics estimates that, by far, the bulk of job growth in the years ahead will occur in service industries and that these jobs will include both high- and low-skilled workers.³⁸¹

Finally, proponents of manufacturing incentives claim that spillovers from manufacturing are especially important. But—in sharp contrast to R&D—the economic evidence does not demonstrate that positive economic spillovers from manufacturing are any greater than those produced by other industries.³⁸²

The push for generous government tax incentives for domestic manufacturing seems to be grounded more in their political appeal and nostalgia than sound economics. If the goal is to create incentives for applied R&D or for employment of scientists and engineers, broad manufacturing incentives are poorly targeted. And if the goal is to stimulate employment or to promote economic growth, the revenue costs of a domestic manufacturing incentive would be better spent lowering income tax rates on businesses generally, rather than singling out particular business sectors for especially advantageous treatment.

In his 2011 book, *The Next Convergence*, Michael Spence concludes that a targeted manufacturing incentive could actually be detrimental to the United States' potential for sustained economic growth.³⁸³ Spence points out that countries should consider their comparative advantages in determining what to produce and export, and he observes that countries' comparative advantages shift over time.³⁸⁴ For example, he notes that in the 1970s Hong Kong, Singapore, Taiwan, and South Korea were major exporters of apparel and shoes. In the 1980s, as wages in those countries rose, those manufacturing markets moved to other locations. The shift was a natural response to rising wages—a desirable phenomenon—and attempts to resist the shift in comparative advantages by, for example, depressing local wages would have been seriously mis-

379. *Id.*

380. *Id.*

381. Total employment is projected to grow by 14.3% over the decade. Of the 20.5 million new jobs, the two largest contributors are the health care and social assistance sector (5.6 million) and the professional and business services sector (3.8 million). By comparison, many of the specific industries projected to lose the most jobs are in the manufacturing sector. Bureau of Labor Stat., U.S. Dep't of Labor, Employment Projections: 2010–2020 Summary 1–2 (2012), available at <http://bls.gov/news.release/pdf/ecopro.pdf> (on file with the *Columbia Law Review*).

382. See *supra* notes 272–279 and accompanying text (examining claim that manufacturing causes spillover effects).

383. Spence, *supra* note 288, at 64–68.

384. *Id.* at 65–66.

guided.³⁸⁵ Instead, these nations moved into more complex industries. According to Spence, adaptation to such structural change is crucial to long-term growth. He describes resistance to such change by subsidizing particular sectors that are losing their comparative advantage as akin to “throwing sand in the gears of an otherwise well-oiled machine.”³⁸⁶

B. *Efforts to Limit IP Income-Shifting*

Both the U.K. patent box initiative and the more limited patent box proposal offered by House Ways and Means Committee Chairman Camp would combine their proposed tax reductions for IP income with provisions intended to restrict MNEs’ ability to shift IP income to low- or zero-tax jurisdictions.³⁸⁷ These proposals, in effect, combine patent box incentives with efforts to limit IP income-shifting. In each of his budget proposals since taking office, President Obama has also advanced proposals to limit IP income-shifting.³⁸⁸ His *Framework* suggests a minimum tax on U.S. MNEs’ worldwide income, along with proposals for increased R&D and manufacturing incentives.³⁸⁹

As described earlier, neither the systems of taxing domestic corporate residents on their worldwide income with a credit for foreign income taxes nor the rules for allocating MNE income to the country of its source have proved effective barriers to MNEs shifting IP income to low- or zero-tax jurisdictions. The United Kingdom and Chairman Camp have both advanced their (quite different) proposals to reduce income-shifting in the broader context of moving from a foreign tax credit system to a system that exempts 90%–95% of dividends paid from foreign

385. *Id.* at 67 (“Growth strategy and policy have everything to do with . . . avoiding barriers and structural impediments . . .”).

386. *Id.* at 68.

387. See HM Treasury, Corporate Tax Reform, *supra* note 136, at 23–44 (discussing United Kingdom’s plan for reform of CFC rules to target artificially diverted U.K. profit); *supra* notes 151–158 and accompanying text (discussing Camp proposal). Because the low rate of the Camp proposal applies to foreign, but not domestic, sales, it might create a new incentive to shift income abroad, offering an additional reason to address IP income-shifting.

388. OMB, 2013 Budget, *supra* note 18, at 220 tbl.S-9; OMB, Exec. Office of the President, Budget of the United States Government, Fiscal Year 2012, at 220 tbl.S-9 (2011); OMB, Exec. Office of the President, Budget of the United States Government, Fiscal Year 2011, at 161 tbl.S-8 (2010); OMB, Exec. Office of the President, Budget of the United States Government, Fiscal Year 2010, Updated Summary Tables 21 tbl.S-11 (2009). Many observers are concerned that eliminating any tax barrier to repatriation would increase companies’ incentives for shifting income to low- or zero-tax jurisdictions. The limited economic evidence, however, does not indicate that this is likely. See Kevin S. Markle, A Comparison of the Tax-Motivated Income Shifting of Multinationals in Territorial and Worldwide Countries 40 (2010), available at http://eureka.bodleian.ox.ac.uk/3199/1/WP_12_06.pdf (on file with the *Columbia Law Review*) (finding no statistically significant difference in income-shifting when firms can defer repatriation of shifted income).

389. See President’s Framework, *supra* note 18, at 1.

subsidiaries to their domestic parents—a system that basically allocates international taxation of business income to the source country.³⁹⁰ President Obama, on the other hand, offered his proposals to limit income-shifting in the context of retaining the existing foreign tax credit system.

The Camp and Obama proposals to restrict shifting of IP income, like many other suggestions in the tax policy literature,³⁹¹ are varied and complex. Analyzing them in detail would fill another lengthy article, a task eschewed here. However, since these proposals have been regarded as necessary companions to the kinds of incentives for technological innovation explored here, this Article will offer some general observations about their scope, their structure, and the major differences among them.

Proposals to limit IP income-shifting generally fall into one or more of five categories: (1) strengthening transfer pricing rules; (2) using a formula based on one or more of an MNE's domestic sales, wages, or property to allocate its income among jurisdictions; (3) revising the source rules; (4) expanding rules requiring immediate taxation of certain categories of mobile income earned by foreign subsidiaries (CFC rules); and (5) imposing some minimum tax on MNEs' domestic, foreign, or worldwide income.

The first two of these, transfer pricing improvements and formulary apportionment, can be viewed as efforts to redress gaps in source-based taxation. This includes efforts to redefine as U.S.-sourced income that which is appropriately attributable to activities within the United States. Since every nation, including the United States, claims jurisdiction to tax income earned within its borders,³⁹² if a country tightens its transfer pricing rules or imposes formulary apportionment, such changes would apply to all MNEs, whether domestic or foreign, doing business within the country. So would the third alternative, an explicit revision of the source rules. In contrast, the fourth approach, expanding the scope of CFC income to tax income earned abroad currently at domestic rates, can be viewed as an expansion of residence-based taxation because such a change would only affect national MNEs, even if aimed, for example, at income shifted from the United States to a low-tax foreign jurisdiction.

390. See Technical Explanation, *supra* note 13, at 18 (discussing Camp's proposed dividends-received deduction). The United Kingdom adopted a 100% dividend exemption in 2009. See Barbara Angus, Tom Neubig, Eric Solomon & Mark Weinberger, Special Report: The U.S. International System at a Crossroads, Tax Notes, Apr. 5, 2010, at 45, 54 tbl.3, available at <http://taxprof.typepad.com/files/angus.pdf> (on file with the *Columbia Law Review*).

391. See *supra* note 302 and accompanying text (describing several proposals).

392. See Timothy J. Goodspeed & Ann Dryden White, International Taxation, in 4 *Encyclopedia of Law and Economics* 256, 257 (Boudewijn Bouckaert & Gerrit de Geest eds., 2000) ("All countries claim the right to tax all income generated within that country's border; that is, all countries begin with a source basis for taxation.").

The final approach, enacting a minimum tax, which is a new idea, might be structured either as a way of redefining income that the United States regards as appropriately sourced to the United States, in which case it might apply to both U.S. and foreign MNEs, or like an expansion of CFC rules, in which case it might be limited to U.S. MNEs. President Obama's minimum tax proposal explicitly takes the latter approach.³⁹³

Filling the gaps in transfer pricing rules is far easier said than done. In 1986, Congress amended the U.S. transfer pricing statute to allow the Treasury and the IRS to allocate prices in a manner "commensurate with . . . income."³⁹⁴ Subsequently, large penalties were added to the tax code in an effort to bolster the transfer pricing requirements.³⁹⁵ Beginning in the early 1990s and since, the Treasury has issued hundreds of pages of regulations endeavoring to implement this broad grant of regulatory authority.³⁹⁶ Similar efforts to improve transfer pricing rules have also been ongoing on a multilateral basis at the OECD, which issued revised transfer pricing guidelines in 1995 and 2010 and a discussion draft of proposed changes in 2012.³⁹⁷ However, success remains elusive. The

393. President's Framework, *supra* note 18, at 14–15.

394. Tax Reform Act of 1986, Pub. L. No. 99-514, § 1231(e)(1), 100 Stat. 2085, 2562–63 (amending I.R.C. § 482 (2006)).

395. See Omnibus Budget Reconciliation Act of 1990, Pub. L. No. 101-508, § 11312, 104 Stat. 1388, 1388-454 to -455 (amending I.R.C. § 6662(e), (h)) (amending tax code to penalize misstatements, rather than just overstatements, and lowering threshold from 400% to 200% overvaluation).

396. For a discussion of the proposed and final regulations implementing I.R.C. § 482, see PricewaterhouseCoopers LLP, *International Transfer Pricing 2012*, at 792–95 (2012), available at http://download.pwc.com/ie/pubs/2012_international_transfer_pricing.pdf (on file with the *Columbia Law Review*). In 1993, the IRS issued temporary regulations under § 482 and proposed regulations under §6662(e) and (h), the penalty provisions. Temp. Treas. Reg. § 1.482 (1993); Prop. Treas. Reg. § 1.6662-5, 58 Fed. Reg. 5304, 5306-10 (Jan. 21, 1993). In 1994, the IRS issued temporary and proposed regulations under § 6662(e) and (h) and final regulations under § 482. Temp. Treas. Reg. §§ 1.6662-5T to 1.6662-6T (1994); Treas. Reg. § 1.482 (1994). In 1995, the IRS issued final regulations on cost sharing. Treas. Reg. § 1.482-7 (1995). In 1996, the IRS issued final transfer pricing penalty regulations under Treas. Reg. § 1.6662-6 (1996). In 2003, the IRS issued final regulations on costs associated with stock options involved in cost-sharing arrangements. Treas. Reg. § 1.482 (2003). Also in 2003, the IRS issued proposed regulations on intragroup services. Prop. Treas. Reg. § 1.482, 68 Fed. Reg. 53448, 53448–82 (Sept. 10, 2003). Temporary and proposed regulations were issued in 2006 and finalized in 2009. Temp. Treas. Reg. § 1.482 (2006); Treas. Reg. § 1.482 (2009).

397. For information on the OECD's efforts, see *Transfer Pricing*, OECD, <http://www.oecd.org/ctp/transferpricing> (on file with the *Columbia Law Review*) (last visited Jan. 25, 2012). The OECD first issued guidelines in 1979. It issued the first draft of the current guidelines in 1995. OECD, *Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations* (1995). Those guidelines were expanded between 1996 and 1999. In 2010, the OECD issued a substantially revised version of the guidelines. OECD, *Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations* (2010), available at <http://codfiscal.realitatea.net/act-pdf/OECD-transfer-pricing-guidelines.pdf> (on file with the *Columbia Law Review*). Those guidelines provide additional guidance on selecting the appropriate transfer pricing method, applying transactional

reason, of course, is that these rules continue to apply an “arms-length” pricing standard when, as has been described, MNEs shift the ownership and management of their IP—along with associated economic risks and rewards—among related companies to an extent and in a manner that they would never do with unrelated parties. This makes any search for a “comparable uncontrolled price” quixotic. The response has been increased efforts to produce rules that will provide an equitable and appropriate split of profits among related companies and of tax revenues among relevant nations. While these efforts, to be sure, are an improvement, multilateral agreement on how to determine the location or source of such profits—how to split profit—has proved controversial. As David Bradford and Hugh Ault pointed out long ago, international income has no particular source, even in principle:

The idea that income has a locatable source seems to be taken for granted, but the source of income is not a well-defined economic idea. The [Schanz-Haig-Simons (SHS)] definition describes a quantity that is, in principle, measurable, whatever the practical problems may be (and they are substantial). The emphasis placed by tax reform advocates on the objective of taxing income “from whatever source” has obscured the fact that the SHS concept is not susceptible to characterization as to source at all. Income in this definition attaches to someone or something that consumes and that owns assets. Income does not come from some place, even though we may construct accounts to approximate it by keeping track of payments that have identifiable and perhaps locatable sources and destinations.³⁹⁸

Nevertheless, profit-split methods continue to evolve and offer some promise for ongoing improvement.³⁹⁹

profit methods, and performing a comparability analysis. *Id.* at 22. In 2010, the OECD began a project on the transfer pricing treatment of intangibles. OECD, Discussion Draft: Revision of the Special Considerations for Intangibles in Chapter VI of the OECD Transfer Pricing Guidelines and Related Provisions 3 (2012), available at <http://www.oecd.org/ctp/transferpricing/50526258.pdf> (on file with the *Columbia Law Review*). After public consultations in the interim, the OECD released a discussion draft on the transfer pricing aspects of intangibles on June 6, 2012. *Id.* The discussion draft proposes revisions to the Transfer Pricing Guidelines, but the OECD indicates that it does not reflect a consensus. *Id.* It requested comments on the discussion draft by September 2012. *Id.*

398. Hugh J. Ault & David F. Bradford, Taxing International Income: An Analysis of the U.S. System and Its Economic Premises, *in* *Taxation in the Global Economy* 11, 30–31 (Assaf Razin & Joel Slemrod eds., 1990), available at <http://www.nber.org/chapters/c7203.pdf> (on file with the *Columbia Law Review*). Mitchell Kane has recently offered a contrary view, but, even so, offers relatively little guidance on how to source IP income. Mitchell A. Kane, Reflections on Some Small, Medium, and Large Design Issues with Income Source Rules in International Taxation 1–4 (2012) (unpublished manuscript) (on file with the *Columbia Law Review*) (arguing that there is “some core way in which source of income is coherent as a geographic concept”).

399. See Hugh J. Ault, Recent Developments in the OECD Work on Transfer Pricing: Increasing Sophistication and Increasing Simplification 1–2, 10–11 (2012)

As illustrated in Part IV, MNEs have been quite successful at exploiting gaps and differences among nations in their transfer pricing rules. The effort to find appropriate intercompany prices for IP or for assets embodying substantial proprietary IP has largely devolved into a contest among companies and governments over both the total level of taxes to be imposed and how those taxes will be divided among nations. No doubt gaps in our current transfer pricing rules might usefully be filled, and profit-split methods could be tightened and more widely applied.⁴⁰⁰ However, given the failures of two decades of efforts, it is difficult to be optimistic that looking solely to improved transfer pricing rules as a solution to IP income-shifting will prove successful.

Concerned about the limitations of using transfer pricing restrictions to halt IP income-shifting, quite a few analysts have urged that nations should instead allocate MNE income according to a formula based on some combination of sales, payroll, and property, as is now done in U.S. states.⁴⁰¹ The European Commission has proposed a version of such formulary apportionment for dividing revenues among European nations in connection with its proposed Common Consolidated Corporate Tax Base.⁴⁰² There are both conceptual and practical disadvantages to such proposals, however.⁴⁰³ The economist James Hines

(unpublished manuscript) (on file with the *Columbia Law Review*) (describing OECD's increasing use of and perceived benefits of profit split methods).

400. For example, in its 2010 Transfer Pricing Guidelines, the OECD revised its 1995 Guidelines to provide new guidance on selecting the most appropriate transfer pricing method and applying the profit-split method. See OECD Approves the 2010 Transfer Pricing Guidelines, OECD (July 22, 2010), <http://www.oecd.org/ctp/taxtreaties/oecdapprovesthe2010transferpricingguidelines.htm> (on file with the *Columbia Law Review*) (announcing approval of 2010 version of Transfer Pricing Guidelines and outlining changes); see also Ilan Benshalom, Taxing the Financial Income of Multinational Enterprises by Employing a Hybrid Formulary and Arm's Length Allocation Method, 28 Va. Tax Rev. 619, 623 (2009) (suggesting application of formulary apportionment to financial transactions); Michael C. Durst & Robert E. Culbertson, Clearing Away the Sand: Retrospective Methods and Prospective Documentation in Transfer Pricing Today, 57 Tax L. Rev. 37, 127–34 (2003) (suggesting various improvements to transfer pricing rules).

401. See Jerome R. Hellerstein & Walter Hellerstein, State Taxation 8-346–8-365 (3d ed. 2003) (describing state apportionment rules in detail).

402. The proposed Common Consolidated Corporate Tax Base (“CCCTB”) provides a single set of rules that could be used by companies operating in the European Union to calculate taxable profits. Under the CCCTB, companies would only have to comply with one set of rules instead of having to comply with the different rules of every country in which they operate. Common Tax Base, Taxation and Customs Union, European Comm'n, http://ec.europa.eu/taxation_customs/taxation/company_tax/common_tax_base/index_en.htm (on file with the *Columbia Law Review*) (last updated Dec. 6, 2012) (outlining CCCTB proposal and its background).

403. See Rosanne Altshuler & Harry Grubert, Formula Apportionment: Is It Better than the Current System and Are There Better Alternatives?, 63 Nat'l Tax J. 1145, 1182 (2010) (finding formulary apportionment offers no clear advantage over current system and noting firms' incentive under formulary apportionment to shift capital and routine activities abroad).

has found that such formulas do not serve well to measure the profits earned in a jurisdiction,⁴⁰⁴ and Walter Hellerstein, the nation's leading legal expert on U.S. state income taxation, has pointed out many practical difficulties both in existing state law and in the European Commission's proposals.⁴⁰⁵

Importantly, including wages and physical capital in the formula creates incentives for shifting labor and capital to low-tax jurisdictions, directly contravening the goals of nations attempting to attract rather than repel jobs and physical capital.⁴⁰⁶ This is why some proponents of formulary apportionment have urged that the formula apply based only on the amount of sales within the jurisdiction,⁴⁰⁷ an option that has proven attractive to some U.S. states.⁴⁰⁸ This single-sales-factor approach avoids an incentive for shifting jobs and capital abroad, and, while no panacea, it might prove appealing to countries with large markets, such as the United States, and perhaps also China, India, Russia, and Brazil. A sales-based formula also seems better targeted to address the specific concerns with IP-shifting than a formula that also includes property and payroll. Recall that for its study of IP income-shifting techniques, the JCT selected companies that had a much higher ratio of U.S. sales to worldwide sales than of U.S. income to worldwide income.⁴⁰⁹ Even with a formula or other income-shifting limitation based on domestic sales, some IP income-shifting techniques, such as shifting the location of wholesale

404. See Hines, *Income Misattribution*, *supra* note 336, at 109 (“[T]he formulas do not apportion income accurately among the jurisdictions in which it is earned.”).

405. See Walter Hellerstein, *Tax Planning Under the CCCTB's Formulary Apportionment Provisions: The Good, the Bad and the Ugly*, in *CCCTB: Selected Issues* 221, 233–52 (Dennis Weber ed., 2012) (presenting critical analysis of CCCTB proposals); Walter Hellerstein & Charles E. McLure, Jr., *The European Commission's Report on Company Income Taxation: What the EU Can Learn from the Experience of the U.S. States*, 11 *Int'l Tax & Pub. Fin.* 199, 211–217 (2004) (discussing various difficulties with U.S. states' approaches and suggesting how European Union might learn from them); see also Roin, *supra* note 332, at 199–215 (describing and criticizing formulary apportionment).

406. Avi-Yonah & Clausing, *supra* note 302, at 12 (noting that using a formula based on property, payroll, and sales “creates an implicit tax on the factors used in the formula, thus discouraging assets and employment in high-tax locations”).

407. See, e.g., *id.* at 11 (“[W]e propose a far simpler formula, which would only consider the fraction of sales in each location.”).

408. See Kirk J. Stark, *The Quiet Revolution in U.S. Subnational Corporate Income Taxation*, 55 *Bull. for Int'l Fiscal Documentation* 523, 528–29 (2001) (describing how states have moved toward sales-based formulas). The Supreme Court upheld the constitutionality of the single-factor sales-based formula in *Moorman Manufacturing Co. v. Blair*, 437 U.S. 267 (1978).

409. See *supra* notes 319–323 and accompanying text (describing JCT study); see also Harry Grubert, *Foreign Taxes and the Growing Share of U.S. Multinational Company Income Abroad: Profits, Not Sales, Are Being Globalized*, 65 *Nat'l Tax J.* 247, 263 (2012) (“[O]pportunities for tax-induced income-shifting are strongly influenced by the presence of intangible assets.”).

versus retail sales, would remain.⁴¹⁰ However, these gambits would be easier to police and substantially less harmful economically than the techniques now being used or that might occur under a formula that includes payroll and property.

However, if the United States—or any other large country, for that matter—were to move unilaterally to a sales-only formula to apportion income, absent any international consensus ratifying such a move, current bilateral and multilateral arrangements might come unglued. The OECD has remained firm in its commitment to separate entity accounting, coupled with enhanced rules for and greater policing of transfer pricing, so the disruptions in the current international order that might be caused by a move to sales-only formulary apportionment might stimulate retaliatory actions by other nations. In addition, double taxation could also result from countries using different methods to allocate income. The numerous U.S. bilateral income tax treaties rely on intercompany pricing procedures and on bilateral agreements to reduce the potential for double taxation. The potential consequences—especially the increased potential for taxation of the same income by more than one country—would almost certainly produce resistance among U.S. MNEs to such a unilateral move by the United States.

A third alternative is to revise the rules that currently determine the “source” of income from IP. Put most simply, the source rules are used to fix the geographic location of income. It is frequently said that the country to which income is sourced has the first claim to tax business income, but if payments are deductible in computing net income of the source jurisdiction, as royalties are, taxation is shifted to the country where the royalties are received.⁴¹¹ For the purposes of this Article, it is sufficient to note that services are sourced to the country where they are performed, so contract R&D will generally be deductible to the payor and includible

410. See, e.g., Grubert & Altshuler, Fixing the System, *supra* note 370, at 35 (describing scheme of using retail and wholesale methods to reduce tax expenditures). Julie Roin details another practical issue with a sales-only formula. Roin, *supra* note 332, at 230–32. Looking to sales in the United States would not capture situations where a U.S. producer sells to a foreign manufacturer who embeds the U.S. product in another commodity that is subsequently sold into the United States. An example is Corning’s sale of LCD glass substrates to manufacturers of LCD panels, which are manufactured in Taiwan, Korea, Japan, and China, but not in the United States. The LCD panels, however, may end up in products that are sold in the United States. Tax Reform: Hearing Before the H. Comm. on Ways and Means, 112th Cong. 2 (2012) (testimony of Susan Ford, Vice President of Corning, Inc.) (on file with the *Columbia Law Review*) (describing Corning LCD panel sales).

411. Some countries impose a flat-rate source-based tax (known as a withholding tax) on such royalties, but bilateral tax treaties tend to reduce such taxes to zero or a very low rate. See, e.g., Convention for the Avoidance of Double Taxation and the Prevention of Fiscal Evasion with Respect to Taxes on Income and Capital and to Certain Other Taxes, U.S.-Ger., art. 12, Aug. 29, 1989, 1708 U.N.T.S. 3.

in the income of the provider of the R&D services.⁴¹² Royalties from the license of intangible property, such as patents, copyrights, or other IP, are sourced to the country where the IP is used.⁴¹³ If the IP is sold, rather than licensed, gains from the sale are sourced in one of two ways. If the sales proceeds are not contingent on the use of the IP, any gain in the sale is sourced based on the residence of the seller.⁴¹⁴ However, if the sales proceeds are contingent on the productivity, use, or disposition of the IP by the purchaser (for example, when the purchase price equals a specified percentage of gross profits), the source of the sales proceeds is the same as if the payments were royalties.⁴¹⁵ When transactions among related entities are involved, the differing source rules give taxpayers considerable flexibility about where income will be sourced, depending on how they structure their transactions.⁴¹⁶

Although none of the current congressional proposals take this approach, the source rules might be revised to eliminate some of the current flexibility and to curtail opportunities for shifting IP income to low- or zero-tax countries. The question such proposals raise is whether IP income should be sourced to (1) the country where the R&D activities take place, (2) the country where the IP is exploited, (3) the country that grants legal protection to the IP, or (4) the country where ultimate consumption of the product created with the IP occurs. Choosing among these alternatives would surely be controversial, and achieving multilateral consensus would no doubt be difficult.

The disadvantages of three-factor formulary apportionment, plus the potential disruptions of unilaterally adopting a sales-only income apportionment formula or new source rules, along with the limited prospects of successfully addressing IP income-shifting through transfer pricing revisions, have led Chairman Camp and President Obama to propose addressing IP income-shifting by tightening U.S. CFC rules and imposing a U.S. minimum tax on foreign-source income, respectively.

Currently, CFC rules require that specified categories of income earned by foreign subsidiaries are taxed when earned to the domestic parent at the home country tax rate. The classic example is mobile passive income, such as interest or dividends.⁴¹⁷ Chairman Camp has proposed three options for tightening U.S. CFC rules to limit IP income-

412. See 26 C.F.R. § 1.861-4(b) (2012) (governing rule for services performed partially inside and partially outside United States).

413. I.R.C. §§ 861(a)(4), 862(a)(4) (2006).

414. *Id.* § 865(a), (d), (g). There is a special rule for goodwill: Noncontingent payments for goodwill are sourced in the country where the goodwill was generated. *Id.* § 865(d)(3).

415. *Id.* § 865(d)(1)(B).

416. See *supra* Part IV (discussing impact of various transaction structures on taxation).

417. In the United States, CFC rules are contained in subpart F of the Internal Revenue Code. I.R.C. §§ 961–964.

shifting. His first option (“option A”) would add to the category of CFC income “excess returns” associated with IP transfers from the United States to a low-taxed foreign related entity.⁴¹⁸ The inclusion in U.S. income would apply only if the excess returns were not taxed abroad at an effective tax rate greater than 15%.⁴¹⁹ Excess returns are defined as the excess of gross income over 150% of the costs attributable to such income.⁴²⁰ This option replicates a proposal advanced by President Obama in each of his annual budget proposals.⁴²¹

Chairman Camp’s second option (“option B”) is modeled somewhat on a Japanese provision. It would tax at the U.S. rate income earned by a CFC that is not subject to a foreign tax rate of at least 10% and also is not derived from the CFC’s conduct of an active business serving the market in the country where the CFC is organized.⁴²²

The third alternative offered by Chairman Camp (“option C”) would combine current U.S. taxation of any CFC’s foreign IP income taxed at a foreign effective tax rate less than 13.5% with a patent box at a 15% rate for all foreign intangible income of a domestic corporation (including royalties).⁴²³ Under this option, IP income would be determined by applying the transfer pricing rules. Chairman Camp describes this alternative as combining “the carrot of an ‘innovation box’ and royalty relief with the ‘stick’ of a current . . . inclusion for intangibles-related income of CFCs in low-tax jurisdictions.”⁴²⁴

Finally, President Obama’s *Framework for Business Tax Reform* proposes that all income earned by subsidiaries of U.S. corporations operat-

418. See Technical Explanation, *supra* note 13, at 32–33 (discussing differences between option A and current taxation system); see also *supra* note 151 (describing current state of taxation of foreign income for U.S. citizens and residents).

419. One hundred percent of excess returns would be included if the foreign effective rate were below 10%, and a sliding scale would apply to include a portion of the income if the foreign effective rate were between 10% and 15%. Technical Explanation, *supra* note 13, at 33.

420. *Id.* Costs for this purpose would not include interest or taxes. *Id.*

421. See Dep’t of the Treasury, General Explanations 2013, *supra* note 201, at 88–89; Dep’t of the Treasury, General Explanations of the Administration’s Fiscal Year 2012 Revenue Proposals 44 (2011), available at <http://www.treasury.gov/resource-center/tax-policy/Documents/General-Explanations-FY2012.pdf> (on file with the *Columbia Law Review*); Dep’t of the Treasury, General Explanations of the Administration’s Fiscal Year 2011 Revenue Proposals 43 (2010), available at <http://www.treasury.gov/resource-center/tax-policy/documents/general-explanations-fy2011.pdf> (on file with the *Columbia Law Review*).

422. See Technical Explanation, *supra* note 13, at 33–34 (detailing option B).

423. See *id.* at 34–35 (detailing option C).

424. H. Comm. on Ways & Means, 111th Cong., Summary of Ways and Means Discussion Draft: Participation Exemption (Territorial) System 2 (2011), available at http://waysandmeans.house.gov/uploadedfiles/summary_of_ways_and_means_draft_option.pdf (on file with the *Columbia Law Review*). The 15% U.S. patent box rate would be accomplished through a deduction of 40% of the income, which otherwise would be subject to a normal U.S. corporate tax rate of 25%. Technical Explanation, *supra* note 13, at 1, 34.

ing abroad be subject to a minimum rate of tax.⁴²⁵ In effect, the proposal would impose some minimum tax rate on all low-taxed CFC income. Although it is clear that this minimum tax would not be limited to IP income or to “excess returns,” the *Framework* neither specifies the U.S. minimum tax rate, nor what would be considered a “low-tax” foreign jurisdiction. Instead, the *Framework* states only that the minimum tax “would be designed to balance the need to stop rewarding tax havens and to prevent a race to the bottom with the goal of keeping U.S. companies on a level playing field with competitors when engaged in activities which, by necessity, must occur in a foreign country.”⁴²⁶

Even this brief description of these CFC and minimum tax proposals reveals their complexity and crucial variations in their potential coverage and impact. The proposals differ in the nature and scope of foreign-source income to be taxed currently by the United States and also diverge in the rates of U.S. income tax they would impose and the scope of entities whose income would be covered.

The most fundamental issue is determining what income will be covered. There are three dimensions on which the proposals vary: first, whether the income to be covered is linked to IP and, if so, how that link is defined; second, whether there is a different rule for sales or active business income earned abroad; and third, whether the U.S. tax turns on the rate of foreign tax and, if so, how.

As this Article has argued, determining how much income from the sales of a product is appropriately attributed to IP is hardly straightforward. The proposals that are limited to IP income (Camp’s options A and C) differ in how that income will be defined. Like the new U.K. patent box described earlier,⁴²⁷ Camp’s option A (and President Obama’s earlier budget proposals on which it is based) would, in effect, treat as IP income any income that reflects an “excess return.”⁴²⁸ The apparent assumption is that only “normal” returns result from manufacturing, distribution, advertising, and other sales activities. So, when greater returns occur, they are assumed to be due to IP, including not only patents but also other IP, such as trade secrets, know-how, trademarks, etc. Normal returns are defined by reference to a specified markup on costs. The size of the markup matters greatly. The Camp proposal, for example, exempts profits up to 50% of costs; the U.K. proposal, in contrast, treats profits in excess of 10% of costs as attributable to IP.⁴²⁹ Thus, the former kicks in when profits are 150% of costs, the latter when they reach 110%.

425. President’s Framework, *supra* note 18, at 14.

426. *Id.*

427. See *supra* notes 134–150 and accompanying text.

428. Technical Explanation, *supra* note 13, at 32.

429. See HM Revenue & Customs, Technical Note, *supra* note 135, at 11 (describing “routine return” of 10%, which is subtracted from qualifying income).

This, of course, is a large difference that greatly affects the scope and bite of the proposals.

Chairman Camp's option C would rely on transfer pricing rules to distinguish IP income attributable to foreign versus U.S. sales. His option B makes no attempt to separate IP income from other income. Both Camp's option B and President Obama's minimum tax focus on low-taxed foreign income. Whenever foreign source CFC income is taxed below a specified threshold—generally in the 10% to 15% range—either the CFC rules (Camp) or the minimum tax (Obama) would apply. Chairman Camp's option C, on the other hand, would require the existence of both IP income (measured by excess returns) and a low effective foreign tax rate, which Camp defines as a rate below 15%.

Each of these options is designed to provide an exception from U.S. tax for income that is appropriately earned abroad. But the range of these exceptions varies significantly. Chairman Camp's options turn on the existence of either sales to foreigners or active business activities within the foreign jurisdiction. President Obama's *Framework* says it will exempt from the minimum tax "activities which, by necessity, must occur in a foreign country."⁴³⁰ Hotel activities are the only example that spokesmen for the White House have offered since the *Framework* was released, but others no doubt would exist.

Proposals to expand coverage of the CFC rules would apply only to the income of foreign subsidiaries of U.S. MNEs. President Obama's *Framework* indicates that his minimum tax proposal is intended to have similar scope, but there is no reason in principle for a minimum tax to be so limited if it is intended to apply to any income characterized as having a U.S. source. Foreign MNEs may be just as adept as U.S. MNEs at shifting income to low- or zero-tax countries that otherwise would be taxed by the United States.⁴³¹ Tightening transfer pricing rules or formulary apportionment would apply to foreign MNEs as well as U.S. MNEs and to noncorporate businesses, such as partnerships. So might a minimum tax.

IP income-shifting that erodes the domestic tax base is especially detrimental to the national interest and should be a priority for redress by tightening anti-abuse rules. If one accepts the proposition that the fundamental goal of a nation's international tax policy is to advance its national interests principally by improving the standards of living of its citizens and residents,⁴³² the following observations should help in choosing among the alternatives:

430. President's Framework, *supra* note 18, at 14.

431. For example, a U.S. automobile subsidiary of a foreign manufacturer, such as BMW, might pay large royalties to its parent.

432. See Graetz, *Inadequate Principles*, *supra* note 339, at 282 (discussing this proposition).

(1) From the U.S. point of view, the greatest concern is shifting income out of the United States—so-called base erosion—not shifting income that would be taxed in a foreign country to a zero-tax jurisdiction. Shifting income from the United States to a tax haven costs the United States tax revenue, which presumably would otherwise benefit U.S. citizens and residents.⁴³³ When a U.S. MNE shifts income from a foreign country to a haven, it is the foreign treasury that loses the revenue, and the tax savings may, in substantial part, accrue to the benefit of U.S. shareholders, who typically constitute the largest group of owners of a U.S. MNE. So foreign-to-foreign income-shifting should principally be the concern of the foreign government from which the income is being shifted. The recent attention to this phenomenon in Europe suggests that foreign governments have become aware of the problem.⁴³⁴ If, however, the ability to achieve very low effective tax rates on foreign income causes MNEs to locate real assets, such as plants and equipment, and jobs abroad rather than in the United States, then foreign-to-foreign shifting should concern the United States. Also, if other countries permit foreign-to-foreign income-shifting and the United States does not, U.S. MNEs may suffer a competitive disadvantage versus foreign MNEs, and this might stimulate inversions by U.S. MNEs or acquisitions of U.S. MNEs by foreign MNEs. In any event, the greatest abuses occur when IP is developed in the United States from R&D subsidized by the U.S. Government and utilized in products that are sold and consumed in the United States. While this most often occurs with U.S. MNEs, such as high-tech and pharmaceutical companies, it may also occur with foreign MNEs.

(2) If the United States were to enact a minimum tax, formulary apportionment, or a transfer pricing change limited to U.S. MNEs that is substantially different from and more inclusive than those typical in other countries, this will introduce new incentives for inversions by U.S. MNEs.⁴³⁵ It may also advantage foreign MNEs over U.S. MNEs in acquisi-

433. See *supra* notes 326–327, 333 and accompanying text (discussing loss of revenue to United States resulting from income-shifting techniques).

434. See, e.g., Vina, *supra* note 328 (describing tax avoidance allegations from U.K. lawmakers against Starbucks, Amazon, and Google).

435. An inversion is a rearrangement of an MNE's corporate structure to replace the U.S. parent company with a foreign parent for the corporate group in order to take advantage of more favorable resident-based income tax rules in the jurisdiction of the new foreign parent. In 2004, Congress enacted Code § 7874 to limit such inversions, but these rules have gaps, as the 2012 inversions of Eaton Corporation, ADN Corporation, and Rowan Industries and the 2009 inversion of ENSCO International Inc. demonstrate. I.R.C. § 7874 (2006); Martin A. Sullivan, *Eaton Migrates to Ireland: Will the U.S. Now Go Territorial?*, 135 *Tax Notes* 1302, 1302 (2012) (discussing how exception to § 7874 may allow Eaton to reincorporate in Ireland to escape U.S. international tax rules if they have "substantial business activities" there); Stuart Webber, *Escaping the U.S. Tax System: From Corporate Inversions to Re-Domiciling*, 63 *Tax Notes Int'l* 273, 274 (2011) (noting § 7874 did not eliminate specter of corporate inversions); see also Solomon, *supra* note 351, at 1203 (describing proliferation of corporate inversions, which rearrange corporate struc-

tions of U.S. businesses. This prospect seems to weigh in favor of a minimum tax, formulary apportionment, or a transfer pricing change rather than a tightening of CFC rules, which would apply only to U.S. MNEs.

(3) Using a low foreign income tax rate as the sole criterion for applying U.S. CFC or minimum tax rules may induce other countries to raise their income taxes to the threshold level or encourage U.S. MNEs to incur higher foreign effective income tax rates to meet the tax-rate threshold whenever the applicable U.S. tax rate is greater than the threshold rate, perhaps finding other benefits to offset the increased taxes. These kinds of responses might provide little benefit to the United States. While such an approach might be effective, for example, in removing incentives for U.S. MNEs to strip income from Ireland (with its 12.5% rate) to Bermuda or the Cayman Islands (with their zero rates), it would fail to address concerns with stripping income from the United States.

(4) Because of the difficulties of identifying income attributable to IP, any effort to calculate and apply a special regime only to IP income creates measurement and definitional difficulties that are fraught with both policy risks and opportunities for political mischief.

On balance, then, it seems worthwhile to begin by endeavoring to limit income-shifting in those circumstances where the staff of the JCT focused its transfer pricing efforts—instances where the U.S. share of a company's sales is a multiple of the U.S. share of its profits.⁴³⁶ Treasury economist Harry Grubert, in an analysis of 1996–2004 tax returns of 754 large, nonfinancial, U.S.-based MNEs, also found that the existence of low foreign income tax rates, along with lawful opportunities to shift income to low-tax jurisdictions, has led to a substantial increase in the foreign share of income of these U.S. MNEs but has had no significant impact on the foreign share of their sales.⁴³⁷

In the first instance, this raises the question whether to revise the way we measure income from U.S. sales of goods and services. As described earlier, gain from the sale of personal property is sourced to the residence of the seller,⁴³⁸ royalties are sourced to the country where the IP is used,⁴³⁹ and services are sourced to the country where the services are performed.⁴⁴⁰ This means that royalties paid by a company in the United States to a foreign entity for the rights to manufacture abroad

tures to locate parent corporation in lower-tax jurisdiction, and noting that lowering U.S. tax rate seems necessary to curtail problem).

436. See *supra* notes 319–323 and accompanying text (discussing how MNEs in JCT study used complex tax planning structures to avoid paying higher U.S. taxes on IP income despite significant proportion of R&D occurring in United States).

437. Grubert, *supra* note 409, at 41.

438. I.R.C. § 865(a).

439. *Id.* § 861(a)(4).

440. *Id.* § 861(a)(3).

and then sell products in the United States are treated as foreign, not U.S., source income, even if the IP was produced in the United States. Aligning the source of income more closely with the location of sales suggests that income from royalties, sales of personal property, and services might more consistently be sourced to the country where the product is sold and where services are delivered.⁴⁴¹ Consideration should also be given to sourcing royalties based on where the IP is produced to better align the location of R&D activities with the taxation of the income they yield.

If looking more closely at U.S. sales as a basis for determining income subject to U.S. tax, rather than directly revising the source rules, were accepted, the United States might measure U.S. income by reference to U.S. sales. In effect, the United States would be dividing a MNE's sales revenue between the U.S. domestic market and foreign markets. Expenses, in turn, might be attributed—with the exception of the costs of domestic R&D—to foreign and domestic sales.⁴⁴² Worldwide R&D expenses (and royalties paid to unrelated third parties) could then be allocated based on the ratios of foreign and domestic sales to worldwide sales. Alternatively, if one wanted to provide a benefit for U.S. R&D, all U.S. R&D might be allowed to offset U.S. sales with only foreign R&D allocated between domestic and foreign sales. The effort here would be to match the costs attributable to U.S. sales with those sales. This calculation might be used either to determine a profit split for transfer pricing purposes or as the income base for a minimum tax. In the context of an expansion of CFC rules, as Congressman Camp has suggested, the above calculations would be required for each CFC, with the amount of net income attributed to the U.S. sales this way included in the CFC's income subject to current taxation.

The current source rules were developed long ago in a very different global economic environment, and they could undoubtedly benefit from updating. However, they are widely followed throughout the industrial world, and a unilateral U.S. modification may not be practical, although such a change might be acceptable if it were to occur in the context of a minimum tax with a relatively low corporate rate. Also, if such a change were to occur in the context of obtaining multilateral agreement on more flexible methods of splitting profits for transfer pricing, that change might more likely produce a multilateral consensus. Each of these offers the potential to ground transfer pricing, CFC inclusions, or a minimum tax on the MNE's U.S. sales.

441. These rules are currently used in determining the imposition of destination-based value-added taxes.

442. This could be a simple allocation based on the ratio of U.S. to worldwide sales, or one could refer to 26 C.F.R. § 1.861-8 (2012) for illustrations of how this might be done.

As stated earlier, weaknesses in the current rules have led a number of analysts to call for a sales-based formulary apportionment of income.⁴⁴³ Alternatively, transfer pricing rules might be modified to reallocate profits to the United States when the domestic share of an MNE's sales exceeds the domestic share of its profits. Likewise, a new CFC income inclusion or minimum tax could similarly be based on the domestic share of an MNE's sales. Unlike expansion of the CFC rules, both a transfer pricing and minimum tax approach could be applied to foreign-based MNEs as well as to U.S. MNEs.

The most straightforward way to accomplish this would be to require that the MNE's ratio of U.S. income to worldwide income must not be less than its ratio of U.S. sales to worldwide sales. This would require consistent ways of measuring income and locating the place of sales, which is, to be sure, easier said than done.⁴⁴⁴ One disadvantage of such an approach is that intermediate sales from businesses to businesses would be taxed, which produces some cascading of the tax. These kinds of calculations of U.S. income for CFC, transfer pricing (profit-splits), or minimum tax purposes are similar to sales-only formulas that some U.S. states apply to determine their share of multistate income. They raise the problems of multilateral coordination described above, but the potential dislocations from a unilateral U.S. action might be substantially lower in the context of a minimum tax imposed at a rate substantially lower than the U.S. corporate rate.

Basing the U.S. tax on the amount of U.S. sales of goods and services also resembles the destination-based allocation of revenues typical of consumption taxes, such as the value-added taxes ("VATs") used in all OECD countries except the United States, and around the world.⁴⁴⁵ Such consumption taxes are imposed in the country where consumption occurs, not where production takes place.

One of the authors has suggested elsewhere that the United States enact a VAT and use a portion of its revenues to lower the U.S. corporate

443. See *supra* notes 407–408 and accompanying text.

444. For a comprehensive analysis of the difficulties of allocating income based on sales, see Roin, *supra* note 332, at 207–09. Determining the location of services, for example, has been controversial under value-added taxes. For more discussion, see Hellerstein, *supra* note 405, at 229 ("Although the place where services are physically carried out may well reflect their destination, in many situations, particularly with respect to so-called 'intangible services,' this often will not be the case.").

445. A VAT is a form of consumption tax that taxes the value added to a product by each stage of manufacture or distribution. Under the "credit method," each seller in the chain charges the tax on the full price of goods or services it sells and remits the difference between that amount and the taxes it paid on its materials to the government. See, e.g., Itai Grinberg, *Where Credit Is Due: Advantages of the Credit-Invoice Method for a Partial Replacement VAT*, 63 *Tax L. Rev.* 309, 312–13 (2010) (providing VAT overview). A VAT is thus similar to a sales tax, but a VAT is partially collected at earlier stages of production, while a retail sales tax is collected in full from retailers.

income tax rate to 15%.⁴⁴⁶ This would have the salutary economic effect of shifting U.S. tax burdens from investment to consumption and from the location of production to where consumption occurs. The current U.S. corporate income tax rate of 35% is the highest in the OECD,⁴⁴⁷ and that does not serve the country well—the greater the difference between the U.S. and foreign corporate tax rates, the greater the incentives for shifting income abroad. Obviously, a U.S. corporate tax rate of 15% would dramatically reduce the incentives for shifting income away from the United States. It would also make the United States a more attractive location for investment. So, a significantly lower corporate tax rate should be an important goal for U.S. tax policy. Enacting a VAT, however, has so far proven politically difficult.⁴⁴⁸ This has resulted in calls for VAT variations that look more like the current income tax.⁴⁴⁹ These are typically based on business accounts, rather than directly on sales, and generally are variations on subtraction-method VATs.⁴⁵⁰

446. See Michael J. Graetz, 100 Million Unnecessary Returns: A Simple, Fair, and Competitive Tax Plan for the United States 108–09 (2008) [hereinafter Graetz, 100 Million Unnecessary Returns] (suggesting decrease in corporate income tax rate to 15% would “dramatically improve the competitive position of the American economy and reduce tax-sheltering behavior”); Michael J. Graetz, How to Shrink the IRS and Grow the Economy, *Am. Int.*, Nov.–Dec. 2011, at 57, 61–63 (proposing seven-step plan to lower corporate income tax rate by taxing consumption). Other revenues from the VAT would be used to eliminate more than 100 million families from the individual income tax base and to lower the rate to 25% or less above a new family allowance of \$100,000. All of this could be done on a revenue- and distributionally-neutral basis. See Eric Toder, Jim Nunns & Joseph Rosenberg, Urban-Brookings Tax Policy Ctr., Using a VAT to Reform the Income Tax 1–2 (2012) (suggesting VAT rate of 12.3%, corporate income tax rate of 10%, income tax rates of 16% on income between \$100,000 and \$200,000, and 25.5% on income above \$200,000 could be revenue- and distributionally-neutral with appropriate relief for low- and moderate-income taxpayers).

447. See Scott A. Hodge, *The Countdown is Over: We’re #1*, Tax Foundation (Apr. 1, 2012), <http://taxfoundation.org/article/countdown-over-were-1> (on file with the *Columbia Law Review*) (comparing U.S. tax rate to OECD averages).

448. The political difficulties of enacting a consumption tax in the United States are recounted in Graetz, 100 Million Unnecessary Returns, *supra* note 446, at 70–77.

449. See, e.g., Robert Carroll & Alan D. Viard, Progressive Consumption Taxation: The X Tax Revisited 20–39 (2012) (advocating X tax developed by David Bradford, a modified VAT applying graduated rates to wages and flat rate to business earnings); Robert E. Hall & Alvin Rabushka, *The Flat Tax* 56 (2d ed. 1995) (proposing flat tax of 19% on earnings above specified exemption); Paul D. Ryan, Comm. on Budget, *A Roadmap for America’s Future, Version 2.0: A Plan to Solve America’s Long-Term Economic and Fiscal Crisis* 59 (2010), available at http://roadmap.republicans.budget.house.gov/uploaded_files/roadmap2final2.pdf (proposing 8.5% business consumption tax on difference between purchases and sales).

450. Under a subtraction-method VAT, the tax base is calculated by subtracting purchases of goods and services from sales of goods and services. Under the credit method, an alternative for ensuring that the same income is not taxed twice, a company is given a credit against the tax on its sales for the tax paid on its purchases from other firms. See Robert Carroll & Alan D. Viard, *Value Added Tax: Basic Concepts and Unresolved Issues*, 126 *Tax Notes* 1117, 1118 (2010) (noting subtraction method has gained particular atten-

Some commentators have advanced minimum tax proposals for the United States that resemble such consumption taxes. Roseanne Altshuler and Harry Grubert, for example, have proposed a 15% minimum tax (determined country-by-country) on foreign income with a deduction for expensing of real investments abroad.⁴⁵¹ They indicate that this kind of minimum tax would put no U.S. tax burden on normal returns and advance this proposal as a way of taxing U.S. MNEs' excess returns abroad. Many economists regard the presence of excess returns in low-tax countries, which cannot be attributed to location-specific assets, such as natural resources, as evidence of IP income-shifting.⁴⁵² By exempting the "normal return" on investments abroad, this proposal resembles a consumption-type tax, but it is based on the MNE's residence rather than the destination of sales.⁴⁵³

In an even more dramatic shift toward consumption- and destination-based taxation, Alan Auerbach has proposed substituting what he calls a "Modern Corporate Tax"—in essence, a destination-based consumption tax with wages taxed only at the individual level—for the U.S. corporate income tax.⁴⁵⁴ Auerbach offers the following example of

tion in United States because it looks similar in form to current corporate income tax). Because it uses total sales and inputs, the subtraction method is considered "account-based," while the credit method is "transaction-based." Representative Ryan's proposal uses a subtraction method. Hall and Rabushka's flat tax and the X tax use a modified subtraction method. See Victoria P. Summers, *The Border Adjustability of Consumption Taxes, Existing and Proposed*, 12 *Tax Notes Int'l* 1793, 1798–99 (1996) (distinguishing Japanese tax strategy from invoice-based ones because "tax is credited against tax, rather than purchases subtracted from sales, and tax is calculated on the net amount [of total taxable sales]"). The form of VAT used in Japan bears certain similarities to the approach this Article suggests, as does the Grubert and Altshuler proposal that allows expensing of investments, as discussed in *Fixing the System*, supra note 370 and accompanying text.

451. See Grubert & Altshuler, *Fixing the System*, supra note 370, at 8.

452. See Joint Comm. Pamphlet, supra note 175, at 6 (noting as evidence of income-shifting that countries with low average tax rates tend to have income shares significantly larger than their shares of business measures that are relatively easier to value, like physical assets, compensation, and employment).

453. See Griffith, Hines & Sørensen, supra note 303, at 916 (discussing an "Allowance for Corporate Equity" system that would exempt normal returns to investment); Alvin C. Warren, Jr., *How Much Capital Income Taxed Under an Income Tax Is Exempt Under a Cash Flow Tax?*, 52 *Tax L. Rev.* 1, 4–6 (1997) (discussing exemption of normal rate of return as similar to cash flow (consumption) tax).

454. Alan J. Auerbach, *Ctr. for Am. Progress & The Hamilton Project, A Modern Corporate Tax* (2010), available at <http://www.americanprogress.org/wp-content/uploads/issues/2010/12/pdf/auerbachpaper.pdf> (on file with the *Columbia Law Review*). Because of the deduction for wages, this form of consumption tax might be considered a "direct" tax by the WTO, which might, in turn, raise the question of whether it can be imposed on a destination basis. See Michael Daly, *WTO Rules on Direct Taxation*, 29 *World Econ.* 527, 528 & nn.4–5 (2006) (noting WTO has increasingly focused on potential of direct taxes to impede cross-border flows, since direct taxes imposed on destination basis can mimic effect of tariffs); Michael J. Graetz, *International Aspects of Fundamental Tax Restructuring: Practice or Principle?*, 51 *U. Miami L. Rev.* 1093, 1097–98 (1997) (discussing consumption tax treatment under GATT).

how his tax base would be calculated and how it would differ from current law.⁴⁵⁵

[The following] lists an industrial company's annual revenues, expenses, and purchases from domestic operations (first column); its tax base under the current tax system (second column); and its tax base under the proposed system (third column).

Hypothetical Nonfinancial Company (figures in millions of dollars)

		Tax base under current system	Tax base under new system
Sales Revenues			
Domestic	1,500	1,500	1,500
Export	300	300	
Expenses			
Labor costs	750	(750)	(750)
Costs of goods sold			
Domestic	100	(100)	(100)
Imported	150	(150)	
Interest	250	(250)	(250)
Depreciation	250	(250)	
Capital purchases			
Domestic	150		(150)
Imported	150		
Inventory investment	50		(50)
Borrowing	200		200
Principal repayment	100		(100)
Tax base		300	300

This proposal provides different treatment based not only on the location of production but also on where borrowing occurs. Foreign borrowing and lending is omitted from the tax base, while domestic borrowing and lending is included. The potential for distortions based on the movement of financial flows complicates tax planning and may create opportunities for tax arbitrage.⁴⁵⁶

Two other related alternatives should be considered. One possibility is a destination-based, consumption-type minimum tax with a deduction for wages, which, unlike Auerbach's version, would omit financial flows from all calculations.⁴⁵⁷ The U.S. tax base for minimum tax purposes

455. Auerbach, *supra* note 454, at 19 tbl.A1.

456. *Id.*

457. Financial institutions would be exempt from the tax and would receive no refunds for their "losses" due to purchases in the United States under circumstances where their financial services income would not be included in the tax base. Taxing financial services has proved difficult under VATs, and omitting financial flows from the tax base

would then be calculated as follows. Export sales would be excluded from revenues, but imported inputs would not be deductible. Depreciation deductions would be eliminated, but deductions for new investment in fixed capital and inventories purchased from domestic vendors would be allowed.⁴⁵⁸

Sales		
Domestic	1,500	
Export	300	1,500
Expenses		
Labor costs	(750)	(750)
Costs of goods sold		
Domestic	100	(100)
Imported	150	
Interest (domestic)	250	
Depreciation	250	(250)
Capital purchases		
Domestic	150	(150)
Imported	150	
Inventory investment (domestic)	50	
Borrowing	200	
Principal repayment	100	
Tax base		200

A third alternative would be to treat purchases of goods and services on a destination basis, as above, but to include all financial flows on a cash-flow basis, without regard to whether they are domestic or foreign.⁴⁵⁹ Each of the three alternatives would tax sales in the United States,

should reduce tax planning that would occur under Auerbach's tax, which differs in its treatment of domestic and foreign financial flows. A tax such as this that omits financial flows is known as an "R-base" tax. One that includes financial flows is an "R&F-base" tax. See J.E. Meade, *Inst. for Fiscal Studies, The Structure and Reform of Direct Taxation* 230–31 (1978), available at <http://www.ifs.org.uk/docs/meade.pdf> (on file with the *Columbia Law Review*).

458. Because expensing is allowed for new domestic plants, equipment, and inventory, over time, as prior costs of goods sold and depreciation are deducted, this tax base would increase. This resembles the Meade Committee's R-base tax. *Id.*

459. See William B. Barker, *A Common Sense Corporate Tax: The Case for a Destination-Based, Cash Flow Tax on Corporations*, 61 *Cath. U. L. Rev.* 955, 978–87 (2012) (explaining how R&F-type tax takes into account all cash flows, and thereby removes tax arbitrage incentives). Professor Barker discusses the choice between an R and R&F tax base and is concerned especially with the distortions of the existing corporate tax on the choice of debt versus equity financing. *Id.* He does not discuss the implications of his proposal under the WTO.

whether made by a foreign or U.S. MNE, on a destination basis.⁴⁶⁰ They differ, however, in their treatment of lending and borrowing, with the first and third varying in their treatment of cross-border borrowing.⁴⁶¹ Assessing their advantages and disadvantages is beyond the scope of this Article. The important point here is that any of the three offers substantial advantages as a minimum tax backup to the current system and has considerable potential to redress the techniques for shifting IP income with that from the United States described in Part IV.

To be sure, imposing a U.S. minimum tax based on a destination-based subtraction-method VAT with a business deduction for the costs of labor would be a more radical departure from existing law than any of the other suggestions this Article has discussed.⁴⁶² Nevertheless—in the absence of a U.S. VAT—a minimum tax or a transfer pricing regime, based either on such an approach or on equalizing the ratio of U.S. income to worldwide income with that of U.S. sales to worldwide sales merits serious consideration, especially if the revenues produced were used to reduce the U.S. corporate tax rate.

The crucial point is that all of the alternatives this Article has suggested—revising transfer-pricing rules, adopting formulary apportionment, or enacting a destination-based minimum tax—concentrate on achieving greater alignment between U.S. sales and U.S. taxable income. This is the direction U.S. international tax policy should now take.

One additional point warrants discussion. Australia has surprisingly loose CFC rules and income-shifting limitations, even though it is a small, open economy with a 30% corporate tax rate (to be reduced to 29% in 2013) and a dividend exemption system for foreign-source business income. Australia's lack of concern with income-shifting may be due to its integrated system of corporate taxation.⁴⁶³ When a corporation pays dividends out of income that has been subject to Australian income tax, the shareholder receives a credit for the corporate tax paid. In essence, because these credits are refundable to Australian residents, this regime converts the Australian corporate tax into the equivalent of a withholding tax for dividends paid to individual shareholders resident in Australia

460. For an analysis of the advantages of taxing corporate income on a destination basis, see Alan J. Auerbach, Michael P. Devereaux & Helen Simpson, Taxing Corporate Income, in 1 *Mirrlees Review: Dimensions of Tax Design*, supra note 9, at 837, 882–88, available at <http://www.ifs.org.uk/mirrleesreview/dimensions/ch9.pdf> (on file with the *Columbia Law Review*).

461. A fourth alternative would be to treat cross-border financial flows among related parties differently than those between unrelated entities. A fifth would be to combine the second alternative above with a separate tax on financial activities or transactions. See generally Daniel Shaviro, The Financial Transactions Tax Versus (?) the Financial Activities Tax (N.Y. Univ. Law & Econ. Research Paper No. 12-04) (Mar. 1, 2012), <http://ssrn.com/abstract=1989163> (on file with the *Columbia Law Review*) (describing and evaluating variety of current proposals).

462. And it may provoke a challenge in the WTO.

463. The authors are grateful to Richard Vann for suggesting this to us.

(“franked dividends”).⁴⁶⁴ Because Australian companies want to pay tax-free or low-taxed dividends to their shareholders, they have much less incentive than U.S. companies to erode their domestic tax base.⁴⁶⁵ Doing so would reduce their ability to pay franked dividends to residents and may require additional withholding taxes when dividends are paid to foreign shareholders.⁴⁶⁶

When corporate integration—albeit through a dividend exemption, rather than an imputation credit system such as Australia’s—was proposed by the U.S. Treasury, the Treasury proposed that the exemption be limited to dividends paid out of profits that had been subject to U.S. corporate taxes.⁴⁶⁷ But, instead, Congress enacted a lower rate on dividends that applies without requiring that any income tax be paid at the corporate level.⁴⁶⁸

Imposing a requirement that the lower rate apply only if U.S. corporate taxes are paid might substantially relieve income-shifting incentives for U.S. MNEs. For example, if the corporate rate were 25%, as Congressman Camp has proposed, and the top individual rate were 39.6%, treating the corporate tax as a withholding tax would produce a top tax rate for individuals on dividends equal to 14.6%, which is very close to the 15% top rate of pre-2013 law. However, the scope of the tax relief for dividends would be narrowed to situations where the corporation actually pays the U.S. corporate tax, a much more focused benefit than under current law.

464. See generally Austl. Taxation Office, Imputation Reference Guide (2004), available at <http://www.ato.gov.au/content/downloads/n10832.pdf> (on file with the *Columbia Law Review*) (describing Australia’s dividend imputation system). No tax credit is available for gains on the sale of shares. Antiabuse rules limit Australian firms’ ability to stream franked dividends selectively to individuals who will receive tax credits. *Id.* at 32.

465. See Peter Birch Sørensen & Shane Matthew Johnson, Taxing Capital Income: Options for Reform in Australia, in *Melbourne Inst. of Applied Econ. and Soc. Research, Melbourne Institute—Australia’s Future Tax and Transfer Policy Conference: Proceedings of a Conference* 179, 185 (2010).

466. In Europe, such imputation systems were essentially eliminated because of decisions by the European Court of Justice. See generally Graetz & Warren, *supra* note 344, at 1578 (articulating ECJ’s “vision of a non-discriminatory system for taxing corporate income distributed as dividends within the European Union”); Michael J. Graetz & Alvin C. Warren, Jr., *Income Tax Discrimination: Still Stuck in the Labyrinth of Impossibility*, 121 *Yale L.J.* 1118, 1121 (2012) (same).

467. Dep’t of the Treasury, *Integration of the Individual and Corporate Tax Systems: Taxing Business Income Once* 16, 19 (1992), available at <http://www.treasury.gov/resource-center/tax-policy/Documents/integration.pdf> (on file with the *Columbia Law Review*).

468. I.R.C. § 1(h)(11) (2006) (applying 15% top rate to qualifying dividends). In 2013 the tax rate on dividends was increased to 20% under the fiscal cliff legislation known as the American Taxpayer Relief Act of 2012, Pub. L. No. 112-240, § 331, 126 Stat. 2313 (codified at I.R.C. § 168). Furthermore, section 1402 of the Health Care and Reconciliation Act of 2010 imposes an additional 3.8% tax on dividend income for individuals above a certain income threshold, effective 2013. Pub. L. No. 111-152, § 1402, 124 Stat. 1029. (codified as amended in scattered sections of 42 U.S.C.).

In the Australian context, Richard Vann has suggested that the country's integration system functions much like a minimum tax, limiting Australian MNEs' incentives and tendencies to engage in tax reduction efforts.⁴⁶⁹ This indirect approach to limiting IP income-shifting may well be worth considering.

In sum, efforts to date to limit MNEs' ability to shift IP income to low- or zero-tax jurisdictions have been unavailing. Offering incentives to develop valuable IP without endeavoring to tax the income it produces is a mistake. The United States is not a small country with the need to attract IP income; it is a large, innovative country with a large domestic market. As the alternative proposals of Congressman Camp and the minimum tax suggested by President Obama imply, fundamental change now seems essential. Unlike the proposals they have offered, however, this Article urges forging a much closer link between a company's level of U.S. sales and its minimum U.S. taxable income. Anything less seems unlikely to succeed.

CONCLUSION

This Article has described income tax rules and proposals providing incentives both here and abroad for R&D expenditures, innovation, and manufacturing. The proposals for a patent box incentive in the United States seem largely a response to the widespread adoption of such incentives in Europe. However, European member states are not an apt model for U.S. tax policy; they have been severely constrained by interpretations of the EU treaties. The United States does not face such constraints. So, if a patent box were adopted by the United States, it should apply only to IP that was created domestically. However, based on extensive examination of the economic evidence, this Article concludes that, at most, only R&D incentives are justified. An R&D incentive that is more cost-effective than current law is desirable. Broad incentives for manufacturing fail to pass muster as a means to stimulate R&D or create jobs. Given the great variations among industries, targeted incentives to industries where the prospects for gains are greatest would be more cost-effective, but they would exacerbate the risks of political misjudgments or favoritism. This Article has also described techniques that U.S. MNEs currently use to shift IP income to low- or zero-tax jurisdictions and summarized the current proposals for limiting such opportunities. In that connection, the Article offers new proposals for change that emphasize imposing U.S. tax based on U.S. sales. These kinds of proposals merit serious consideration when the U.S. Congress takes up business reform.

469. Richard J. Vann, Reflections on Business Profits and the Arm's-Length Principle, *in* *The Taxation of Business Profits Under Tax Treaties* 133, 157 & n.61 (B.J. Arnold, J. Sasseville & E.M. Zolt eds., 2003) (noting imputation systems that depend on domestic taxes constrain corporate tax planning).

SELECTED BIBLIOGRAPHY

- Aerts, Kris, Katholieke Universiteit Leuven, Who Writes the Pay Slip? Do R&D Subsidies Merely Increase Researcher Wages? (2008).
- Altshuler, Rosanne, & Harry Grubert, Formula Apportionment: Is It Better than the Current System and Are There Better Alternatives?, 63 Nat'l Tax J. 1145 (2010).
- Altshuler, Rosanne, & Harry Grubert, The Three Parties in the Race to the Bottom: Host Governments, Home Governments and Multinational Companies, 7 Fla. Tax Rev. 153 (2005).
- Alworth, Julian S., Commentary on International Capital Taxation, in 1 Inst. for Fiscal Studies, Mirrlees Review: Dimensions of Tax Design 997 (2010), available at <http://www.ifs.org.uk/mirrleesreview/dimensions/ch10.pdf>.
- Ambos, Björn, Foreign Direct Investment in Industrial Research and Development: A Study of German MNCs, 34 Res. Pol'y 395 (2005).
- Atkinson, Robert D., & Scott Andes, Info. Tech. & Innovation Found., Patent Boxes: Innovation in Tax Policy and Tax Policy for Innovation (2011), available at <http://www.itif.org/files/2011-patent-box-final.pdf>.
- Auerbach, Alan J., Ctr. for Am. Progress & The Hamilton Project, A Modern Corporate Tax (2010), available at <http://www.americanprogress.org/wp-content/uploads/issues/2010/12/pdf/auerbachpaper.pdf>.
- Ault, Hugh J., Recent Developments in the OECD Work on Transfer Pricing: Increasing Sophistication and Increasing Simplification (2012) (unpublished manuscript).
- Ault, Hugh J., & David F. Bradford, Taxing International Income: An Analysis of the U.S. System and Its Economic Promises, in *Taxation in the Global Economy* 11 (Assaf Razin & Joel Slemrod eds., 1990), available at <http://www.nber.org/chapters/c7203.pdf> (on file with the *Columbia Law Review*).
- Avi-Yonah, Reuven S., & Kimberly A. Clausing, Reforming Corporate Taxation in a Global Economy: A Proposal to Adopt Formulary Apportionment (Brookings Inst., Hamilton Project Discussion Paper No. 2007-08, 2007), available at http://www.brookings.edu/~media/research/files/papers/2007/6/corporatetaxes-clausing/200706clausing_aviyonah.

- Barker, William B., A Common Sense Corporate Tax: The Case for a Destination-Based, Cash Flow Tax on Corporations, 61 *Cath. U. L. Rev.* 955 (2012).
- Bartlett, Bruce, Does Manufacturing Deserve Special Tax Breaks?, 134 *Tax Notes* 1561 (2012).
- Benshalom, Ilan, Taxing the Financial Income of Multinational Enterprises by Employing a Hybrid Formulary and Arm's Length Allocation Method, 28 *Va. Tax Rev.* 619 (2009).
- Bloom, Nicholas, & Rachel Griffith, The Internationalisation of UK R&D, 22 *Fiscal Stud.* 337 (2001).
- Bloom, Nick, Rachel Griffith & John Van Reenen, Do R&D Tax Credits Work? Evidence from a Panel of Countries 1979–1997, 85 *J. Pub. Econ.* 1 (2000).
- Boak, Josh, White House's Manufacturing Math May Not Add Up, *Politico* (Feb. 14, 2012, 11:04 PM), <http://www.politico.com/news/stories/0212/72875.html>.
- Cantwell, John, & Ram Mudambi, The Location of MNE R&D Activity: The Role of Investment Incentives, 40 *Mgmt. Int'l Rev.* 127 (2000).
- Carlino, Gerald A., et al., The Agglomeration of R&D Labs (Research Dep't, Fed. Reserve Bank of Phila., Working Paper No. 11-42, 2011), available at http://www.seas.upenn.edu/~tesmith/R&D_Clustering_Paper.pdf.
- Carroll, Robert, & Alan D. Viard, Progressive Consumption Taxation: The X Tax Revisited (2012).
- Carroll, Robert, & Alan D. Viard, Value Added Tax: Basic Concepts and Unresolved Issues, 126 *Tax Notes* 1117 (2010).
- Chorvat, Elizabeth, Forcing Multinationals to Play Fair: Proposal for a Rigorous Transfer Pricing Theory, 54 *Ala. L. Rev.* 1251 (2003).
- Clausing, Kimberly A., The Revenue Effects of Multinational Firm Income Shifting, 130 *Tax Notes* 1580 (2011).
- Criscuolo, Chiara, The Effect of R&D Tax Incentives on Location of R&D Investment, *in* Expert Grp. on Impacts of R&D Tax Incentives, Design and Evaluation of Tax Incentives for Business Research and Development: Good Practice and Future Developments 32 (Nov. 15, 2009), available at http://ec.europa.eu/invest-in-research/pdf/download_en/tax_expert_group_final_report_2009.pdf.

- Darby III, Joseph B., & Kelsey Lemaster, Double Irish More Than Doubles the Tax Savings, *Prac. US/Int'l Tax Strategies*, May 15, 2007, at 2.
- Desai, Mihir A., C. Fritz Foley & James R. Hines, Jr., The Demand for Tax Haven Operation, 90 *J. Pub. Econ.* 513 (2006).
- Devereux, Michael P., & Rachel Griffith, Taxes and the Location of Production: Evidence from a Panel of US Multinationals, 68 *J. Pub. Econ.* 335 (1998).
- Devereux, Michael P., Ben Lockwood & Michela Redoano, Do Countries Compete Over Corporate Tax Rates?, 92 *J. Pub. Econ.* 1210 (2008).
- Dharmapala, Dhammika, & Nadine Riedel, Earnings Shocks and Tax-Motivated Income-Shifting: Evidence from European Multinationals, (Ill. Program in Law, Behavior & Soc. Sci., Working Paper No. LBSS11-09, 2012), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1629792.
- Durst, Michael C., & Robert E. Culbertson, Clearing Away the Sand: Retrospective Methods and Prospective Documentation in Transfer Pricing Today, 57 *Tax L. Rev.* 37 (2003).
- Ekholm, Karolina, & Katarina Hakkala, Location of R&D and High-Tech Production by Vertically Integrated Multinationals, 117 *Econ. J.* 518 (2007).
- Ellison, Glenn, & Edward L. Glaeser, Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach, 105 *J. Pub. Econ.* 889 (1997).
- Eynatten, Wim, European R&D and IP Tax Regimes: A Comparative Study, 36 *Intertax* 502 (2008).
- Eynatten, Wim, & Patrick Brauns, Benelux Tax Competition To Attract IP Income Is On Again, *Int'l Tax Rev.*, Mar. 2010, at 43.
- French, Kenneth R., & James M. Poterba, Investor Diversification and International Equity Markets, 81 *Am. Econ. Rev.* 222 (1991).
- Goolsbee, Austan, Does Government R&D Policy Mainly Benefit Scientists and Engineers?, 88 *Am. Econ. Rev.* 298 (1998).
- Graetz, Michael J., 100 Million Unnecessary Returns: A Simple, Fair, and Competitive Tax Plan for the United States (2008).

- Graetz, Michael J., The David R. Tillinghast Lecture: Taxing International Income: Inadequate Principles, Outdated Concepts, and Unsatisfactory Policies, 54 *Tax L. Rev.* 261 (2001).
- Graetz, Michael J., The End of Energy: The Unmaking of America's Environment, Security, and Independence (2011).
- Graetz, Michael J., How to Shrink the IRS and Grow the Economy, *Am. Int.*, Nov.–Dec. 2011, at 57.
- Graetz, Michael J., & Alvin C. Warren, Jr., Income Tax Discrimination: Still Stuck in the Labyrinth of Impossibility, 121 *Yale L.J.* 1118 (2012).
- Graetz, Michael J., & Alvin C. Warren, Jr., Income Tax Discrimination and the Political and Economic Integration of Europe, 115 *Yale L.J.* 1186 (2006).
- Gravelle, Jane G., Cong. Research Serv., R41743, International Corporate Tax Rate Comparisons and Policy Implications (2011).
- Greenstone, Michael, Richard Hornbeck & Enrico Moretti, Identifying Agglomeration Spillovers: Evidence from Winners and Losers of Large Plant Openings, 118 *J. Pol. Econ.* 536 (2010).
- Griffith, Rachel, & Helen Miller, Support for Research and Innovation, *in* The IFS Green Budget: February 2010, at 238, 240 (Robert Chote et al. eds., 2010), available at <http://www.ifs.org.uk/budgets/gb2010/gb2010.pdf>.
- Griffith, Rachel, James Hines & Peter Birch Sørensen, International Capital Taxation, *in* 1 *Mirrlees Review: Dimensions of Tax Design* 914 (2010), available at <http://www.ifs.org.uk/mirrleesreview/dimensions/ch10.pdf>.
- Griffith, Rachel, Helen Miller & Martin O'Connell, Corporate Taxes and the Location of Intellectual Property (Ctr. for Econ. Policy Research, Discussion Paper No. 8424, 2011), available at <http://www.cepr.org/pubs/dps/DP8424>.
- Griffith, Rachel, Stephen Redding & John Van Reenen, Measuring the Cost-Effectiveness of an R&D Tax Credit for the UK, 22 *Fiscal Stud.* 375 (2001).
- Grubert, Harry, Foreign Taxes and the Growing Share of U.S. Multinational Company Income Abroad: Profits, Not Sales, Are Being Globalized, 65 *Nat'l Tax J.* 247 (2012).

- Grubert, Harry, & Rosanne Altshuler, *Fixing the System: An Analysis of Alternative Proposals for the Reform of International Tax* (June 7, 2012) (unpublished manuscript), available at <http://www.sbs.ox.ac.uk/centres/tax/symposia/Documents/2012/Grubert%20Altshuler%20Fixing%20the%20System%20Oxford%20Version.pdf>.
- Grubert, Harry, & Joel Slemrod, *The Effect of Taxes on Investment and Income Shifting to Puerto Rico*, 80 *Rev. Econ. and Stat.* 365 (1998).
- Guenther, Gary, Cong. Research Serv., R42742, *Federal Tax Benefits for Manufacturing: Current Law, Legislative Proposals, and Issues for the 112th Congress* (2012), available at <http://www.fas.org/sgp/crs/misc/R42742.pdf>.
- Håkanson, Lars, & Robert Nobel, *Determinants of Foreign R&D in Swedish Multinationals*, 22 *Res. Pol'y* 397 (1993).
- Hall, Bronwyn H., *R&D Tax Policy During the 1980s: Success or Failure?*, in 7 *Tax Policy and the Economy* 1 (James Poterba ed., 1993).
- Hall, Bronwyn, & John Van Reenen, *How Effective Are Fiscal Incentives for R&D? A Review of the Evidence*, 29 *Res. Pol'y* 449 (2002).
- Hall, Robert E., & Alvin Rabushka, *The Flat Tax* (2d ed. 1995).
- Hellerstein, Jerome R., & Walter Hellerstein, *State Taxation* (3d. ed., 2003).
- Hellerstein, Walter, *Tax Planning Under the CCCTB's Formulary Apportionment Provisions: The Good, the Bad and the Ugly*, in *CCCTB: Selected Issues* (Dennis Weber ed., 2012).
- Hellerstein, Walter, & Charles E. McLure, Jr., *The European Commission's Report on Company Income Taxation: What the EU Can Learn from the Experience of the U.S. States*, 11 *Int'l Tax & Pub. Fin.* 199 (2004).
- Helper, Susan, Timothy Krueger & Howard Wial, *Why Does Manufacturing Matter? Which Manufacturing Matters?* (2012), available at http://www.brookings.edu/~media/research/files/papers/2012/2/22%20manufacturing%20helper%20krueger%20wial/0222_manufacturing_helper_krueger_wial.pdf.
- Hines Jr., James R., *Income Misattribution Under Formula Apportionment*, 54 *Eur. Econ. Rev.* 108 (2010).

- Hines, Jr., James R., Taxes, Technology Transfer, and the R&D Activities of Multinational Firms, *in* *The Effects of Taxation on Multinational Corporations* 225 (James R. Hines, Jr. et al. eds., 1995).
- Hines, Jr., James R., & Adam B. Jaffe, International Taxation and the Location of Inventive Activity, *in* *International Taxation and Multinational Activity* 201 (James R. Hines, Jr. ed., 2000).
- Jaffe, Adam, et al., Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations, 108 *Q. J. Econ.* 577 (1993).
- Jensen, J. Bradford, Op-Ed., Think Services, Not Manufacturing, *Wash. Post*, Feb. 24, 2012, at A15.
- Jensen, J. Bradford, & Lori G. Kletzer, Tradable Services: Understanding the Scope and Impact of Services Outsourcing (Inst. for Int'l Econ., Working Paper No. 05-9, 2005).
- Johnston, David Cay, Obama's Hamburger Problem, *Reuters* (Mar. 8, 2012), <http://blogs.reuters.com/david-cay-johnston/2012/03/08/obamas-hamburger-problem/>.
- Jones, Charles I., & John C. Williams, Measuring the Social Return to R&D, 113 *Q. J. Econ.* 1119 (1998).
- Kane, Mitchell A., Reflections on Some Small, Medium, and Large Design Issues with Income Source Rules in International Taxation (2012) (unpublished manuscript).
- Kenney, Martin, & Richard Florida, The Organization and Geography of Japanese R&D: Results from a Survey of Japanese Electronics and Biotechnology Firms, 23 *Res. Pol'y* 305 (1994).
- Ketokivi, Mikko, & Jyrki Ali-Yrkkö, Determinants of Manufacturing-R&D Co-Location (Research Inst. of the Finnish Econ., Discussion Paper No. 1082, 2007).
- Kleinbard, Edward D., Stateless Income, 11 *Fla. Tax Rev.* 699 (2011).
- Kleinbard, Edward D., Stateless Income's Challenge to Tax Policy, 132 *Tax Notes* 1021 (2011).
- Krugman, Paul, Scale Economies, Product Differentiation, and the Pattern of Trade, 70 *Am. Econ. Rev.* 950 (1980).
- Kuemmerle, Walter, Foreign Direct Investment in Industrial Research in the Pharmaceutical and Electronics Industries—Results from a Survey of Multinational Firms, 28 *Res. Pol'y* 179 (1999).

- Levine, Linda, Cong. Research Serv., RL32292, Offshoring (or Offshore Outsourcing) and Job Loss Among U.S. Workers (2011).
- Lokshin, Boris, & Pierre Mohnen, Measuring the Effectiveness of R&D Credits in the Netherlands (United Nations Univ., UNU-MERIT Working Paper No. 2007-025, 2007).
- Loretz, Simon, Taxes and the Co-Location of Intangibles and Tangibles, (Apr. 27, 2012) (unpublished presentation), available at <http://www.etpf.org/papers/CEPS2012/CEPS2012Loretz.pdf>.
- Lychagin, Sergey, et al., Spillovers in Space: Does Geography Matter? (Ctr. for Econ. Performance, Discussion Paper No. 991, 2010), available at <http://cep.lse.ac.uk/pubs/download/dp0991.pdf>.
- Machin, Stephen, & John Van Reenen, Technology and Changes in Skill Structure: Evidence from Seven OECD Countries, 113 *Q.J. Econ.* 1215 (1998).
- Mariani, Myriam, Next to Production or to Technological Clusters? The Economics and Management of R&D Location, 6 *J. Mgmt & Governance* 131 (2002).
- McClure Jr., Charles, U.S. Federal Use of Formula Apportionment to Tax Income from Intangibles, 14 *Tax Notes Int'l* 859 (1997).
- McCutchen, Jr., William W., Estimating the Impact of the R&D Tax Credit on Strategic Groups in the Pharmaceutical Industry, 22 *Res. Pol'y* 344 (1993).
- Merrill, Peter, et al., Is It Time for the United States To Consider the Patent Box?, 134 *Tax Notes* 1665 (2012).
- Misey, Jr., Robert J., & Michael S. Schadevald, *Practical Guide to U.S. Taxation of International Transactions* (7th ed. 2009).
- Moretti, Enrico, *The New Geography of Jobs* (2012).
- Moris, Francisco, Nat'l Sci. Found., The U.S. Research and Experimentation Tax Credit in the 1990s (2005), available at <http://www.nsf.gov/statistics/infbrief/nsf05316/nsf05316.pdf>.
- Nordhaus, William, The Sources of the Productivity Rebound and the Manufacturing Employment Puzzle (Nat'l Bureau of Econ. Res., Working Paper 11354, 2005), available at http://www.nber.org/papers/w11354.pdf?new_window=1.
- Parsons, Mark & Nicholas Phillips, An Evaluation of the Federal Tax Credit for Scientific Research and Experimental Development

- (Canadian Dep't of Fin., Working Paper No. 2007-08, 2007), available at http://publications.gc.ca/collections/collection_2008/fin/F21-8-2007-8E.pdf.
- Rao, Nirupama, Do Tax Credits Stimulate R&D Spending?: Revisiting the Effect of the R&D Tax Credit in its First Decade (Sept. 2010) (unpublished manuscript), available at <http://economics.mit.edu/files/5540>.
- Roin, Julie, Can the Income Tax be Saved? The Promise and Pitfalls of Adopting Worldwide Formulary Apportionment, 61 *Tax L. Rev.* 169 (2008).
- Romer, Christina D., Do Manufacturers Need Special Treatment?, *N.Y. Times*, Feb. 5, 2012, at BU4.
- Roxan, Ian, Limits to Globalization: Some Implications for Taxation, Tax Policy, and the Developing World (LSE Law, Soc'y & Econ., Working Paper No. 3/2012, 2012), available at <http://ssrn.com/abstract=1995633>.
- Ryan, Paul D., Comm. on Budget, A Roadmap for America's Future, Version 2.0: A Plan to Solve America's Long-Term Economic and Fiscal Crisis (2010), available at <http://roadmap.republicans.budget.house.gov/uploadedfiles/roadmap2final2.pdf>.
- Salter, Ammon, et al., Sci. & Tech. Policy Research, Univ. of Sussex, Talent, Not Technology: Publicly Funded Research and Innovation in the UK, (2000), available at <http://www.sussex.ac.uk/Units/spru/nprnet/documents/talentshort.pdf>.
- Sherlock, Molly F., Cong. Research Serv., R41988, The Section 199 Production Activities Deduction: Background and Analysis (2011).
- Solomon, Eric, Corporate Inversions: A Symptom of Larger Tax System Problems, 67 *Tax Notes Int'l* 1203 (2012).
- Solow, Robert M., Technical Change and the Aggregate Production Function, 39 *Rev. Econ. & Stat.* 312 (1957).
- Spence, Michael, The Next Convergence: The Future of Economic Growth in a Multispeed World (2011).
- Spence, Michael, & Sandile Hlatshwayo, The Evolving Structure of the American Economy and the Employment Challenge (Mar. 2011) (Council on Foreign Rel., unpublished working paper), available at http://cfr.org/content/publications/attachments/CGS_WorkingPaper13_USEconomy.pdf.

- Sperling, Gene, Dir., Nat'l Econ. Council, Remarks at the Conference on the Renaissance of American Manufacturing (Mar. 27, 2012), available at http://www.whitehouse.gov/sites/default/files/administration-official/sperling_-_renaissance_of_american_manufacturing_-_03_27_12.pdf.
- Stark, Kirk J., The Quiet Revolution in U.S. Subnational Corporate Income Taxation, 55 Bull. for Int'l Fiscal Documentation 523 (2001).
- Stöwhase, Sven, Profit Shifting Opportunities, Multinationals, and the Determinants of FDI (Dep't of Econ., Univ. of Munich, Munich Discussion Paper No. 2002-11, 2002), available at http://epub.uni-muenchen.de/29/1/0211_stoewhase.pdf.
- Sullivan, Martin A., Time for a U.S. Patent Box?, 133 Tax Notes 1304 (2011).
- Summers, Victoria P., The Border Adjustability of Consumption Taxes, Existing and Proposed, 12 Tax Notes Int'l 1793 (1996).
- Tecu, Isabel, The Location of Industrial Innovation: Does Manufacturing Matter? (Sept. 2011) (unpublished manuscript), available at <http://www.econ.brown.edu/econ/events/Tecu.pdf>.
- Thomson, Russell, & Paul H. Jensen, The Effects of Public Subsidies on R&D Employment: Evidence from OECD Countries, (Intellectual Prop. Research Inst. of Austl., Working Paper No. 2/11, 2011), available at http://www.ipria.org/publications/wp/2011/WP2_2011.pdf.
- Toder, Eric, Urban-Brookings Tax Policy Ctr., International Competitiveness: Who Competes Against Whom and for What? (2012), available at <http://tpcprod.urban.org/UploadedPDF/412477-international-competitiveness.pdf>.
- Toder, Eric, Jim Nunns, & Joseph Rosenberg, Urban-Brookings Tax Policy Ctr., Using a VAT to Reform the Income Tax (2012).
- Tyson, Laura D'Andrea, Why Manufacturing Still Matters, Economix Blog, N.Y. Times (Feb. 10, 2012, 6:00 AM), <http://economix.blogs.nytimes.com/2012/02/10/why-manufacturing-still-matters>.
- Tyson, Laura, & Greg Linden, Ctr. for Am. Progress, The Corporate R&D Tax Credit and U.S. Innovation and Competitiveness: Gauging the Economic and Fiscal Effectiveness of the Credit (2012), available at http://www.americanprogress.org/wp-content/uploads/issues/2012/01/pdf/corporate_r_and_d.pdf.

- Warren, Jr., Alvin C., How Much Capital Income Taxed Under an Income Tax Is Exempt Under a Cash Flow Tax?, 52 *Tax L. Rev.* 1 (1997).
- Webber, Stuart, Escaping the U.S. Tax System: From Corporate Inversions to Re-Domiciling, 63 *Tax Notes Int'l* 273 (2011).
- Wilson, Daniel J., Beggar Thy Neighbor? The In-State, Out-of-State, and Aggregate Effects of R&D Tax Credits, 91 *Rev. Econ. & Stat.* 431 (2009).
- Cong. Budget Office, Federal Support for Research and Development (2007), available at <http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/82xx/doc8221/06-18-research.pdf>.
- H. Comm. on Ways & Means, 112th Cong., Technical Explanation of the Ways and Means Discussion Draft Provisions to Establish a Participation Exemption System for the Taxation of Foreign Income 34 (2011), available at http://waysandmeans.house.gov/uploadedfiles/final_te_-_ways_and_means_participation_exemption_discussion_draft.pdf.
- HM Revenue & Customs, Report No. 107, An Evaluation of Research and Development Tax Credits (U.K.), available at <http://www.hmrc.gov.uk/research/report107.pdf>.
- HM Revenue & Customs, The Patent Box: Technical Note and Guide to the Finance Bill 2012 Clauses (2012) (U.K.), available at <http://www.hmrc.gov.uk/budget-updates/march2012/patent-box-tech-note.pdf>.
- HM Treasury, Corporate Tax Reform: Delivering a More Competitive System (Nov. 2010) (U.K.), available at http://www.hm-treasury.gov.uk/d/corporate_tax_reform_complete_document.pdf.
- Nat'l Sci. Bd., Nat'l Sci. Found., Research and Development: Essential Foundation for U.S. Competitiveness in a Global Economy (2008), available at <http://www.nsf.gov/statistics/nsb0803/start.htm>.
- Nat'l Sci. Found., Science and Engineering Indicators 2012, ch. 4, (2012), available at <http://www.nsf.gov/statistics/seind12/pdf/c04.pdf>.
- OECD, Policy Brief, Reforming Corporate Income Tax (2008), available at www.oecd.org/dataoecd/30/16/41069272.pdf.
- OECD, Tax Incentives for Research and Development: Trends and Issues (2002), available at http://www.metutech.metu.edu.tr/download/tax_incentives_for_R&D.pdf.

OECD, *Transfer Pricing Aspects of Business Restructurings: Discussion Draft for Public Comment 19 September 2008 to 19 February 2009*, available at <http://www.oecd.org/tax/transferpricing/41346644.pdf>.

OECD, *Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations (2010)*, available at <http://codfiscal.realitatea.net/act-pdf/OECD-transfer-pricing-guidelines.pdf>.

Office of Tax Policy, U.S. Dept' of the Treasury, *Investing in U.S. Competitiveness: The Benefits of Enhancing the Research and Experimentation (R&E) Tax Credit (2011)*, available at [http://www.treasury.gov/resource-center/tax-policy/Documents/Research and Experimentation report FINAL.PDF](http://www.treasury.gov/resource-center/tax-policy/Documents/Research%20and%20Experimentation%20report%20FINAL.PDF).

Staff of Joint Comm. on Taxation, 112th Cong., JCX-61-12, *Background and Present Law Relating to Manufacturing Activities Within the United States (2012)*, available at <https://www.jct.gov/publications.html?func=startdown&id=4473>.

Staff of Joint Comm. on Taxation, 112th Cong., JCX-19-12, *Background and Present Law Relating to Cost Recovery and Domestic Production Activities (2012)*, available at <https://www.jct.gov/publications.html?func=startdown&id=4401>.

Staff of Joint Comm. on Taxation, 111th Cong., JCX-37-10, *Present Law and Background Related to Possible Income Shifting and Transfer Pricing (2010)*, available at <https://www.jct.gov/publications.html?func=startdown&id=3692>.

U.S. Gov't Accountability Office, GAO/GGD-89-114, *Tax Policy and Administration: The Research Tax Credit Has Stimulated Some Additional Research Spending 3 (1989)*, available at <http://archive.gao.gov/d26t7/139607.pdf>.

White House & Dep't of the Treasury, *The President's Framework for Business Tax Reform (2012)*, available at <http://www.treasury.gov/resource-center/tax-policy/Documents/The-Presidents-Framework-for-Business-Tax-Reform-02-22-2012.pdf>.

