

What We Know: Reviewing The Academic Literature On Profit Shifting

by Elke Asen

Reprinted from *Tax Notes International*, May 24, 2021, p. 1033

What We Know: Reviewing the Academic Literature On Profit Shifting

by Elke Asen



Elke Asen

Elke Asen is a policy analyst at the Tax Foundation's Center for Global Tax Policy in Washington.

In this article, the author considers the magnitude and channels of profit shifting, as well as the economic pros and cons of antiavoidance measures such as the OECD's base erosion and profit-shifting initiative.

Copyright 2021 Elke Asen. All rights reserved.

In recent years, significant unilateral and global efforts have been made to address profit shifting. However, in reviewing the literature, one finds that mainly because of a lack of granular, recent data, there is still little consensus among academics on the extent of current and historic profit shifting and the resulting loss in corporate tax revenue. Similarly, the effectiveness of antiavoidance measures, such as thin cap rules, controlled foreign corporation rules, and nexus requirements, needs further study. Research indicates there is a trade-off between countering tax avoidance and encouraging business investment.

Lawmakers are considering substantial changes to international tax rules to address tax avoidance. Many changes have recently been made, with early economic evidence indicating that they might not only address tax avoidance but also affect business hiring and investment decisions. With the ongoing discussions, it is important to consider the origins of the

international tax system and the research and policy changes that have come in recent decades.

In the 1920s, the League of Nations decided on an international tax system based on three principles: source-country taxation, the arm's-length principle, and bilateral tax treaties.¹

IMF economists have described the international tax system as follows:

The tax treatment of MNCs [multinational corporations] is determined by the international tax framework, which is a myriad of domestic legislations and a wide network of bilateral and multilateral tax treaties. The framework relies largely on separate accounting, which means that taxation of an MNC group is at the level of individual subsidiaries that operate in different countries. Each country has a right to tax the income assigned, based on its domestic law and tax treaty obligations.²

In today's increasingly globalized, mobile, and digitalized world, multinational enterprises operate much differently than they did 100 years ago. However, because the basic framework of the international tax system has remained largely unchanged since its implementation in the 1920s, various challenges, including tax avoidance by MNEs to minimize global tax liability, have arisen.

¹International tax issues need to be resolved at the bilateral rather than multilateral level. International trade, by contrast, has been regulated through the multilateral General Agreement on Tariffs and Trade since 1947.

For more details on the history of the international tax system, see Gabriel Zucman, "Taxing Across Borders: Tracking Personal Wealth and Corporate Profits," 28(4) *J. Econ. Persp.* 121 (Fall 2014).

²Sebastian Beer, Ruud A. de Mooij, and Li Liu, "International Corporate Tax Avoidance: A Review of the Channels, Magnitudes, and Blind Spots," IMF Working Paper 18/168 (July 23, 2018).

Since the global financial crisis in 2008-2009 — and further motivated by tax scandals such as LuxLeaks and the Paradise Papers — there has been a renewed focus on studying and addressing international tax avoidance. In 2013 the OECD launched its base erosion and profit-shifting project.³ Two years later, the OECD published its 15-point action plan to curb international tax avoidance. Since then, both OECD and non-OECD countries have implemented various antiavoidance measures.

In 2019 the OECD launched a new effort — commonly referred to as BEPS 2.0 — to further counter tax avoidance and reform the international tax system more fundamentally. If implemented, BEPS 2.0 would reallocate taxing rights across countries (pillar 1) and implement a global minimum tax (pillar 2). Inspired by the U.S. global intangible low-taxed income regime, the OECD's proposed global anti-base-erosion (GLOBE) tax would essentially function as a top-up tax on low-taxed foreign earnings. Unlike GILTI, GLOBE would be calculated at the jurisdictional level and would likely have a different rate and base.⁴ Agreement on BEPS 2.0 is expected by mid-2021.

The United Nations Conference on Trade and Development (UNCTAD) has defined three factors that enable tax avoidance: tax rate differentials, legislative mismatches and gaps, and tax treaties (see Table 1).⁵

This article surveys the academic literature on profit shifting, which, although still relatively scarce, has expanded rapidly in recent years. It attempts to provide answers to three profit-shifting questions: What is the magnitude of profit shifting, what are the channels multinationals use to shift profits, and how effective are antiavoidance measures and what economic harms do they cause?

Table 1. Overview of UNCTAD's Main International Tax Avoidance Levers

Enabling Factor	Specific Levers
Tax Rate Differentials	<ul style="list-style-type: none"> • Transfer pricing manipulation (trade mispricing, use of intangibles and intellectual property, commissionaire structures) • Excessive debt financing • Others (for example, location planning, loss use)
Legislative Mismatches and Gaps	<ul style="list-style-type: none"> • Hybrid mismatches • Derivative transactions • Disguised domestic investments • Deferred repatriation
Tax Treaties	<ul style="list-style-type: none"> • Treaty shopping • Triangular structures • Circumvention of treaty thresholds
<p><i>Source:</i> UNCTAD, "FDI, Tax and Development: The Fiscal Role of Multinational Enterprises: Towards Guidelines for Coherent International Tax and Investment Policies," Working Paper (Mar. 26, 2015).</p>	

Magnitude of U.S. and Global Profit Shifting

While the academic literature generally agrees that profit shifting exists, there is a debate about the extent. Numerous academics have empirically estimated a profit-shifting semi-elasticity — that is, if the tax rate differential in one country relative to other countries increases, how much do shifted profits to the lower-tax jurisdiction increase? More recently, however, there have also been attempts to quantify the dollar amount of corporate tax revenue lost as a result of profit shifting.

Main Method to Quantify Profit Shifting

A simple conceptual framework developed by James R. Hines Jr. and Eric M. Rice in 1994, and extended by Harry Huizinga and Luc Laeven in 2008, has been widely used to examine the extent of tax-motivated profit reallocation.⁶ A semi-elasticity for profit shifting is the central measure.

³ See OECD, "International Collaboration to End Tax Avoidance."

⁴ For more details on the differences between GILTI and GLOBE, see Daniel Bunn, "Can GILTI and the GloBE Be Harmonized in a Biden Administration?" *MNE Tax*, Mar. 3, 2021.

⁵ UNCTAD, "FDI, Tax and Development: The Fiscal Role of Multinational Enterprises: Towards Guidelines for Coherent International Tax and Investment Policies," Working Paper (Mar. 26, 2015).

⁶ Hines and Rice, "Fiscal Paradise: Foreign Tax Havens and American Business," 109(1) *Q.J. Econ.* 49 (Feb. 1994); and Huizinga and Laeven, "International Profit Shifting Within Multinationals: A Multi-Country Perspective," 92(5) *J. Pub. Econ.* 1164 (June 2008).

The model can be boiled down to the following regression:

$$\log(\pi_i) = \varepsilon(\tau_i - \bar{\tau}) + \gamma'X_i + \omega_i$$

π_i represents reported pretax profits in country i ; $\tau_i - \bar{\tau}$ is the difference between the statutory corporate tax rate in country i and the average corporate tax rate among other affiliates of the same company group; X_i is a vector of control variables (such as labor and capital inputs) in country i ; and ω_i is an idiosyncratic error term. Finally, the coefficient ε captures the responsiveness of reported profits to the tax rate differential and is expected to be negative in the presence of profit shifting.⁷

Researchers have used both macro and microdata to estimate that regression (or a form of it), with studies using microdata becoming more common as more microdata become available. Studies using aggregated data (macrostudies) tend to find larger profit-shifting effects than studies that use company-level data (microstudies). One potential explanation for that difference is short- versus long-term responses. In other words, because of adjustment costs and fixed costs of tax planning, the effect is smaller in the short term (microstudies) than in the long term (macrostudies). Another possible explanation is that macrostudies capture more profit-shifting channels than microstudies do.

Studies on profit shifting use various data sources, including macroeconomic statistics, financial account databases (for example, Orbis or Compustat), investment surveys, and tax return data.⁸ Three data sets segregate U.S. MNEs' profits by country: Bureau of Economic Analysis (BEA) data on the activities of U.S. MNEs; Treasury data on CFCs; and Treasury data on country-by-country reporting. Each of those data sets is available publicly (in aggregate) or through contractual arrangement (at the company level).⁹

Estimated Semi-Elasticities for Profit Shifting

Sebastian Beer, Ruud A. de Mooij, and Li Liu did a meta-analysis of 402 semi-elasticities estimated in 37 academic papers.¹⁰ The earliest study used cross-sectional data from 1982;¹¹ the latest used micro-level panel data up to the year 2012.¹²

Beer, de Mooij, and Liu's preferred consensus semi-elasticity estimate is 0.98, which means that a corporate rate 1 percentage point lower than other countries' will expand pretax income by approximately 1 percent in that jurisdiction.

Put differently, a company with \$1 million of pretax profits in a jurisdiction that reduces its tax rate from 35 percent to 25 percent (if other countries retain their rates) would report an additional 10 percent, or \$100,000, of income into that jurisdiction. If that company had been shifting its profits to low-tax jurisdictions, it would now have a smaller incentive to do so.

Beer, de Mooij, and Liu also found that semi-elasticity increases over time. For the year 2015, they suggested that a corporate tax rate 1 percentage point lower than other countries' will expand pretax income by 1.5 percent — that is, a semi-elasticity of 1.5.

Tim Dowd, Paul Landefeld, and Anne Moore — economists at the Joint Committee on Taxation — have argued that tax responsiveness is nonlinear, implying that semi-elasticities are highest for tax havens and lowest for high-tax jurisdictions (which means the log-linear specification commonly used may underestimate the semi-elasticity).¹³

Beer, de Mooij, and Liu's estimate is larger than the consensus semi-elasticity of 0.8 estimated in a meta-analysis by Jost H. Heckemeyer and

⁷For more on that regression, see Beer, de Mooij, and Liu, *supra* note 2.

⁸Financial accounts databases tend to have many missing data fields (particularly for tax havens), which likely leads to an underestimation of profit shifting.

⁹For more on those three data sources, see Jennifer Blouin and Leslie A. Robinson, "Double Counting Accounting: How Much Profit of Multinational Enterprises Is Really in Tax Havens?" SSRN (Dec. 8, 2019).

¹⁰Beer, de Mooij, and Liu, *supra* note 2.

¹¹Hines and Rice, *supra* note 6.

¹²Tim Dowd, Paul Landefeld, and Anne Moore, "Profit Shifting of U.S. Multinationals," 148(C) *J. Pub. Econ.* 1 (2017).

¹³*Id.*

Michael Overesch.¹⁴ Hines has suggested that the semi-elasticity is closer to 0.2-0.4.¹⁵

Importantly, all those studies use data that predate the 2017 passage of the Tax Cuts and Jobs Act. The cut in the U.S. corporate tax rate from 35 percent to 21 percent probably significantly altered the global profit-shifting landscape.¹⁶ Unfortunately, no studies that estimate a profit-shifting semi-elasticity using post-TCJA data could be found.

However, Kimberly A. Clausing has discussed how profit-shifting incentives have changed because of the TCJA.¹⁷ Her estimates suggest that the TCJA's international provisions (plus the corporate rate cut) have led to a 12 to 16 percent reduction in the U.S. affiliate corporate base in tax havens, an 8 to 9 percent increase in the U.S. affiliate corporate base in foreign countries above the minimum tax threshold, and a \$15 billion to \$30 billion increase in the U.S. corporate base each year.

Estimated Corporate Tax Revenue Losses

As mentioned, a limited number of studies have tried to estimate the amount of corporate tax revenue lost as a result of profit shifting. This section provides an overview of estimates for the amounts of lost U.S. and global corporate tax revenue. Estimates differ significantly, suggesting that the specific dollar amount — as well as the semi-elasticity for profit shifting and the amount

of foreign profits in each jurisdiction — is still relatively unclear.

Global Estimates

Using their preferred consensus semi-elasticity estimate, Beer, de Mooij, and Liu simulated the global and country-specific corporate tax revenue effects of profit shifting in 2015.¹⁸ According to their findings, profit shifting reduced global corporate tax revenue by 2.6 percent (or 0.07 percent of global GDP) in 2015, reflecting profit shifting away from the United States and other high-tax countries toward low-tax countries. In 2015 profit shifting eroded approximately 17 percent of the U.S. tax base and corporate tax revenue, more than any other country studied (see Table 2). The TCJA's reduction of the U.S. corporate rate and changes to international provisions likely significantly altered the amount of profit shifting in the United States and globally.¹⁹

Beer, de Mooij, and Liu's country-level simulations show that seven large economies — Spain, Italy, the Netherlands, China, Turkey, Indonesia, and the United Kingdom — gained corporate tax revenue from profit shifting in 2015 because their rates were (and continue to be) lower than those elsewhere (see figure).

The OECD estimated in its final BEPS action 11 report that global corporate tax revenues were \$100 billion to \$240 billion lower in 2014 because of profit shifting — which translates to approximately 4 to 10 percent of global corporate tax revenue. The IMF in 2014 estimated that profit shifting reduces corporate tax revenue by approximately 5 percent worldwide, but by almost 14 percent in non-OECD countries.²⁰ According to Clausing, global corporate revenue losses caused by profit shifting exceeded \$280 billion in 2012.²¹

UNCTAD has estimated that developing countries lost around \$100 billion in corporate tax

¹⁴Heckemeyer and Overesch, "Multinationals' Profit Response to Tax Differentials: Effect Size and Shifting Channels," 50(4) *Canadian J. Econ.* (Nov. 2017).

Extrapolating from a 0.8 semi-elasticity implies that less than 20 percent of MNEs' foreign profits are shifted to tax havens. However, MNEs' foreign profits reported in havens are substantially larger than this (around 40 percent). One explanation for that stark difference is that the larger number is the result of both tax avoidance and behavioral responses to taxes. See Dhammika Dharmapala, "Profit Shifting in a Globalized World," 109 *AEA Papers and Proceedings* 488 (May 2019).

¹⁵Hines, "How Serious Is the Problem of Base Erosion and Profit Shifting?" 62(2) *Canadian Tax J.* 443, 443-453 (2014). For a comprehensive overview of key studies on profit shifting published between 2007 and 2015, see OECD, "Measuring and Monitoring BEPS, Action 11 — 2015 Final Report," Table 3.1 (Oct. 5, 2015).

¹⁶While the TCJA's changes in domestic and international business taxation certainly affected profit-shifting incentives, the overall federal tax burden on the foreign earnings of U.S. corporations appears to have been largely unaffected. See Scott D. Dyreng et al., "The Effect of U.S. Tax Reform on the Tax Burdens of U.S. Domestic and Multinational Corporations," SSRN (June 5, 2020).

¹⁷Clausing, "Profit Shifting Before and After the Tax Cuts and Jobs Act," 73(4) *Nat'l Tax J.* 1233 (Jan. 13, 2021).

¹⁸Beer, de Mooij, and Liu, *supra* note 2.

¹⁹Beer, Alexander D. Klemm, and Thornton Matheson, "Tax Spillovers From US Corporate Income Tax Reform," IMF Working Paper 18/166 (July 13, 2018).

²⁰IMF, "Spillovers in International Corporate Taxation," IMF Policy Paper (May 9, 2014).

²¹Clausing, "The Effect of Profit Shifting on the Corporate Tax Base in the United States and Beyond," SSRN (June 19, 2016).

Table 2. 2015 Estimated Revenue Losses by Beer, de Mooij, and Liu

Country	United States	Big 15	Low-Tax 15	Global
Corporate revenue (in billions)	\$363	\$1,563	\$49	\$1,888
Corporate rate (federal + state)	40%	31%	15%	30%
Reported corporate base	907	4,983	318	6,213
True corporate base	1,095	5,078	263	6,213
Corporate income shifted	198	102	-55	0
Revenue loss (in % of corporate tax revenue)	17.2	4.1	-19.8	2.6
Revenue loss (in % of GDP)	0.42	0.11	-0.43	0.07

Notes: The authors use 2015 corporate tax rates for 81 countries in a KPMG LLP database. “Big 15” refers to the 15 largest economies in the sample, “low-tax 15” refers to the 15 countries with the lowest corporate rates, and “global” refers to the average among all 81 countries.

Source: Sebastian Beer, Ruud A. de Mooij, and Li Liu, “International Corporate Tax Avoidance: A Review of the Channels, Magnitudes, and Blind Spots,” IMF Working Paper 18/168 (July 23, 2018).

revenue in 2012 as a result of tax avoidance through offshore investment links (trade mispricing is not captured here).²² Ernesto Crivelli, de Mooij, and Michael Keen found that BEPS likely causes higher losses in corporate revenue as a percent of GDP in developing rather than developed countries.²³ According to their estimates, in the short term, OECD countries lose \$207 billion in corporate revenue (0.23 percent of GDP) and developing countries lose \$105 billion (0.84 percent of GDP).

U.S. Estimates

Using survey data from the BEA, Clausing estimated that profit shifting resulted in the U.S. government losing between \$77 billion and \$111 billion in corporate tax revenue in 2012 (using a semi-elasticity of 2.92).²⁴ However, Jennifer Blouin and Leslie A. Robinson argue that the academic literature on U.S. — and potentially global — profit shifting is severely flawed, because researchers have misunderstood the accounting

treatment of indirectly owned foreign affiliates in the U.S. international economic accounts data.²⁵

Blouin and Robinson applied their method to Clausing’s framework and found that U.S. corporate tax revenues were only \$10 billion to \$32 billion lower because of profit shifting. Reestimating Clausing, Blouin and Robinson found a much lower semi-elasticity of 1.8. However, the main reason for the lower estimate of corporate tax revenue loss is the accounting adjustment Blouin and Robinson made to the amount of profits in foreign jurisdictions.

Clausing responded to Blouin and Robinson’s double-counting critique and revised her estimates using 2017 data.²⁶ However, even after making some adjustments based on Blouin and Robinson’s critique, Clausing still found that profit shifting amounted to approximately \$100 billion of lost revenue in the United States.

Using national accounts and balance of payments statistics, Gabriel Zucman estimated that in 2013 profit shifting to low-tax jurisdictions reduced corporate taxes paid by U.S.-owned

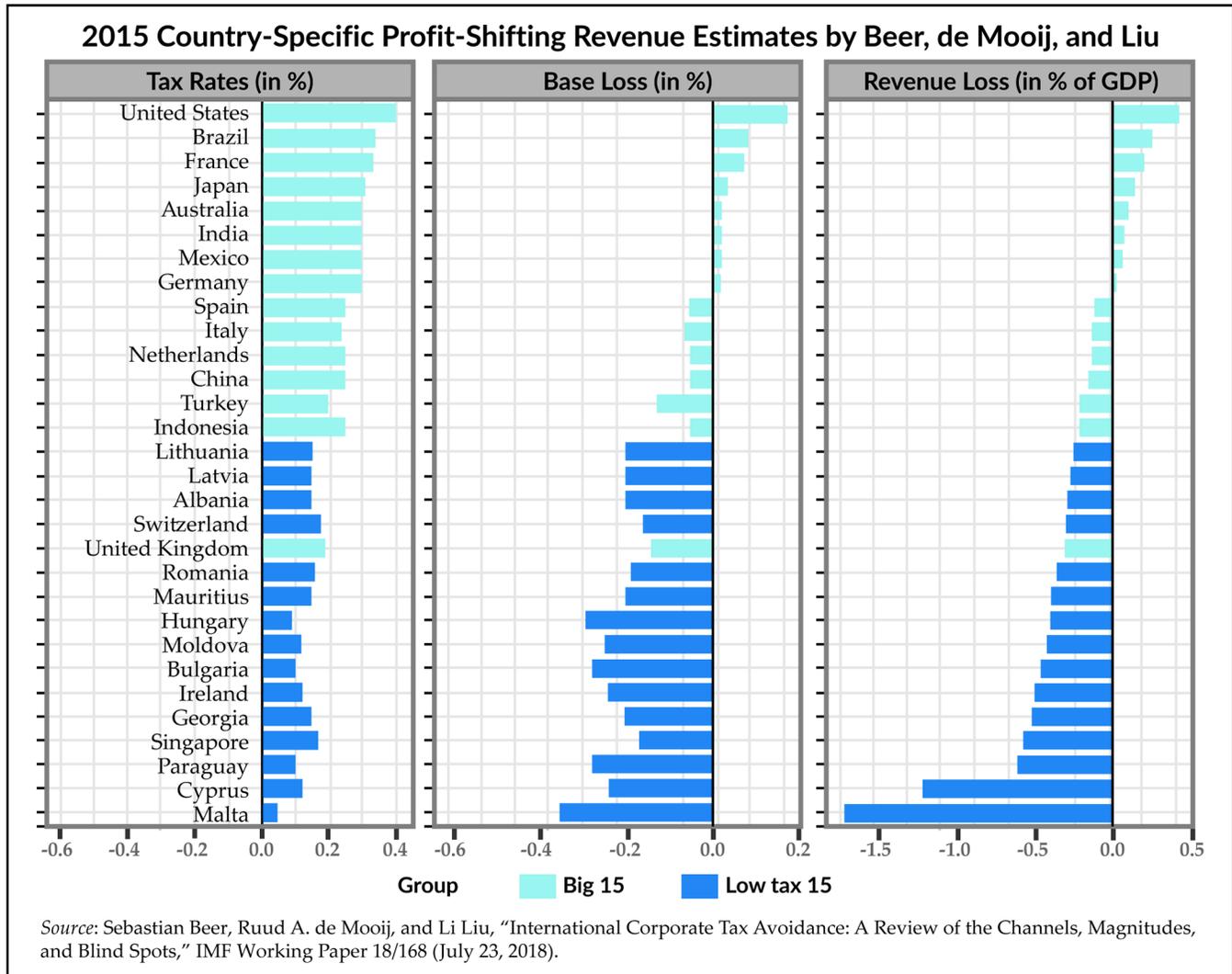
²² UNCTAD, “World Investment Report 2015: Reforming International Investment Governance” (2015). UNCTAD also estimated that tax incentives reduced developing countries’ corporate income tax revenue by \$130 billion.

²³ Crivelli, de Mooij, and Keen, “Base Erosion, Profit Shifting and Developing Countries,” IMF Working Paper (May 29, 2015).

²⁴ Clausing, *supra* note 21.

²⁵ Blouin and Robinson, *supra* note 9.

²⁶ Clausing, “How Big Is Profit Shifting?” SSRN (May 17, 2020).



businesses by about 20 percent (about \$130 billion annually).²⁷

Using administrative data, Dowd, Landefeld, and Moore estimated that reported profits in Bermuda, the Cayman Islands, Ireland, Luxembourg, the Netherlands, and Switzerland would have declined by more than \$100 billion in 2010 had those countries had statutory tax rates of 29 percent and average tax rates of 17 percent.²⁸

In 2009 Clausing examined how both financial and real types of tax avoidance by U.S. MNEs between 1982 and 2004 were likely to affect U.S.

corporate tax revenues.²⁹ She found that a host-country tax rate 1 percentage point lower relative to the United States was associated with a 0.5 percentage point higher profit rate for affiliates in that host country. According to her calculations, that translated to 35 percent lower corporate income tax revenues by 2004 because of financial tax avoidance. She examined real responses to international tax incentives by estimating the relationship between employment and tax rate differences across countries. Her findings suggest that employment-based tax responses resulted in approximately 15 percent lower corporate tax revenues by 2004.

²⁷ According to Zucman, using CbC balance of payments data indicates that in 2013, 55 percent of foreign profits earned by U.S. MNEs were made in the Netherlands, Bermuda, Luxembourg, Ireland, Singapore, and Switzerland. See *supra* note 1.

²⁸ Dowd, Landefeld, and Moore, *supra* note 12.

²⁹ Clausing, "Multinational Firm Tax Avoidance and Tax Policy," 62(4) *Nat'l Tax J.* 703 (Dec. 2009).

Tax Havens

Studying the characteristics of tax havens, Dhammika Dharmapala and Hines found that tax havens are small, affluent countries with high-quality governance institutions.³⁰ For a country with a population under 1 million, the likelihood of becoming a tax haven rises from 26 percent to 61 percent as governance quality improves from the level of Brazil to that of Portugal. According to the authors, that is most likely because tax havens can be successful only if they have high-quality governance. Anticipating that, countries with low-quality governance do not attempt to become tax havens.

Preliminary results by Katarzyna Bilicka, Yaxuan Qi, and Jing Xing showed stylized facts on the use of tax havens by MNEs globally from 2005 to 2017.³¹ The authors found that the proportion of MNEs without tax haven subsidiaries declined from 71 percent in 2005 to 52 percent in 2017. At the same time, the percentage of MNEs that owned one to five tax haven subsidiaries increased steadily, and tax havens have become more geographically diversified. Almost 40 percent of sample MNEs that had subsidiaries in tax havens in one geographical region in 2009 had haven-based subsidiaries in at least two regions by 2017, and they tended to arrange tax haven operations close to their headquarters.

Similarly, Mihir A. Desai, C. Fritz Foley, and Hines in 2006 studied the characteristics of U.S. companies with operations in tax havens, as well as the purpose tax havens serve for those companies.³² Large companies with high shares of international activity, high research and development activity, and large volumes of intrafirm trade were most likely to have affiliates in tax havens. U.S. multinationals used tax haven operations both to shift taxable income away from high-tax jurisdictions and reduce the burden of U.S. taxation on income earned in low-tax locations. The primary use of affiliates in larger

havens appeared to be to reallocate taxable income, whereas the primary use of affiliates in smaller tax haven countries was to facilitate deferral of U.S. taxation of foreign income.³³

Juan Carlos Suárez Serrato showed that eliminating tax havens can harm high-tax economies.³⁴ The author studied the 1996 repeal of IRC section 936, which provided a tax credit for the full amount of U.S. tax on income earned in U.S. possessions, such as Puerto Rico. Because that foreign-source income was fully exempt from U.S. taxation, it encouraged U.S. multinationals to shift profits to Puerto Rico. Suárez Serrato found that the businesses affected by the repeal of section 936 reduced investment and employment in the United States.

In 2004 Desai, Foley, and Hines also found a complementary relationship between haven and non-haven activity.³⁵ They showed that subsidiaries in tax havens indirectly stimulate the growth of business operations in non-haven countries in the same region. In line with the academic findings discussed above, their affiliate-level data also reveal that U.S. MNEs use tax haven affiliates to reallocate taxable income away from high-tax jurisdictions and defer home-country taxes on foreign income, effectively reducing global tax liability.

Finally, research by Qing Hong and Michael Smart on the revenue and investment implications of tax havens also revealed that income shifting may reduce high-tax jurisdictions' tax revenues.³⁶ However, the authors also found that using havens reduces the tax burden on mobile capital and thus increases investment. International tax planning may make the location of real investment less responsive to tax rate differentials, which, in principle, would then allow countries to maintain — or in some cases, increase — corporate tax rates without seeing an outflow of foreign direct investment.

³⁰ Dharmapala and Hines, "Which Countries Become Tax Havens?" 93 *J. Pub. Econ.* 1058 (Oct. 2009).

³¹ Bilicka, Qi, and Xing, "Geographical Diversification of Tax Havens: How Did the Use of Tax Haven Subsidiaries Change in Recent Years?" Working Paper (May 2020).

³² Desai, Foley, and Hines, "The Demand for Tax Haven Operations," 90(3) *J. Pub. Econ.* 513 (Feb. 2006).

³³ The United States had a worldwide tax system when this study was conducted but has since shifted to a partially territorial system.

³⁴ Suárez Serrato, "Unintended Consequences of Eliminating Tax Havens," NBER Working Paper 24850 (rev. Dec. 2019).

³⁵ Desai, Foley, and Hines, "Economic Effects of Regional Tax Havens," NBER Working Paper 10806 (Sept. 2004).

³⁶ Hong and Smart, "In Praise of Tax Havens: International Tax Planning and Foreign Direct Investment," 54(1) *Eur. Econ. Rev.* 82 (Jan. 2010).

Channels for Profit Shifting

Profit-shifting channels vary depending on whether a country has a territorial or worldwide tax system.

Avoiding Source-Country Taxation

Under a territorial system, foreign-earned profits are generally exempt from domestic taxation, which creates an incentive to artificially shift domestic high-tax income to foreign low-tax jurisdictions to minimize the global tax bill. There are various ways in which MNEs shift their income from high- to low-tax jurisdictions, including transfer mispricing, strategic location of intellectual property, international debt shifting, and treaty shopping.³⁷

Transfer Mispricing

Transfer mispricing refers to stretching, violating, or exploiting weaknesses in the arm's-length principle to minimize global tax liability. The arm's-length principle demands that internal prices between related parties should resemble prices that would prevail between independent parties. Yet, despite extensive OECD and U.N. guidelines, there may be significant room for subjective interpretation, allowing MNEs to charge artificially low prices for exports sold from high- to low-tax countries or artificially high prices for inputs coming from low-tax countries to reduce their global tax liability. Heckemeyer and Overesch provided some back-of-the-envelope calculations that suggest that transfer mispricing and licensing are the dominant profit-shifting channels.³⁸

The increasing importance and prevalence of IP owned by multinationals has made the application of the arm's-length principle more difficult, because comparable third-party transactions often do not exist. For example, there is no comparable third-party transaction for a new algorithm developed by a tech multinational, leaving room for subjective interpretation and

³⁷ Other tax avoidance channels beyond the scope of this article include risk transfer, which can take the form of conducting operations in high-tax jurisdictions on a contractual basis to limit profits attributable there; avoiding permanent establishment status; and locating asset sales in low-tax jurisdictions to avoid taxes on the capital gains.

³⁸ Heckemeyer and Overesch, *supra* note 14.

thus making it difficult for tax administrations to evaluate the price of the transaction.

For example, assume that the tech multinational has operations in both high- and low-tax countries. An intrafirm sale of services based on a new algorithm owned by a subsidiary in a low-tax jurisdiction at an inflated price from the low- to the high-tax country would reduce global taxes. That is because deducting the expense in the high-tax country provides a greater tax benefit than the additional taxes levied on the income in the low-tax country.

Tax-motivated transfer mispricing is well documented. Evidence shows that the price wedge between the arm's-length price for unrelated transactions and the transfer price for related-party transactions varies systematically with corporate tax rate differentials faced by MNEs. Clausing; Andrew B. Bernard, J. Bradford Jensen, and Peter K. Schott; and Aaron Flaaen all provide empirical evidence for that phenomenon in the United States.³⁹

There is also recent empirical evidence for France,⁴⁰ Germany,⁴¹ and the United Kingdom.⁴² The U.K. study found that a shift from a worldwide to a territorial system in taxing MNEs' foreign profits leads to stronger transfer mispricing, which is concentrated in the most R&D-intensive companies, suggesting that transactions involving unique assets leave the most room for subjective interpretation of the arm's-length principle.

Eric J. Bartelsman and Roel M.W.J. Beetsma used data from the manufacturing sector to estimate the revenue effects of transfer mispricing

³⁹ Clausing, "Tax-Motivated Transfer Pricing and US Intrafirm Trade Prices," 87(9-10) *J. Pub. Econ.* 2207 (Sept. 2003); Bernard, Jensen, and Schott, "Transfer Pricing by U.S.-Based Multinational Firms," NBER Working Paper 12493 (Aug. 2006); and Flaaen, "The Role of Transfer Prices in Profit-Shifting by U.S. Multinational Firms: Evidence From the 2004 Homeland Investment Act," FEDS Working Paper 2017-055 (May 25, 2017).

⁴⁰ Ronald Davies et al., "Knocking on Tax Haven's Door: Multinational Firms and Transfer Pricing," 100(4) *Rev. Econ. & Stat.* (Jan. 2015).

⁴¹ Shafik Hebous and Niels Johannesen, "At Your Service! The Role of Tax Havens in International Trade With Services," CESifo Working Paper 5414 (June 2015).

⁴² Liu, Tim Schmidt-Eisenlohr, and Dongxian Guo, "International Transfer Pricing and Tax Avoidance: Evidence From Linked Trade-Tax Statistics in the UK," CESifo Working Paper 6594 (July 2017).

in OECD countries.⁴³ Their results suggest that more than 65 percent of the additional revenue resulting from a unilateral tax increase is lost to other OECD countries because of income shifting.

Overall, the estimated semi-elasticity for transfer mispricing — that is, the percentage increase in the transfer price of exports in response to a 1 percentage point reduction in the tax rate differential to lower-taxed countries — ranges between 0.5 and 6.

International Debt Shifting

This tax avoidance strategy involves excessive intracompany borrowing in high-tax countries and lending to low-tax countries. Differences in corporate tax rates create opportunities for lending from low-tax countries to affiliates in high-tax countries or for locating external borrowing in high-tax countries, reducing the MNE's global tax bill without affecting the group's overall debt exposure (and hence its bankruptcy risk).

For example, an MNE with affiliates in both low- and high-tax countries might provide an intracompany loan from its low-tax affiliate to its high-tax affiliate. The tax benefit of the interest deduction in the high-tax country exceeds the tax on interest earned in the low-tax country, reducing the multinational's overall tax burden. Similarly, the MNE might decide to do its external borrowing primarily in the high-tax jurisdiction, because the value of the interest deduction is highest there.

Empirical evidence shows that MNEs indeed take advantage of international debt shifting. For example, Thiess Buettner and Georg Wamser and Dirk Schindler et al. have shown that international tax differentials have a positive, significant effect on both internal and external debt of German MNEs.⁴⁴

Strategic Location of IP

This tax avoidance strategy involves the strategic location of IP management to low-tax countries to reduce taxes on associated income. The underlying R&D activities can be conducted in one country, but the resulting patent can be transferred to a low-tax country (which often happens before the IP is fully developed and its value fully known to the tax authorities to avoid capital gains on the initial transfer).

Because there is often no comparable transaction between unrelated parties, it can be difficult to apply the arm's-length principle, leaving room for transfer mispricing. Further, many countries have so-called patent boxes, which tax income derived from patents (and often other intangibles) at a rate below the statutory corporate income rate, essentially providing incentives to shift patents there.⁴⁵

Empirical evidence shows that the probability of patent application and the subsidiary's level of IP in one country correlates with the level of the corporate tax rate. Using panel data on European MNEs, Matthias Dischinger and Nadine Riedel showed that the lower a subsidiary's corporate rate is relative to other group affiliates, the higher its level of intangible asset investment.⁴⁶ Similarly, Tom Karkinsky and Riedel found that the number of patent applications filed by a multinational's affiliate decreases if that affiliate faces a higher corporate tax rate than other group affiliates.⁴⁷ Olena Dudar and Johannes Voget showed that the tax response also significantly depends on the type of IP, with trademarks being much more susceptible to being shifted than patents, because generating patents is likely to be tied with some real R&D activities.⁴⁸

Rachel Griffith, Helen Miller, and Martin O'Connell found that companies are more likely to locate patents in countries with relatively lower

⁴³ Bartelsman and Beetsma, "Why Pay More? Corporate Tax Avoidance Through Transfer Pricing in OECD Countries," 87(9-10) *J. Pub. Econ.* 2225 (Sept. 2003).

⁴⁴ Buettner and Wamser, "Internal Debt and Multinational Profit Shifting: Empirical Evidence From Firm-Level Panel Data," 66(1) *Nat'l Tax J.* 63 (Mar. 2013); and Schindler et al., "International Debt Shifting: Do Multinationals Shift Internal or External Debt?" VfS Annual Conference (2013).

⁴⁵ For an overview of patent boxes in Europe, see Elke Asen and Bunn, "Patent Box Regimes in Europe," Tax Foundation (Nov. 26, 2020).

⁴⁶ Dischinger and Riedel, "Corporate Taxes and the Location of Intangible Assets Within Multinational Firms," 95(7-8) *J. Pub. Econ.* 691 (Aug. 2011).

⁴⁷ Karkinsky and Riedel, "Corporate Taxation and the Choice of Patent Location Within Multinational Firms," 88(1) *J. Int'l Econ.* 176 (Sept. 1, 2012).

⁴⁸ Dudar and Voget, "Corporate Taxation and Location of Intangible Assets: Patents vs. Trademarks," ZEW — Centre for European Economic Research Discussion Paper 16-015 (Mar. 24, 2016).

effective tax rates on income derived from patents than in countries with higher rates.⁴⁹ They also found that businesses prefer countries where they have associated real innovative activity. Further, while patent boxes do attract IP from foreign countries, the tax revenue loss from the lower preferential rate tends to exceed the revenue gains from additional patents, resulting in a net revenue loss.

Treaty Shopping

There is considerable variation in the withholding rates in the more than 3,000 bilateral tax treaties, which allows MNEs to link treaties in a way that channels cross-border payments through the countries with the lowest rates.

In 2008 Alfons J. Weichenrieder and Jack Mintz became the first to provide empirical evidence for treaty shopping by using German microdata that show that higher bilateral withholding taxes on foreign direct investment to (from) Germany increase the probability that outward (inward) investment is diverted via a third country.⁵⁰ Francis Weyzig found similar evidence for the Netherlands.⁵¹ Beer and Jan Loeprick found that when sub-Saharan countries sign treaties with investment hubs, they experience substantial corporate tax revenue loss (around 15 percent) that is not associated with additional investment.⁵²

Avoiding Residence-Country Taxation

A worldwide tax system includes foreign-earned income in the domestic tax base and grants credits for taxes paid abroad. Strategies to avoid paying corporate income tax in the residence country are based on the system's design.

Tax Deferral

Because worldwide taxation with deferral imposes residence tax only on repatriation of

profits, MNEs can avoid taxes by retaining foreign earnings abroad instead of paying them back to the parent company. In theory, deferring repatriation reduces only the present value of taxes paid, not the total tax bill (assuming tax rates stay constant). However, if taxes on repatriated income are expected to be lowered in the future — even if only temporarily, as in the 2004 U.S. repatriation tax holiday — there is a clear incentive to use tax deferral.

Empirical studies using the adoption of a territorial tax system by Japan and the United Kingdom as quasi-experiments show that exempting foreign earnings boosts dividend repatriation.⁵³ When the U.S. tax rate on repatriated dividends was reduced from 35 percent to 5.25 percent during the 2004 holiday, corporations repatriated \$312 billion.

The TCJA levied a one-time transition tax on unrepatriated foreign earnings to prevent MNEs benefiting from the new territorial system without first paying taxes on earnings that would have eventually been taxed under the old worldwide system. Foreign illiquid assets were taxed at 8 percent while liquid assets were taxed at 15.5 percent. Repatriations increased significantly in response to the TCJA. In 2018, \$851 billion was returned to U.S. shareholders, a volume 4.6 times larger than in 2017. Repatriations remained at an elevated level through the first three quarters of 2020.⁵⁴

Scott D. Dyreng and Kevin S. Markle showed that under the U.S. worldwide tax system, financially constrained companies shifted approximately 20 percent less income from the United States to foreign countries than their unconstrained peers.⁵⁵ That is because constrained companies might have to repatriate their shifted earnings in the short term, which would trigger the same U.S. tax as if it had not been shifted, thus diminishing the benefits of profit shifting.

⁴⁹ Griffith, Miller, and O'Connell, "Ownership of Intellectual Property and Corporate Taxation," 112 *J. Pub. Econ.* 12 (Apr. 2014).

⁵⁰ Weichenrieder and Mintz, "What Determines the Use of Holding Companies and Ownership Chains?" Oxford University Centre for Business Taxation Working Paper 0803 (2008).

⁵¹ Weyzig, "Tax Treaty Shopping: Structural Determinants of Foreign Direct Investment Routed Through the Netherlands," 20 *Int'l Tax & Pub. Fin.* 910 (2013).

⁵² Beer and Loeprick, "The Cost and Benefits of Tax Treaties With Investment Hubs: Findings From Sub-Saharan Africa," IMF Working Paper 18/277 (Oct. 24, 2018).

⁵³ Makoto Hasegawa and Kozo Kiyota, "The Effect of Moving to a Territorial Tax System on Profit Repatriation: Evidence From Japan," 153 *J. Pub. Econ.* 92 (Sept. 2017); and Peter H. Egger et al., "Consequences of the New UK Tax Exemption System: Evidence From Micro-Level Data," 125(589) *Econ. J.* 1764 (Dec. 1, 2015).

⁵⁴ Bunn, "U.S. Cross-Border Tax Reform and the Cautionary Tale of GILTI," Tax Foundation, Feb. 17, 2021.

⁵⁵ Dyreng and Markle, "The Effect of Financial Constraints on Income Shifting by U.S. Multinationals," 91(6) *Acct. Rev.* 1601 (Feb. 2016).

Anticipating that inability to defer repatriation over a longer period, financially constrained companies engaged in less profit shifting than unconstrained ones.

Corporate Inversions

In countries with worldwide tax systems, an MNE can avoid repatriation taxes by changing the residence of the corporation, or inverting roles in the corporate group. That is particularly relevant for countries with high corporate rates, because an MNE's tax savings from an inversion can be substantial.

Between 1997 and 2007, about 6 percent of all MNEs globally relocated their headquarters.⁵⁶

Corporate inversions by U.S. parent companies have generally been associated with substantial tax savings. Using a data set of 60 U.S. MNEs that restructured between 1983 and 2015, the Congressional Budget Office showed that those MNEs reduced their ratio of worldwide tax expense to earnings from an average of 29 percent the year before the inversion to an average of 18 percent the year after, saving on average about \$45 million in the year after the inversion.⁵⁷ Further empirical evidence shows that both repatriation taxes and CFC rules lead to more corporate inversions.⁵⁸

Effects of Antiavoidance Measures

The OECD's BEPS project has led to numerous countries implementing or strengthening antiavoidance measures. As a result, almost all OECD countries now have transfer pricing regulations (some of which have been in place for decades) and require MNEs to comply with thin capitalization rules, CFC rules, nexus requirements, and other antiavoidance measures (see Table 3).

However, because most countries have only recently implemented those measures, it is still relatively unclear how effective they are — particularly from a global perspective. Also, there is scarce but growing evidence that some of the measures can have adverse economic effects.

⁵⁶ IMF, *supra* note 20; and Voget, "Relocation of Headquarters and International Taxation," 95(9-10) *J. Pub. Econ.* 1067 (Oct. 2011).

⁵⁷ CBO, "An Analysis of Corporate Inversions" (Sept. 18, 2017).

⁵⁸ Voget, *supra* note 56.

Table 3. Overview of Tax Avoidance Strategies and Corresponding Antiavoidance Measures

Tax Avoidance Strategy	Antiavoidance Measure
Territorial Tax System	
Transfer mispricing	Transfer pricing regulations
International debt shifting	Thin capitalization rules
Strategic location of IP	Modified nexus requirements
Treaty shopping	Anti-treaty-shopping provisions
Various types of profit shifting	CFC rules
Worldwide Tax System	
Tax deferral	CFC rules for specific types of income
Corporate inversions	Anti-inversion rules
<i>Source:</i> Author's compilation.	

Transfer Pricing Regulations

Empirical evidence suggests that transfer pricing rules are effective in curbing international tax avoidance. Riedel, Theresa Zinn, and Patricia Hofmann showed that implementing transfer pricing rules can reduce tax sensitivity of corporate profits by 50 percent.⁵⁹ Theresa Lohse and Riedel's evidence points in the same direction.⁶⁰ However, Beer and Loerprick showed that the effect is much smaller for companies with high intangible endowments.⁶¹

In 2018 de Mooij and Liu found that transfer pricing rules can significantly harm real investment because they increase the effective tax rate on multinationals by eliminating profit-shifting opportunities.⁶²

⁵⁹ Riedel, Zinn, and Hofmann, "Do Transfer Pricing Laws Limit International Income Shifting? Evidence From European Multinationals," University of Bochum Discussion Paper (Oct. 26, 2015).

⁶⁰ Lohse and Riedel, "Do Transfer Pricing Laws Limit International Income Shifting? Evidence From European Multinationals," CESifo Working Paper 4404 (Oct. 2, 2013).

⁶¹ Beer and Loerprick, "Profit Shifting: Drivers of Transfer (Mis)Pricing and the Potential of Countermeasures," 22 *Int'l Tax & Pub. Fin.* 426 (2015).

⁶² De Mooij and Liu, "At a Cost: The Real Effects of Transfer Pricing Regulations," IMF Working Paper 18/69 (Mar. 23, 2018).

Thin Capitalization Rules

Ireland and Israel are the only OECD countries without some type of thin cap rules. The TCJA limited interest deductibility in the United States to 30 percent of adjusted taxable income.⁶³

Overesch and Wamser showed that thin cap rules induce much less internal borrowing, implying that the rules indeed limit tax avoidance through international debt shifting.⁶⁴ Estimates by Richard Carrizosa, Fabio B. Gaertner, and Dan Lynch suggested that the interest limitations enacted as part of the TCJA led to a decrease in debt of 5.8 percent relative to the average debt-to-asset ratio of affected businesses pre-TCJA.⁶⁵

However, Bilicka, Qi, and Xing questioned the effectiveness of thin cap rules at the global level.⁶⁶ They showed that the 2010 U.K. reform to require an MNE's interest expense deductions for U.K. tax purposes to be below a fixed ratio relative to the MNE's worldwide debt holdings had both debt shifting and real economic activity effects. First, affected MNEs reduced the amount of debt held in the United Kingdom and increased debt held abroad, implying that from a global perspective, thin cap rules may be ineffective in countering profit shifting. Second, and at the same time, affected multinationals reduced total assets, fixed assets, and employment in their U.K. subsidiaries by 7.5 percent, 11.4 percent, and 3.9 percent, respectively, while substantially increasing real operations in their non-U.K. subsidiaries, especially in those to which they moved debt. Those findings imply that thin cap rules may harm the country that implements them but benefit other countries.

Buettner, Overesch, and Wamser estimated that thin cap rules increase the cost of capital and thus harm employment and investment for affected businesses, especially in high-tax host

countries.⁶⁷ Using a micro-level data set covering MNE affiliates in 34 countries from 2006 to 2014, de Mooij and Liu in 2021 found that at an average corporate rate of 27 percent, a thin cap rule on average reduces investment of multinational affiliates by 20 percent, with the effect (1) critically depending on the corporate rate in the country where the rule is introduced and (2) being stronger at higher corporate rates.⁶⁸

Similarly, Blouin et al. showed that thin cap rules significantly affect an MNE's capital structure and market valuation.⁶⁹

Modified Nexus Requirement

Patent box regimes came under scrutiny during the OECD's BEPS project, partly because few required local R&D investment, making it relatively easy to shift IP rights without the underlying R&D activities and thus avoid taxes. In 2015 OECD countries agreed on a so-called modified nexus approach for patent boxes as part of BEPS action 5.

The modified approach limits the scope of qualifying IP assets and requires a link among R&D expenditures, IP assets, and IP income. In other words, a company can take advantage of the reduced tax rate only if it undertook the R&D underlying the IP-derived income. Marketing-related IP assets such as trademarks do not qualify for tax benefits under the nexus standard, however.

To be in line with the new approach, previously noncompliant countries either abolished or amended their patent box regimes, and grandfathering rights were put in place.

No academic studies that estimate the revenue and economic effects of the new modified nexus approach could be found at the time of writing this article.

⁶³ Until January 1, 2022, ATI is similar to earnings before interest, taxes, depreciation, and amortization; for tax years beginning after December 31, 2021, ATI is similar to earnings before interest and taxes.

⁶⁴ Overesch and Wamser, "Corporate Tax Planning and Thin-Capitalization Rules: Evidence From a Quasi-Experiment," 42(5) *Applied Econ.* 563 (2010).

⁶⁵ Carrizosa, Gaertner, and Lynch, "Debt and Taxes? The Effect of TCJA Interest Limitations on Capital Structure," SSRN (Sept. 10, 2020).

⁶⁶ Bilicka, Qi, and Xing, "Real Responses to Anti-Tax Avoidance: Evidence From the UK Worldwide Debt Cap," SSRN (rev. Dec. 2, 2020).

⁶⁷ Buettner, Overesch, and Wamser, "Anti Profit-Shifting Rules and Foreign Direct Investment," 25 *Int'l Tax & Pub. Fin.* 553 (2018).

⁶⁸ De Mooij and Liu, "At a Cost: The Real Effects of Thin Capitalization Rules," IMF Working Paper 2021/023 (Feb. 5, 2021).

⁶⁹ Blouin et al., "Thin Capitalization Rules and Multinational Firm Capital Structure," IMF Working Paper 14/12 (Jan. 24, 2014).

CFC Rules

CFC rules expand taxation rights of territorial systems to foreign jurisdictions under specific circumstances while avoiding the impact of deferral under worldwide tax systems.⁷⁰ Switzerland is the only OECD country without CFC rules.⁷¹

James F. Albertus found that CFC rules are effective in reducing profit shifting.⁷² However, he also provided evidence that CFC rules significantly harm real economic activity such as investment and employment in the country where the foreign subsidiary is located. Egger and Wamser found that German MNEs' foreign fixed assets decline by an average of about €7 million in response to CFC treatment.⁷³

Sarah Clifford showed that CFC rules lead to bunching behavior.⁷⁴ She provided evidence that multinationals redirect profits into subsidiaries just above the CFC threshold and change incorporation patterns to place fewer subsidiaries below, and more above, the threshold. The resulting increase in global tax revenue accrues to the rule-enforcing country, as well as the country the profits are shifted to.

⁷⁰ Another much broader form of taxing foreign low-taxed income under a territorial system is the U.S. GILTI regime.

⁷¹ In the United States, CFC rules are referred to as subpart F rules.

⁷² Albertus, "The Real Effects of U.S. Tax Arbitrage by Foreign Multinational Firms," SSRN (revised Oct. 27, 2018).

⁷³ Egger and Wamser, "The Impact of Controlled Foreign Company Legislation on Real Investments Abroad. A Multi-Dimensional Regression Discontinuity Design," 129 *J. Pub. Econ.* 77 (Sept. 2015).

⁷⁴ Clifford, "Taxing Multinationals Beyond Borders: Financial and Locational Responses to CFC Rules," 173 *J. Pub. Econ.* 44 (May 2019).

Conclusion

Although profit shifting has been debated and addressed extensively over the last decade, academic evidence on its magnitude and channels remains scarce — and in some cases, ambiguous. While the academic community agrees that multinationals engage in tax planning to minimize their global tax bills, there is no consensus on the amount of corporate revenue lost to profit shifting. That largely results from a lack of data, because financial accounts databases tend to be incomplete and governments generally do not share MNEs' tax return data with researchers.

Moreover, the TCJA's reduction of the U.S. corporate rate and novel international provisions have likely altered many MNEs' tax strategies in major ways. However, because of a data lag, to date almost no studies capture the new international tax environment, adding additional uncertainty to existing estimates of the extent of profit shifting.

Despite that lack of evidence, particularly since the completion of BEPS 1.0 in 2015, many governments have implemented new antiavoidance measures. Evidence on the effects of those measures is also relatively scarce — again, mainly because of a lack of recent data.

Existing research on antiavoidance measures suggests there is a trade-off between countering tax avoidance and encouraging economic growth. As policymakers consider additional measures to change international tax rules, they should be cautious to avoid affecting hiring and investment decisions, which could have implications for global growth. ■