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POLICY BRIEF

17-29 United States Is Outlier in Tax Trends in Advanced and Large Emerging Economies

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The US Congress and President Donald Trump say they want to lower corporate tax rates and simplify the tax code. Policymakers in Washington should keep the global context in mind, because new tax legislation underway in other countries will affect US competitiveness.

Changes in tax legislation have been implemented or are anticipated in some of the world's largest economies, for example Australia, China, France, Germany, India, and Saudi Arabia. The sources of government revenues in advanced and large emerging economies have converged significantly in the past 30 years. The average corporate income tax rate has fallen to about 20 to 25 percent, nearly every country has introduced carbon taxes, and personal income taxes have stabilized around 35 to 45 percent.

The United States stands out in this comparative analysis as relying primarily on direct taxes, in particular on high corporate income taxes. The US tax system is an anomaly in another respect: It has no value-added tax (VAT) or carbon tax. Should the Trump administration manage to reduce the corporate tax rate substantially, the United States will look more like the rest of the world. However, the US Congress has yet to seriously discuss a shift to indirect taxes like the VAT to make up for revenues that would be lost under a reduced corporate tax rate.

By contrast, the share of indirect taxes in total revenue has risen in other countries, helped by the adoption of the VAT in some large emerging economies, such as India and Saudi Arabia, and the establishment of carbon taxes in nearly every large economy apart from Brazil and the United States. The average VAT rate in advanced economies in 2017 is 19 percent, with the United States the only country without a VAT. The median carbon tax in 2016 was $8 per ton of CO_2 emissions, with wide variance across countries. Sweden charges $130 per ton, while Poland charges $1 per ton.

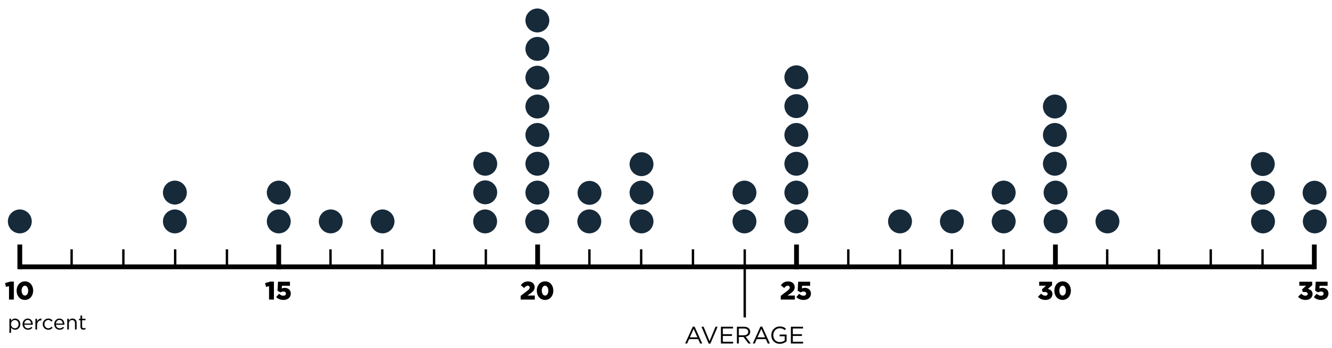
Since the fall of communism, 12 countries in Eastern Europe have introduced flat taxes with low corporate and personal income rates,[1] a system not followed elsewhere. This experience demonstrates how historical patterns persist in the design of fiscal systems: Only a significant disruption can bring about radical reform. The low price of oil has presented such a disruption in the case of Saudi Arabia, which has introduced indirect taxes for the first time in its history. The introduction of the carbon tax in every advanced economy but the United States is a consequence of another disruptive force: climate change.

This Policy Brief amasses data on all major statutory taxes at the central government level in 46 advanced and large emerging economies and illustrates the differences in tax legislation. The inclusion of large economies outside the Organization for Economic Cooperation and Development (OECD) in this new dataset goes beyond previous analyses. Such an expanded focus is important, as these economies generate over 40 percent of global income.[2]

1. These 12 countries are Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Russia, Serbia, and Slovakia.

2. The additional countries are: Bulgaria, Croatia, Lithuania, and Romania in Eastern Europe; the smallest EU members Cyprus and Malta; and the four largest developing economies Brazil, China, India, Russia, and Saudi Arabia.

Figure 1 **Statutory corporate income tax rates for advanced and large emerging economies, 2017**



Bulgaria	10.0	Finland	20.0	South Korea	24.2	India	30.0
Cyprus	12.5	Iceland	20.0	Austria	25.0	Japan	30.0
Ireland	12.5	Russia	20.0	China	25.0	Mexico	30.0
Latvia	15.0	Saudi Arabia	20.0	Israel	25.0	Germany	30.2
Lithuania	15.0	Turkey	20.0	Netherlands	25.0	Italy	31.4
Romania	16.0	United Kingdom	20.0	Norway	25.0	Belgium	34.0
Slovenia	17.0	Portugal	21.0	Spain	25.0	Brazil	34.0
Czech Republic	19.0	Switzerland	21.1	Canada	26.8	France	34.4
Hungary	19.0	Denmark	22.0	New Zealand	28.0	Malta	35.0
Poland	19.0	Slovakia	22.0	Greece	29.0	United States	35.0
Croatia	20.0	Sweden	22.0	Luxembourg	29.2		
Estonia	20.0	Chile	24.0	Australia	30.0		

Note: Figures are rounded on the scale. Statutory tax rates are the legally imposed rates, not including any tax benefits.
Source: World Bank's Doing Business project, at www.doingbusiness.org.

CORPORATE INCOME TAX RATES CONVERGING BELOW 25 PERCENT

Politicians favor lower corporate income tax rates because "[e]ffective corporate tax rates have a large and significant adverse effect on corporate investment and entrepreneurship, even when controlling for other related variables" (Djankov et al. 2010, 31).

Since 1986 the average corporate tax rate across OECD countries fell from 49 to 23 percent in 2017 (the average for all 46 countries examined in this paper is 24 percent). In the 15 original member countries of the European Union, that average has plunged 22 percentage points from 48 to 26 percent (Åslund and Djankov 2017, 42), with France at the top with a 34.4 percent corporate tax rate and Ireland the lowest at 12.5 percent. Germany has the fourth-highest corporate tax rate in the European Union, at 30.2 percent (Belgium is second, at 34.0 percent; Italy is third, at 31.4 percent). Among major non-European economies, Australia, Japan, and Mexico have a corporate tax rate of 30 percent. Turkey has the lowest non-EU corporate tax rate, at 20 percent (figure 1).

The European Union has not undertaken coordinated corporate tax cuts, as corporate tax law is not part of the European Commission's responsibilities. Instead, tax changes in Europe have been driven either by banking crises or perceived tax competition from newer members. In Northern Europe, the banking crises of the early 1990s ushered in a period of tax cuts (Auerbach, Hassett, and Södersten 1995). Sweden, for example, slashed its corporate rate from 57 to 30 percent in 1991. Finland reduced its tax rate gradually from 52 to 25 percent between 1989 and 1993. These changes did not spread beyond the crisis-affected countries. However, once Estonia and Hungary implemented a low corporate income tax in 1994 and 1995, respectively, a domino effect followed. Poland and Slovakia were next, introducing a 19 percent tax in 2004. Austria, which had intended to reduce its corporate income tax rate from 34 to 31 percent, instead announced a reduction to 25 percent in 2005 (Goliaš 2004), and Germany went from 38.9 to 30.2 percent three years later. The Czech Republic cut its corporate tax rate to 19 percent in 2010.

In July 2017, French president Emmanuel Macron announced an initiative to harmonize corporate taxes across Europe. Macron declared that France would drop the corporate tax rate to 25 percent in pursuit of such harmonization. Finance minister Bruno Le Maire explained the next steps, "The objective is a common corporate tax with Germany in

2018 which should be the basis for a harmonization at the level of the 19 member states of the euro zone."[3] German finance minister Wolfgang Schäuble set September 2017 as the deadline for a joint corporate tax reform proposal.[4] As of November details of a proposal have not been released, and the results of the German parliamentary elections may cause further delay.

Since 1986 the average corporate tax rate across OECD countries fell from 49 to 23 percent in 2017.

If France and Germany manage to reduce their corporate tax rate to 25 percent, the remaining five euro area countries with rates exceeding this threshold (Belgium, Greece, Italy, Luxembourg, and Malta) will likely follow suit. Full harmonization is unlikely, however, as countries with corporate tax rates below this threshold are loathe to raise taxes. The 25 percent cutoff will effectively become the upper bound for corporate taxes in Europe, with the average rate falling to about 20 percent.

In the United States, a revision of the widely criticized corporate tax is among the top agenda items of the Trump administration and the Republican leadership of Congress, and even many Democrats say the time has come to revamp the tax to make US-based multinational corporations more competitive in the global economy. US officials initially said they wanted to reduce the federal corporate income tax rate to 15 percent from the current 35 percent. While the average effective corporate tax rates in the United States are somewhat lower than the statutory rate, at 29 percent they are still the highest among advanced economies.[5]

A multitude of problems stand in the way of such an overhaul, such as whether the change in the tax code will add to the federal deficit, require the elimination of tax preferences, or require increases in other taxes to replace lost revenues—and, most important, whether the tax changes can be negotiated in a bipartisan manner. In early August 2017 White House economic adviser Gary Cohn suggested the corporate tax would be cut in line with the average rate among other advanced economies to 20 to 25 percent.[6] Congressman Paul Ryan, the Republican speaker of the House of Representatives, set his goal at 22.5 percent.[7]

The aspirations of the new French and US administrations to reduce the corporate income tax rate come after similar revisions in Japan to reduce the tax rate below 30 percent in 2016 and legislative changes in Australia to bring down the rate to 25 percent by 2025.[8] With these changes in place, the corporate income tax rate in advanced and large emerging economies will converge below 25 percent.

PERSONAL INCOME TAXES: DRIVEN DOWN IN THE 1980S, INCHING UP SINCE 2008

Governments have realized that they cannot tax corporations heavily, as they can move shop or lobby for loopholes. But individuals are not so resourceful, partly because their residences are usually permanent and they do not have large legal teams to advise them on optimal tax locations. Therefore they tend to be taxed more than businesses, and this divergence has become apparent in the last three decades (figure 2).

Until the 1980s, the highly progressive income tax was seen as a good instrument for social policy. The objective was to check the wealth of the rich, and studies on personal income taxation of the period did not even mention tax evasion as a consideration. Eventually, the stifling effect of high marginal taxes on economic activity became a concern in the influential work of economists Milton Friedman, Friedrich Hayek, and James Buchanan. They emphasized that high marginal taxes perverted incentives. In addition, national economies were no longer closed and strictly regulated, and globalization offered ever more opportunities for

3. Francois de Beaupuy, Caroline Connan, and Geraldine Amiel, "France and Germany Plan Crackdown on Apple Tax Loopholes," *Washington Post,* August 7, 2017, https://washpost.bloomberg.com/Story?docId=1376-OU66YV6S972801-3A9I5SPC9VB0SBBE12JEID7NL0 (accessed on October 12, 2017).

4. Paul Carrel, "German, French Ministers to Present Tax Harmonization Plan," *US News & World Report,* July 11, 2017, https://money.usnews.com/investing/news/articles/2017-07-12/german-french-ministers-to-present-tax-harmonization-plan-handelsblatt (accessed on October 12, 2017).

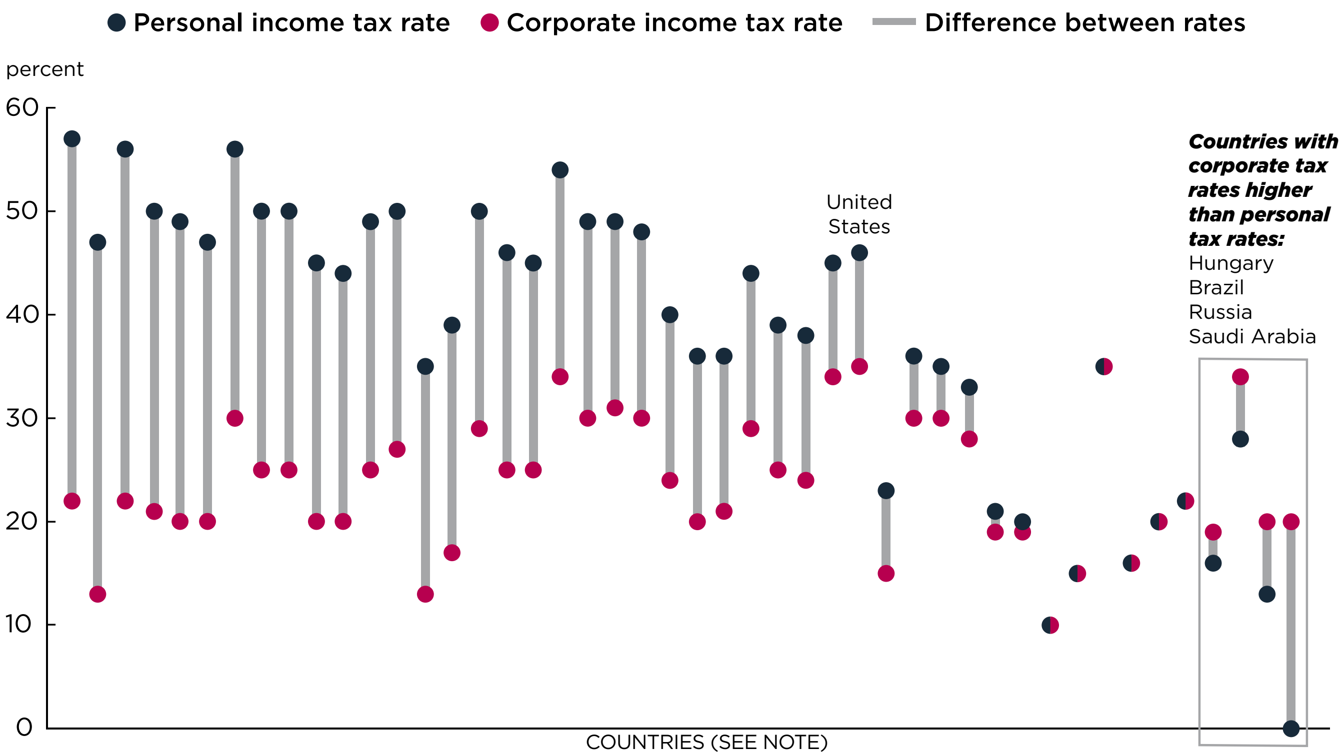
5. CBO 2017, https://www.cbo.gov/sites/default/files/115th-congress-2017-2018/reports/52419-internationaltaxrate-comp.pdf.

6. Alexis Leondis, "Cohn Says Tax Writers Have to Get Corporate Rate Below 23%," *Bloomberg,* August 4, 2017, https://www.bloomberg.com/news/articles/2017-08-04/cohn-says-u-s-tax-writers-have-to-get-corporate-rate-below-23 (accessed on October 12, 2017).

7. David Morgan and David Lawder, "U.S. corporate tax cut goal in doubt, Trump dines with senators," *Reuters*, September 12, 2017, https://www.reuters.com/article/us-usa-tax/u-s-corporate-tax-cut-goal-in-doubt-trump-dines-with-senators-idUSKCN1BN1L6 (accessed on October 12, 2017).

8. Takaya Yamaguchi, "Japan to cut corporate tax rate to 29.74 percent in two stages," *Reuters,* December 11, 2015, https://www.reuters.com/article/us-japan-economy-tax-idUSKBN0TV02D20151212 (accessed on October 12, 2017); and Les Nielson, "Corporate tax rate reduction — large businesses," Budget Review 2016–17, Parliament of Australia, http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/BudgetReview201617/Corporate (accessed on October 12, 2017).

Figure 2 **Top marginal personal income tax rates and statutory corporate income tax rates for advanced and large emerging economies, 2017**



Note: Countries are ordered by difference between personal and corporate tax rates, from left to right: Sweden, Ireland, Denmark, Portugal, Finland, Croatia, Japan, Austria, Israel, United Kingdom, Iceland, Netherlands, Canada, Cyprus, Slovenia, Greece, Spain, China, France, Australia, Italy, Germany, Chile, Turkey, Switzerland, Luxembourg, Norway, South Korea, Belgium, United States, Latvia, India, Mexico, New Zealand, Poland, Czech Republic, Bulgaria, Lithuania, Malta, Romania, Estonia, Slovakia, Hungary, Brazil, Russia, and Saudi Arabia.
Sources: World Bank's Doing Business project and KPMG.

tax avoidance and tax evasion. These criticisms informed President Ronald Reagan's transformation of US taxation. To begin with, Reagan cut the highest federal personal income tax from 70 percent to 50 percent in 1981. Five years later, he succeeded in reducing the top federal income tax further to 28 percent. Admittedly, this low level of taxation lasted for only a few years, and soon the highest federal tax rate went up to about 40 percent.[9]

Reagan's tax reform had an impact on fiscal thinking in Europe, and Prime Minister Margaret Thatcher pursued the same ideas in the United Kingdom by reducing the top marginal personal income tax rate from 83 percent to 60 percent. But the end of communism in Eastern Europe brought about the biggest challenge to traditional thinking in Western Europe about tax systems. Under communism, state banks had carried out tax collection, and there was no system to collect personal income taxes from workers and entrepreneurs. Tax evasion thrived. The communist standard had been low flat income taxes at around 13 percent, though some countries, notably Hungary, pursued social experiments at the end of communism with marginal income taxes as high as 60 percent. But personal income taxes were rather insignificant for state revenues and hence received little attention (Åslund and Djankov 2017, 50).

Immediately after the fall of communism, East European countries adopted progressive income taxes, but they malfunctioned because of widespread tax evasion. In 1994, Estonian prime minister Mart Laar pioneered a new tax model. "Its basic principles were clear and simple: few taxes, broad tax bases, no loopholes, simplicity and low rates" (Laar 2014, 77). The main novelty was a flat income tax. Initially, the Estonian flat tax was set at 26 percent, but it has gradually declined to 21 percent. Estonia subsequently equalized the personal income tax with the corporate income tax, because these taxes tended to be fungible for wealthy people and wealthy businessmen should not be taxed less than other people.

Altogether a dozen post-communist countries have enacted flat taxes ranging from 10 to 25 percent, usually set-

9. Floyd Norris, "Tax Reform Might Start With a Look Back to '86," *New York Times*, November 22, 2012, http://www.nytimes.com/2012/11/23/business/a-starting-point-for-tax-reform-what-reagan-did.html (accessed October 25, 2017).

ting the flat personal income tax rate at the same level as the corporate income tax rate (Åslund and Djankov 2017, 54). Bulgaria adopted the lowest tax rates, setting its personal income tax and corporate income tax rates at 10 percent in 2008, and maintained this rate during the global financial crisis. As the poorest EU country with problematic governance, Bulgaria uses low taxes to be competitive and avoid corruption in its tax administration. In Eastern Europe only Croatia, Poland, and Slovenia stuck to progressive income taxes, though the Czech Republic and Slovakia abandoned their flat income taxes in 2008–11 during the global financial crisis (Djankov 2017, 6).

The difference in top marginal income taxes from country to country in the European Union is remarkably large, being 57 percent in Sweden but only 10 percent in Bulgaria—a gap of 47 percentage points. In France, President Francois Hollande imposed a personal income tax of 75 percent on income above €1 million in 2010. Two years later however, the courts struck down this tax as unconstitutional.[10]

The highest marginal income taxes declined over the period starting in the 1980s, and by 2008 several West European countries had maximum tax rates of 40 percent (Italy, Luxembourg, the United Kingdom, Greece, Ireland, and Portugal), and the average had fallen to 47 percent. But after the global financial crisis, the average top marginal tax rate surged to above 50 percent. This policy change was driven by a new political focus on rectifying inequality by taxing the rich. Sweden has the highest top marginal tax rate at 57.1 percent, followed by Denmark at 55.8 percent and France at 54 percent. Greece and Portugal increased their personal income taxes to 50 percent in 2011 and 2012, respectively.

Among non-European advanced economies, Japan has the highest top marginal tax rate at 55.7 percent, with Australia, Canada, and Israel at 49 percent. Turkey has the lowest top marginal rate at 33 percent. Saudi Arabia is the only large economy without a personal income tax. Personal income tax rates in the United States currently have a ceiling of 39.6 percent. President Trump's outline of personal income tax legislation offers to reduce the number of individual income tax brackets from "seven to three—10, 25, and 35 percent—easing the tax burden on most Americans...."[11] This proposal however is less advertised by the US administration than the corporate income tax cut proposal and may be discarded altogether.

A GRADUAL SHIFT TO INDIRECT TAXES: THE VAT AND CARBON TAX

The reduction in the corporate income tax rate, and the associated reduction in the marginal personal income tax rate in some European countries, is counterbalanced by higher proportions of indirect taxes, for example in Bulgaria (53.5 percent of total tax revenue), Croatia (52.4 percent), and Hungary (48.4 percent). The two types of taxes that have gained prominence in advanced and large emerging economies are the value-added tax (VAT) and the carbon tax.

Indirect taxes have become important for state revenues in Europe, yielding nearly 14 percent of GDP on average. VAT rates in the European Union range from 17 to 25 percent, with an average of 21 percent (World Bank 2017). Hungary is an outlier, with a VAT rate of 27 percent, which was introduced in 2011 to bring additional government revenue and close a large budget deficit (figure 3). The revenues from these indirect taxes vary less than from other taxes, from 10.5 percent of GDP (Slovakia) to 18.9 percent of GDP (Sweden) in 2016.

All countries that employ the VAT either exempt exports or rebate the entire VAT paid on exports. Similarly, all countries that levy a VAT also levy it on their imports. This structure of levies has two positive effects. Domestically, all goods pay the same amount of tax regardless of country of origin. Second, internationally, the VAT places exports on an equal footing with products from other countries because they all face the same amount of tax regardless of where they are sold.

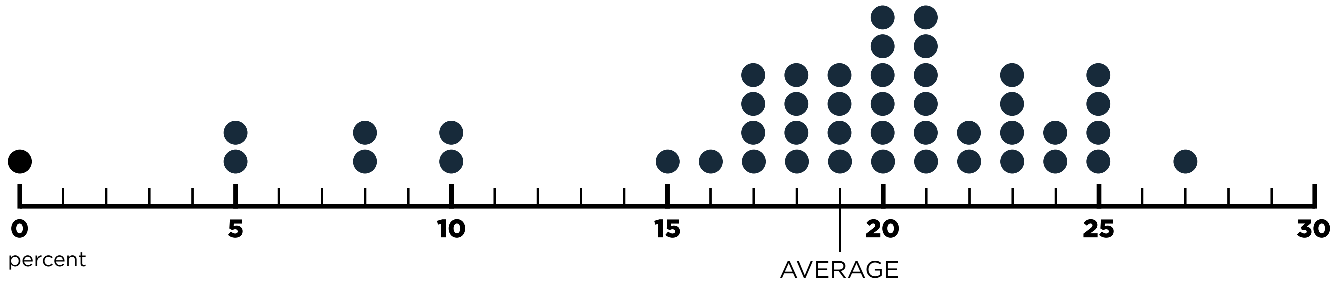
On the downside, the VAT has three drawbacks: First, the bookkeeping involved has a higher cost than for a sales tax. Second, VAT fraud, especially for exports, is a problem in some countries, particularly for energy products. Third, the value-added tax is regressive, as the poor spend a larger share of their income on consumption than the rich. In many advanced economies basic food products like milk, bread, and some medical products are exempt from the VAT, to ensure that the poor can buy these necessities. Some countries exempt textbooks or print items more generally. Among advanced economies, France has the most generous VAT exemptions scheme.

Every EU country has the VAT. In 1967, the first two EU-wide VAT directives were adopted. They laid down the general structure of the common tax system but left it to the member states to determine coverage and rates. Forty years later, in 2007, VAT rates were harmonized, requiring a minimum rate of 15 percent and allowing two reduced

10. Ben Carter, "Which country has the highest tax rate?," *BBC Magazine*, February 25, 2014, http://www.bbc.com/news/magazine-26327114 (accessed on October 26, 2017).

11. Julie Davis and Alan Rappeport, "White House Proposes Slashing Tax Rates, Significantly Aiding Wealthy," *New York Times,* April 26, 2017, https://www.nytimes.com/2017/04/26/us/politics/trump-tax-cut-plan.html?mcubz=0 (accessed on October 12, 2017).

Figure 3 Value-added tax rates for advanced and large emerging economies, 2017



United States	0	Luxembourg	17	France	20	Ireland	23
Canada	5	India	18	Slovakia	20	Poland	23
Saudi Arabia	5	Malta	18	United Kingdom	20	Portugal	23
Japan	8	Russia	18	Belgium	21	Finland	24
Switzerland	8	Turkey	18	Czech Republic	21	Iceland	24
Australia	10	Chile	19	Latvia	21	Croatia	25
South Korea	10	Cyprus	19	Lithuania	21	Denmark	25
New Zealand	15	Germany	19	Netherlands	21	Norway	25
Mexico	16	Romania	19	Spain	21	Sweden	25
Brazil	17	Austria	20	Italy	22	Hungary	27
China	17	Bulgaria	20	Slovenia	22		
Israel	17	Estonia	20	Greece	23		

Source: World Bank's Doing Business project, at www.doingbusiness.org.

rates of at least 5 percent for a long list of specified goods like textbooks and food products.

China implemented a VAT in 1994 and currently collects nearly 48 percent of its revenues from it. The main rate is 17 percent with a number of exceptions where the prevailing rate is set at 13 percent. Russia charges an 18 percent VAT, while Brazil charges a base VAT of 17 percent, and some Brazilian states add a percentage point or two above that base.

The largest change in value-added taxation is taking place in India, where a nationwide tax at 18 percent, known in India as the goods and services tax, replaces over a dozen excise duties, services taxes, and interstate customs duties and surcharges, as well as the state-level VAT and the interstate entry tax, which are charged as goods cross state borders in India. Of India's 29 states, 22 have already approved the tax legislation and are scrapping tax and customs checkpoints to comply with it.[12]

The tax reform, originally contemplated in 1999, failed twice to pass in parliament until it was adopted by Prime Minister Narendra Modi's government in 2017. The short-term effects of this change are well-documented: A quarter million accounting and training jobs have been created to help the approximately 30 million businesses deal with the new tax. Beyond this immediate effect, interstate trade is bound to increase, as the current system encourages suboptimal production chains within states. Economists at the US Federal Reserve Board estimate that the long-term effect will add 4.2 percent of GDP to India's manufacturing output. With current technology, this macroeconomic expansion is the equivalent of adding 10.5 million new jobs (Van Leemput and Wiencek 2017).

A 5 percent VAT is scheduled for implementation in Saudi Arabia in 2018.[13] The main reasons for its introduction are low commodity prices and the need for new sources of public revenue.

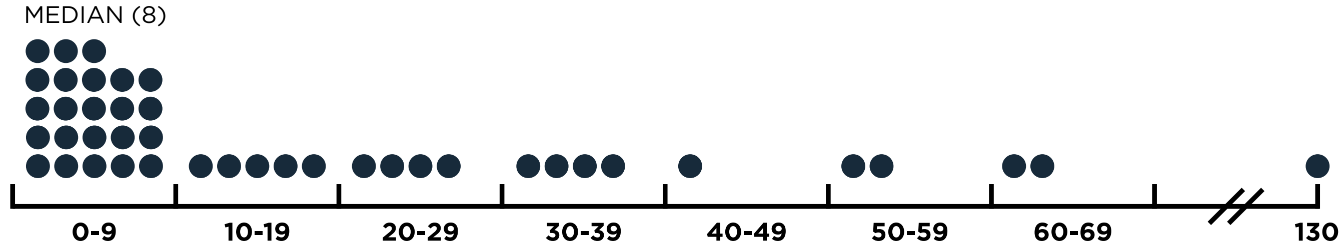
The United States is the only advanced economy without a VAT. In early 2017, however, the VAT became the subject of renewed interest because of its "border adjustability."[14] The existence of state and municipal sales taxes in the United States make the adoption of a federal-level VAT unlikely. The second worry in introducing a VAT to the United States

12. G. S. G. Krishnan, "22 states scrap checkposts for smooth GST rollout," *Times of India,* June 4, 2017, http://timesofindia.indiatimes.com/india/22-states-scrap-checkposts-for-smooth-gst-rollout/articleshow/59432654.cms (accessed on October 12, 2017).

13. Sarah Diaa, "GCC states in agreement on 5% VAT," *Gulf News*, August 30, 2017, http://gulfnews.com/business/economy/gcc-states-in-agreement-on-5-vat-1.1677576 (accessed on October 12, 2017).

14. Caroline Freund, "PIIE Debates Border Adjustment Tax," RealTime Economic Issues blog, Peterson Institute for International Economics, February 9, 2017, https://piie.com/blogs/realtime-economic-issues-watch/piie-debates-border-adjustment-tax (accessed October 12, 2017).

Figure 4 Differences in carbon tax rates are high



dollars per ton of CO_2 emissions

Australia	0	Latvia	4	South Korea	9	France	31
Brazil	0	Chile	5	Israel	11	Greece	33
Saudi Arabia	0	China	5	New Zealand	11	Japan	36
United States	0	Turkey	5	Spain	14	Austria	41
Poland	1	Czech Republic	6	Netherlands	17	Norway	52
India	1	Hungary	6	Slovenia	19	Italy	57
Estonia	2	Luxembourg	6	Ireland	22	Switzerland	62
Malta	2	Portugal	6	Canada	23	Finland	64
Russia	3	Belgium	7	Denmark	25	Sweden	130
Mexico	3	Iceland	8	United Kingdom	28		
Bulgaria	4	Slovakia	8	Germany	30		

Note: No data available for Croatia, Cyprus, Lithuania, and Romania.
Source: World Bank.

is that it will increase government spending. At 15 percent, a VAT would collect about 6 percent of GDP. In 2018, this would mean more than $1.2 trillion in higher taxes. If the rate was 20 percent, the VAT would raise 8 percent of GDP, just under $1.7 trillion in higher taxes in 2018. A tax increase of this magnitude would raise the federal tax burden between 33 percent and 44 percent above its historical average. A reasonable approach would be to replace state and local sales taxes with the VAT. Such a replacement would, however, shift more fiscal power to the federal government and runs counter to US political culture.

Another indirect tax gaining momentum outside the United States is the carbon tax. Most carbon taxes with implications for greenhouse gas emissions in advanced economies are levied on energy products and motor vehicles, rather than directly on emissions (Kossoy et al. 2015). The run-up to the Paris climate change conference in 2015 provided momentum for the adoption of such taxes. The median carbon tax in advanced economies is about $8 per ton of CO_2 emissions, but the tax varies widely from $130 per ton in Sweden to $1 in Poland (figure 4).

As of 2017, all 28 EU countries levy carbon taxes (figure 5). Carbon tax revenues as a percentage of government revenue in the European Union started to rise in 2009, during the global financial crisis, and were equal to 6.3 percent of revenue in 2015. The ratio of environmental tax revenues to total revenue varies from over 10 percent in Croatia, Slovenia, and Greece, to about 5 percent in Belgium and France.

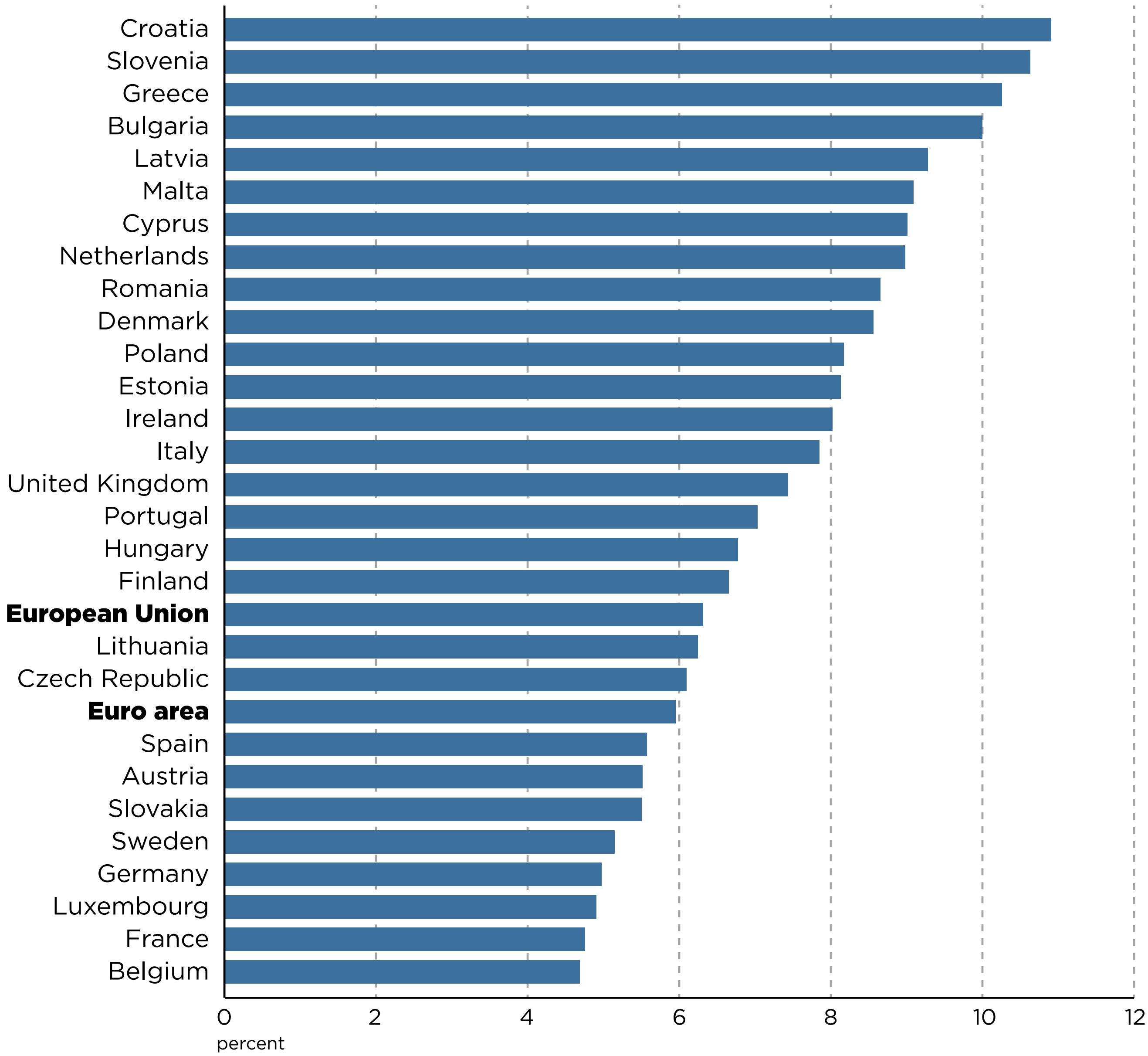
Australia, Canada, and the United States are the only advanced economies that do not have carbon taxes at the federal level, while Brazil is the only large emerging economy without a carbon tax. Several large Canadian states have implemented such a tax, however: Alberta and Quebec in 2007 and British Columbia in 2008.

No US state has a carbon tax. An attempt to break through with a tax on carbon emissions in the state of Washington was defeated in a referendum in November 2016, after similar defeats in Colorado and California in previous years. In May 2010 Montgomery County, Maryland passed the nation's first county-level carbon tax. The following year the Federal Court of Appeals ruled that the tax was a fee imposed "for regulatory or punitive purposes" rather than a tax, and therefore should be repealed. Research finds that "a $20 per ton tax on energy-related CO_2 emissions could raise up to 2 to 3 percent of state GDP in the most emissions-intensive states" (Morris, Bauman. and Bookbinder 2016). That is significant, as state revenue instruments—sales, property, income, and business taxes—typically collect only about 5 percent of GDP.

Australia instituted a carbon tax in 2012 but repealed it two years later, under pressure from the main political parties there.

Japan phased in a carbon tax over five years from 2012 to 2016. In 2014, Chile and Mexico approved the first carbon tax in South America, starting with modest levies—$5 per metric ton of emissions in Chile and $3.50 per ton in Mexico. Although Brazil does not have a carbon

Figure 5 Carbon tax revenues as share of total revenue, for EU members, 2015



Source: European Commission.

tax yet, it levies taxes on fuels. In 2017, Brazil increased the gasoline tax from 12 cents to 25 cents per liter and for diesel fuel from 7 cents to 15 cents per liter at refineries. For ethanol, the tax rate increased from 3.8 cents to 4.1 cents for the producer, and 4.7 cents per liter for the distributors.[15]

China and Korea have gone a different way: Instead of imposing a carbon tax, they experimented with emissions trading systems in 2013 and 2015, respectively. An emissions trading system works by setting a cap on emissions and requiring emitters to hold a permit for each ton that they emit. The level of the cap determines the number of permits available.

China's new emissions trading system covers key industry sectors such as iron and steel, power generation, chemicals, building materials, papermaking, and nonferrous metals. It currently has seven pilot emissions trading systems, which combined form the largest national carbon pricing initiative in the world in terms of volume. Since the start of the pilots in Beijing, Guangdong, Shanghai, Shenzhen, and Tianjin in 2013, and in Chongqing and Hubei in 2014, the designs of some of these systems has evolved—their scope has expanded and their stringency has increased. For example, Shenzhen expanded its emissions trading system

15. Ricardo Brito, "Brazilian judge allows fuel tax hike, overturns suspension," Reuters, July 26, 2017.

to include transport, Guangdong included buildings and transport, and Hubei added 49 large companies to its emissions trading systems. Korea imposed caps on emissions from 525 of the country's biggest companies, creating the second-largest market globally.[16] The World Bank estimates that China's emissions trading systems are equivalent to charging between $7 (Beijing) and $2 (Shanghai) per ton, while the Korean emissions trading system is equivalent to charging $9 per ton (Kossoy et al. 2015).

EXCISE TAXES

Excise taxes are used not only to raise revenues but also to limit behaviors that endanger public health or pollute the environment. The US federal excise tax revenue has remained stable relative to the size of the economy. As a percentage of GDP, excise tax revenue fell slightly from 0.7 percent in 1986 to roughly 0.5 percent in 2016.[17] The average revenue from excise taxes on alcohol and tobacco in the European Union is 0.3 percent of GDP. However, several countries have larger dependence on such taxes: Estonia at 4.8 percent in 2016; Luxembourg at 2.5 percent; the Czech Republic, Ireland, and the Netherlands at about 1.5 percent.[18]

Saudi Arabia adopted excise tax regulations in 2017: 50 percent on soft drinks, and 100 percent on energy drinks, tobacco, and tobacco products.[19] The "sugar" tax is a new phenomenon. Croatia has had such taxes on all sugar and coffee-based products since 2014. Ireland approved a "soda tax" set to start in April 2018, which is around the same time a similar tax takes effect in the United Kingdom.

A variation of the excise tax is the luxury tax, aimed at the wealthy. In 1991, the United States Congress enacted a luxury tax, with the goal to generate additional revenues to reduce the federal budget deficit. In particular, the Congress enacted a 10 percent luxury surcharge tax on boats worth over $100,000, cars over $30,000, aircraft over $250,000, and furs and jewelry over $10,000. The federal government estimated that it would raise $9 billion in excess revenues over the following five-year period. However, in August 1993, only two years after its imposition, the Congress decided to eliminate the "luxury tax," since it did not achieve its main objective of raising revenues. However, the luxury automobile tax remained in effect until 2002.

Today, the luxury tax is effective in Australia, where it can fetch a third of the initial price of luxury items.[20] Both China and India have implemented small-scale schemes for luxury taxes and are considering expanding their coverage of cars and fashion goods.[21] In France, a similar luxury car tax annually adds more than $2.5 billion to the national budget. Russians with cars worth more than $90,000 pay as much as $4,000 a year in taxes on the vehicles, thanks to a luxury car tax that came into force in 2014.[22]

Some jurisdictions also impose a luxury tax on real estate; for example, the province of British Columbia in Canada has long experience with such taxes.[23] Buyers there pay a tax rate of 3 percent on properties valued above $2 million, but a 1 percent rate still applies to the first $200,000 of the value and a 2 percent rate applies to the portion between $200,000 and $2 million. In New York, the "mansion tax" is levied on properties valued above $1 million.[24] London has the most progressive luxury tax on homes: Buyers pay no tax on properties worth up to £125,000, then 2 percent on houses worth up to £250,000 and 5 percent on houses worth up to £925,000. Homes worth up to £1.5 million, however, are subject to a stamp duty of 10 percent, and there is a 12 percent tax on any property worth more than that (Djankov 2015, 6). The luxury property tax is best collected at the

16. Stian Reklev, "South Korea launches world's second-biggest carbon market," Reuters, January 11, 2015, http://in.reuters.com/article/southkorea-carbontrading-idINKBN0KL05K20150112 (accessed on October 16, 2017).

17. Office of Management and Budget, Budget of the United States Government, Fiscal Year 2017, Historical Tables, Table 2.3. Receipts by Source as a Percentage of GDP: 1934–2021 and Table 2.4. Composition of Social Insurance and Retirement Receipts and of Excise Taxes: 1940–2021.

18. Data available from the European Commission, Excise Duty Rates, http://ec.europa.eu/taxation_customs/business/excise-duties-alcohol-tobacco-energy/excise-duties-alcohol/excise-duty-rates_en (accessed on August 30, 2017).

19. World Bank, Doing Business project, www.doingbusiness.org (accessed on October 26, 2017).

20. Data from the Australian Taxation Office available at https://www.ato.gov.au/business/luxury-car-tax/when-lct-applies/ (accessed on August 30, 2017).

21. Aditi Shah, "Mercedes warns India's luxury car tax hike could hit expansion," Reuters, August 8, 2017, http://europe.autonews.com/article/20170808/ANE/170809755/mercedes-warns-indias-luxury-car-tax-hike-could-hit-expansion (accessed on October 16, 2017); and Kenneth Rapoza, "China Considers Luxury Tax," *Forbes*, May 24, 2013, https://www.forbes.com/sites/kenrapoza/2013/05/24/china-considers-luxury-tax/#78d274d91979 (accessed on October 16, 2017).

22. Ekaterina Drobínina, "Is Russia's new luxury car tax necessary?," Russia Beyond, January 27, 2014, https://www.rbth.com/business/2014/01/27/is_russias_new_luxury_car_tax_necessary_33563.html (accessed on October 26, 2017).

23. Brent Jang, "B.C.'s luxury tax for homes over $2-million casts a wide net in Vancouver," *Globe and Mail*, February 17, 2016, https://beta.theglobeandmail.com/report-on-business/economy/housing/the-real-estate-beat/bcs-luxury-tax-for-homes-over-2-million-casts-a-wide-net-in-vancouver/article28790535/ (accessed on October 16, 2017).

24. Carl Campanile, "'Mansion Tax' produces geyser of revenue for New York," *New York Post*, March 20, 2014, http://nypost.com/2014/03/20/mansion-tax-produces-geyser-of-revenue-for-new-york/ (accessed on October 16, 2017).

municipal or state level so that it can be adjusted for the value of local properties.

During the global financial crisis luxury taxes became popular in continental Europe. Hungary's prime minister, Viktor Orban, proposed a 35 percent VAT on luxury goods in 2011, but the European Commission turned it down (Djankov 2015). Such a tax, albeit on a limited number of goods, was launched the same year in Greece. It involves an annual levy of 13 percent on recreational boats over five meters (16 feet) in length. Other countries that have introduced luxury taxes include Bulgaria, the Czech Republic, Italy, and Spain. Taxable items include expensive residences, cars, yachts, and art.

The overall fiscal effect of excise and luxury taxes is trivial—about 0.5 percent of government revenues in advanced economies and large emerging markets based on calculations for this Policy Brief. Their political appeal far exceeds their usefulness as a fiscal tool.

POLICY RECOMMENDATIONS

The United States stands out in the comparative analysis of advanced and large emerging economies as relying primarily on high direct personal and corporate taxes. The US tax system is an anomaly in another respect: It has no value-added tax (VAT) or carbon tax.

Should the Trump administration manage to reduce the corporate tax rate, the United States will look more like the rest of the world. The US Congress should cut the corporate tax rate by 10 to 15 percentage points, to reach the OECD average and boost US competitiveness.

Lawmakers can further consider a shift to indirect taxes like the VAT, to make up for revenues that would be lost under a reduced corporate tax rate.

Finally, introducing carbon taxes will reduce pressure on state budgets and may be a necessary step towards replacing the state-level sales tax with a nationwide VAT.

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