TAX INCENTIVES FOR DOMESTIC MANUFACTURING

Scheduled for a Public Hearing
Before the
SENATE COMMITTEE ON FINANCE
on March 16, 2021

Prepared by the Staff
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JOINT COMMITTEE ON TAXATION

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INTRODUCTION AND SUMMARY

The Senate Committee on Finance has scheduled a public hearing on March 16, 2021, titled "Made in America: Effect of the U.S. Tax Code on Domestic Manufacturing." This document,[1] prepared by the staff of the Joint Committee on Taxation, describes present-law and prior-law tax incentives for domestic manufacturing, and provides economic analysis.

Part I of this document provides a description of present-law income tax rates. This Part also describes rules relating to depreciation, including certain first-year expensing provisions, along with associated recapture provisions. In addition, Part I describes domestic research incentives and the credit for certain advanced energy projects that re-equip, expand, or establish a manufacturing facility for certain energy-related property. Part I also describes the prior-law deduction for income attributable to domestic production activities.

Part II of this document provides economic analysis relating to tax incentives for domestic manufacturing. In particular, it addresses the concepts of user cost of capital and effective marginal tax rates. Part II also provides and analyzes data on specific tax incentives relating to manufacturing. In addition, Part II analyzes macroeconomic data relating to investment and GDP, as well as data on manufacturing output and employment.

[1] This document may be cited as follows: Joint Committee on Taxation, *Tax Incentives for Domestic Manufacturing* (JCX-15-21), March 12, 2021. This document can also be found on the Joint Committee on Taxation website at www.jct.gov.

I. PRESENT AND PRIOR LAW

A. Tax Rates on Income

Tax rates on income of individuals

In general

Individual taxpayers' net income tax liability is the greater of (1) regular individual income tax liability reduced by credits allowed against the regular tax or (2) tentative minimum tax reduced by credits allowed against the minimum tax.[2] The amount of income subject to tax is determined differently under the regular tax and the alternative minimum tax ("AMT"), and separate rate schedules apply. Lower rates apply for long-term capital gain and certain dividends; those rates apply for both the regular tax and the AMT.

Tax rates

To determine regular tax liability, a taxpayer generally must apply the tax rate schedules (or the tax tables) to his or her regular taxable income. The rate schedules are broken into several ranges of income, known as income brackets, with the marginal tax rate increasing as a taxpayer's income increases.[3] Separate rate schedules apply based on an individual's filing status (*i.e.*, single, head of household, married filing jointly, or married filing separately).

Regular tax rates.–The top marginal regular individual income tax rate is 37 percent. The marginal regular individual income tax rate for the lowest bracket is 10 percent.

AMT rates.–An AMT is imposed on individuals in an amount by which the tentative minimum tax exceeds the regular income tax for the taxable year.[4] The tentative minimum tax is the sum of (1) 26 percent of so much of the taxable excess as does not exceed an indexed dollar amount,[5] and (2) 28 percent of the remaining taxable excess.[6]

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[2] Estates and most trusts are also subject to income tax under rules similar to those for individuals. See sec. 641(b). Estates and most trusts pay tax on income at the entity level to the extent that the income is not distributed or required to be distributed under governing law or under the terms of the governing instrument. Such entities determine their tax liability using a special tax rate schedule and are subject to the alternative minimum tax. Certain trusts do not pay any Federal income tax at the entity level, for example trusts that distribute all income currently to beneficiaries. Other trusts are treated as being owned by grantors in whole or in part for tax purposes; in such cases, the grantors are taxed on the income of the trust.

[3] The term "marginal tax rate" generally refers to the additional, or incremental, increase in tax liability that a taxpayer incurs from a $1.00 increase in his or her income. The marginal tax rates for individuals defined in section 1 of the Code and described in Table 1 are referred to as "statutory marginal tax rates."

[4] Sec. 55.

[5] The breakpoint between the 26-percent and 28-percent brackets is indexed for inflation.

[6] The maximum tax rates on net capital gain and dividends used in computing the regular tax are used in computing the tentative minimum tax.

Capital gains tax rates.–The top marginal income tax rate on adjusted net capital gain generally is 20 percent.[7] Capital losses generally are deductible in full against capital gains. In addition, individual taxpayers may deduct capital losses against up to $3,000 of ordinary income in each year. Any remaining unused capital losses may be carried forward indefinitely to another taxable year. The maximum rate of tax on the adjusted net capital gain of an individual depends on the individual's taxable income and filing status. These maximum rates apply for purposes of both the regular tax and the AMT.

Tax rate on corporate income

Income of a corporation is taxed at 21 percent.[8] While no separate rate structure exists for corporate capital gains, a corporation may not deduct the amount of capital losses in excess of capital gains for any taxable year. Disallowed capital losses may be carried back three years or carried forward five years.

Qualified dividends from a corporation are generally subject to tax at capital gains rates in the hands of shareholders eligible for the capital gains rates.[9]

Tax rate on income of passthrough entities

Income of an S corporation is taxed to the S corporation shareholders. Each S corporation shareholder's pro rata share of S corporation income, gain, loss, deduction and credit is passed through to the shareholder.[10] Similarly, a partnership generally is not subject to Federal income tax, but rather, income and gain of the partnership generally are taxed to partners. Items of partnership income, gain, loss, deduction, and credit pass through to partners.[11]

The character of S corporation items and partnership items, such as ordinary income or loss, capital gain, or capital loss, passes through to S corporation shareholders and partners.[12] As a result, S corporation shareholders and partners are subject to tax at the rates applicable to their

[7] Sec. 1(h).

[8] Sec. 11. Before 2018, corporations were subject to an AMT that was payable (in addition to all other tax liabilities) to the extent that it exceeded the corporation's regular income tax liability. If a corporation was subject to AMT in any taxable year, the amount of AMT was allowed as an AMT credit in any subsequent taxable year to the extent the corporation's regular tax liability exceeded its tentative minimum tax in the subsequent year. See sec. 53. As part of the repeal of the corporate AMT, a corporation may offset its entire regular tax liability for a taxable year with any AMT credits carried forward from prior taxable years. The corporate AMT credit is allowable and refundable for taxable years beginning after 2017 and before 2020.

[9] Sec. 1(h)(11).

[10] Secs. 1363(a) and 1366.

[11] Secs. 701 and 702. Note, however, that certain publicly traded partnerships are treated as corporations for Federal tax purposes. See sec. 7704.

[12] Secs. 1366(b) and 702(b).

taxable income (including capital gains rates where applicable) and their filing status as an individual, estate, trust, or corporation.[13]

A business conducted as a sole proprietorship is not treated as an entity distinct from its owner for Federal income tax purposes.[14] Rather, the business owner is taxed directly on business income, and files Schedule C (sole proprietorships generally), Schedule E (rental real estate and royalties), or Schedule F (farms) with his or her individual tax return.[15]

A taxpayer other than a corporation generally may deduct 20 percent of qualified business income from a partnership, S corporation, or sole proprietorship, as well as 20 percent of aggregate qualified real estate investment trust ("REIT") dividends and qualified publicly traded partnership income. A specified agricultural or horticulture cooperative generally may deduct nine percent of qualified production activities income.[16]

[13] In the case of a partnership, a tax-exempt entity or a passthrough entity (that generally is not subject to income tax) may be a partner.

[14] A single-member unincorporated entity is disregarded for Federal income tax purposes, unless its owner elects to be treated as a C corporation. Treas. Reg. sec. 301.7701-3(b)(1)(ii). Sole proprietorships often are conducted through legal entities for nontax reasons. While sole proprietorships generally may have no more than one owner, a married couple that files a joint return and jointly owns and operates a business may elect to have that business treated as a sole proprietorship under section 761(f).

[15] Nonetheless, a sole proprietorship is treated as an entity separate from its owner for employment tax purposes, for certain excise taxes, and certain information reporting requirements. See Treas. Reg. sec. 301.7701-2(c)(2)(iv)-(vi).

[16] Sec. 199A.

B. Cost Recovery

1. Depreciation

In general

A taxpayer generally must capitalize the cost of property used in a trade or business or held for the production of income and recover such cost over time through annual deductions for depreciation or amortization.[17] The period for depreciation or amortization generally begins when the asset is placed in service by the taxpayer.[18] Tangible property generally is depreciated under the modified accelerated cost recovery system ("MACRS"), which determines depreciation for different types of property based on an assigned applicable depreciation method, recovery period, and convention.[19]

Recovery periods and depreciation methods

The applicable recovery period for an asset is determined in part by statute and in part by historic Treasury guidance.[20] The "type of property" of an asset is used to determine the "class life" of the asset, which in turn dictates the applicable recovery period for the asset.

The MACRS recovery periods applicable to most tangible personal property range from three to 20 years. The depreciation methods generally applicable to tangible personal property are the 200-percent and 150-percent declining balance methods,[21] switching to the straight line

[17] See secs. 263(a) and 167. In general, only the tax owner of property (*i.e.*, the taxpayer with the benefits and burdens of ownership) is entitled to claim tax benefits such as cost recovery deductions with respect to the property. In addition, where property is not used exclusively in a taxpayer's business, the amount eligible for a deduction must be reduced by the amount related to personal use. See, *e.g.*, sec. 280A.

[18] See Treas. Reg. secs. 1.167(a)-10(b), -3, -14, and 1.197-2(f). See also Treas. Reg. sec. 1.167(a)-11(e)(1)(i).

[19] Sec. 168.

[20] Exercising authority granted by Congress, the Secretary issued Rev. Proc. 87-56, 1987-2 C.B. 674, laying out the framework of recovery periods for enumerated classes of assets. The Secretary clarified and modified the list of asset classes in Rev. Proc. 88-22, 1988-1 C.B. 785. In November 1988, Congress revoked the Secretary's authority to modify the class lives of depreciable property. Rev. Proc. 87-56, as modified, remains in effect except to the extent that the Congress has, since 1988, statutorily modified the recovery period for certain depreciable assets, effectively superseding any administrative guidance with regard to such property.

[21] Under the declining balance method, the depreciation rate is determined by dividing the appropriate percentage (here 150 or 200) by the appropriate recovery period. This leads to accelerated depreciation when the declining balance percentage is greater than 100. The table below illustrates depreciation for an asset with a cost of

method for the first taxable year where using the straight line method with respect to the adjusted basis as of the beginning of that year yields a larger depreciation allowance. The recovery periods for most real property are 39 years for nonresidential real property, 27.5 years for residential rental property, and 15 years for qualified improvement property. The straight line depreciation method is required for the aforementioned real property.

Placed-in-service conventions

Depreciation of an asset begins when the asset is deemed to be placed in service under the applicable convention.[22] Under MACRS, nonresidential real property, residential rental property, and any railroad grading or tunnel bore generally are subject to the mid-month convention, which treats all property placed in service during any month (or disposed of during any month) as placed in service (or disposed of) on the mid-point of such month.[23] All other property generally is subject to the half-year convention, which treats all property placed in service during any taxable year (or disposed of during any taxable year) as placed in service (or disposed of) on the mid-point of such taxable year to reflect the assumption that assets are placed in service ratably throughout the year.[24] However, if substantial property is placed in service during the last three months of a taxable year, a special rule requires use of the mid-quarter convention,[25] designed to prevent the recognition of disproportionately large amounts of first-year depreciation under the half-year convention.

Alternative depreciation system

The alternative depreciation system ("ADS") is required to be used for tangible property used predominantly outside the United States,[26] certain tax-exempt use property,[27] tax-exempt

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$1,000 and a seven-year recovery period under the 200-percent declining balance method, the 150-percent declining balance method, and the straight line method.

Recovery method	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
200-percent declining balance	285.71	204.08	145.77	104.12	86.77	86.77	86.77	1,000.00
150-percent declining balance	214.29	168.37	132.29	121.26	121.26	121.26	121.26	1,000.00
Straight-line	142.86	142.86	142.86	142.86	142.86	142.86	142.86	1,000.00

*Details may not add to totals due to rounding.

[22] Treas. Reg. sec. 1.167(a)-10(b).

[23] Sec. 168(d)(2) and (d)(4)(B).

[24] Sec. 168(d)(1) and (d)(4)(A).

[25] The mid-quarter convention treats all property placed in service (or disposed of) during any quarter as placed in service (or disposed of) on the mid-point of such quarter. Sec. 168(d)(3) and (d)(4)(C).

[26] Sec. 168(g)(1)(A).

[27] Sec. 168(g)(1)(B).

bond financed property,[28] certain imported property covered by an Executive order,[29] and certain property held by either a real property trade or business[30] or a farming business[31] electing out of the business interest limitation under section 163(j).[32] In addition, an election to use ADS is available to taxpayers for any class of property for any taxable year.[33]

Under ADS, all property is depreciated using the straight line method and the applicable convention over recovery periods which generally are equal to the class life of the property, with certain exceptions.[34]

2. Election to expense certain depreciable business assets

Subject to certain limitations, a taxpayer may elect under section 179 to deduct (or "expense") the cost of qualifying property, rather than to recover such costs through depreciation deductions. The maximum amount a taxpayer may expense is $1,000,000 of the cost of qualifying property placed in service for the taxable year.[35] The $1,000,000 amount is reduced (but not below zero) by the amount by which the cost of qualifying property placed in service during the taxable year exceeds $2,500,000.[36]

The $1,000,000 and $2,500,000 amounts are indexed for inflation for taxable years beginning after 2018.[37] For taxable years beginning in 2021, the total amount that may be expensed is $1,050,000, and the phase-out threshold amount is $2,620,000.[38] For example, assume that during 2021 a calendar year taxpayer purchases and places in service $3,000,000 of

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[28] Sec. 168(g)(1)(C).

[29] Sec. 168(g)(1)(D).

[30] Sec. 168(g)(1)(F) and (g)(8). An electing real property trade or business is defined in section 163(j)(7)(B) by cross reference to section 469(c)(7)(C) (*i.e.*, any real property development, redevelopment, construction, reconstruction, acquisition, conversion, rental, operation, management, leasing, or brokerage trade or business).

[31] Sec. 168(g)(1)(G). An electing farming business is defined in section 163(j)(7)(C), which defines an electing farming business as (i) a farming business as defined in section 263A(e)(4), or (ii) any trade or business of a specified agricultural or horticultural cooperative as defined in section 199A(g)(4) (a clerical correction may be necessary to correct this reference).

[32] Sec. 168(g).

[33] Sec. 168(g)(1)(E) and (g)(7).

[34] Sec. 168(g)(2) and (3).

[35] Sec. 179(b)(1).

[36] Sec. 179(b)(2).

[37] Sec. 179(b)(6).

[38] Section 3.26 of Rev. Proc. 2020-45, 2020-46 I.R.B. 1016.

section 179 property. The $1,050,000 section 179(b)(1) dollar amount for 2021 is reduced by the excess section 179 property cost amount of $380,000 ($3,000,000 – $2,620,000). The taxpayer's 2021 section 179 expensing limitation is $670,000 ($1,050,000 – $380,000).[39]

In general, qualifying property is defined as depreciable tangible personal property, off-the-shelf computer software, and qualified real property[40] that is purchased for use in the active conduct of a trade or business.[41] Qualifying property excludes any property described in section 50(b) (other than paragraph (2) thereof[42]).[43]

Qualified real property includes (1) qualified improvement property[44] and (2) any of the following improvements to nonresidential real property that are placed in service by the taxpayer after the date such nonresidential real property was first placed in service: roofs; heating, ventilation, and air-conditioning property ("HVAC");[45] fire protection and alarm systems; and security systems.[46]

Passenger automobiles subject to the section 280F limitation are eligible for section 179 expensing only to the extent of the dollar limitations in section 280F. For sport utility vehicles above the 6,000 pound weight rating and not more than the 14,000 pound weight rating, which are not subject to the limitation under section 280F, the maximum cost that may be expensed for any taxable year under section 179 is $25,000 (the "sport utility vehicle limitation").[47] The

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[39] Note, however, that the taxpayer's remaining basis in the property may be eligible for bonus depreciation under section 168(k) (discussed further below). See Treas. Reg. sec. 1.168(k)-1(a)(2)(iii).

[40] At the election of the taxpayer. Sec. 179(d)(1)(B)(ii). See sec. 3.02 of Rev. Proc. 2019-08, 2019-03 I.R.B. 347, for guidance regarding the election to treat qualified real property as section 179 property.

[41] Sec. 179(d)(1). If section 179 property is not used predominantly in a trade or business of the taxpayer at any time before the end of its recovery period, recapture rules apply. See sec. 179(d)(10) and Treas. Reg. sec. 1.179-1(e).

[42] Thus, section 179 property includes certain depreciable tangible personal property used predominantly to furnish lodging or in connection with furnishing lodging (*e.g.*, beds and other furniture, refrigerators, ranges, and other equipment used in the living quarters of a lodging facility such as an apartment house, dormitory, or any other facility (or part of a facility) where sleeping accommodations are provided and let). See Treas. Reg. sec. 1.48-1(h).

[43] Sec. 179(d)(1) flush language. Property described in section 50(b) (other than paragraph (2) thereof) is generally property used outside the United States, property used by certain tax-exempt organizations, and property used by governmental units and foreign persons or entities (*i.e.*, certain property not eligible for the investment tax credit).

[44] As defined in sec. 168(e)(6).

[45] HVAC property includes all components (whether in, on, or adjacent to the building) of a central air conditioning or heating system, including motors, compressors, pipes and ducts. Treas. Reg. sec. 1.48-1(e)(2). See also, sec. 3.01(1)(b)(iii)(B) of Rev. Proc. 2019-08, 2019-03 I.R.B. 347.

[46] Sec. 179(e).

[47] Sec. 179(b)(5). For this purpose, a sport utility vehicle is defined to exclude any vehicle that: (1) is designed for more than nine individuals in seating rearward of the driver's seat; (2) is equipped with an open cargo

$25,000 amount is indexed for inflation for taxable years beginning after 2018. For taxable years beginning in 2021, the sport utility vehicle limitation is $26,200. [48]

The amount eligible to be expensed for a taxable year may not exceed the taxable income for such taxable year that is derived from the active conduct of a trade or business (determined without regard to section 179).[49] Any amount that is not allowed as a deduction because of the taxable income limitation may be carried forward to succeeding taxable years (subject to limitations).

Amounts expensed under section 179 are allowed for both regular tax and the alternative minimum tax.[50] However, no general business credit under section 38 is allowed with respect to any amount for which a deduction is allowed under section 179.[51] In addition, if a corporation makes an election under section 179 to deduct expenditures, the full amount of the deduction does not reduce earnings and profits. Rather, the expenditures that are deducted under section 179 reduce corporate earnings and profits ratably over a five-year period.[52]

An expensing election is made under rules prescribed by the Secretary.[53] In general, any election made under section 179, and any specification contained therein, may be revoked by the taxpayer with respect to any property without the consent of the Commissioner.[54] Such revocation, once made, is irrevocable.

3. Additional first-year depreciation deduction

An additional first-year depreciation deduction is allowed equal to 100 percent of the adjusted basis of qualified property acquired after September 27, 2017,[55] and placed in service

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area, or a covered box not readily accessible from the passenger compartment, of at least six feet in interior length; or (3) has an integral enclosure, fully enclosing the driver compartment and load carrying device, does not have seating rearward of the driver's seat, and has no body section protruding more than 30 inches ahead of the leading edge of the windshield.

[48] Section 3.26 of Rev. Proc. 2020-45, 2020-46 I.R.B. 1016.

[49] Sec. 179(b)(3).

[50] See the Senate Finance Committee Report to Accompany H.R. 3838, Tax Reform Act of 1986, S. Rep. No. 99-313, May 29, 1985, p. 522. See also the Instructions for Form 6251, Alternative Minimum Tax - Individuals (2020), p. 5.

[51] Sec. 179(d)(9).

[52] Sec. 312(k)(3)(B).

[53] Sec. 179(c)(1). Such election may be made on an amended return. See sec. 3.02 of Rev. Proc. 2017-33, 2017–19 I.R.B. 1236; and sec. 3.02 of Rev. Proc. 2019-08, 2019-03 I.R.B. 347.

[54] Sec. 179(c)(2).

[55] For a description of section 168(k) as it applies to qualified property acquired before September 28, 2017, as well as a transition rule that permits a taxpayer to elect to apply a 50-percent allowance instead of the 100-

before January 1, 2023 (January 1, 2024, for certain property with a recovery period of at least 10 years or certain transportation property,[56] and certain aircraft[57]).[58] The 100-percent allowance is phased down by 20 percent per calendar year for property acquired after September 27, 2017, and placed in service after December 31, 2022 (after December 31, 2023, for longer production period property and certain aircraft).[59] This additional first-year depreciation is commonly referred to as "bonus depreciation."

The bonus depreciation deduction is allowed for both regular tax and AMT purposes, but is not allowed in computing earnings and profits.[60] The basis of the property and the depreciation allowances in the placed in service year and later years are appropriately adjusted to reflect the bonus depreciation deduction.[61] The amount of the bonus depreciation deduction is not affected by a short taxable year.[62] A taxpayer may elect out of bonus depreciation for any class of property for any taxable year.[63] An election out of bonus depreciation may be revoked only with the consent of the Secretary.[64]

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percent allowance for a taxable year that includes September 28, 2017, see Joint Committee on Taxation, *General Explanation of Public Law No. 115-97* (JCS-1-18), December 2018, pp. 115-128. This document can be found on the Joint Committee on Taxation website at www.jct.gov.

[56] Property qualifying for the extended placed-in-service date must have a recovery period of at least 10 years or constitute transportation property, have an estimated production period exceeding one year, and have a cost exceeding $1 million. Transportation property generally is defined as tangible personal property used in the trade or business of transporting persons or property. Section 168(k)(2)(B). Property defined in section 168(k)(2)(B) is hereinafter collectively referred to as "longer production period property."

[57] Certain aircraft which is not transportation property, other than for agricultural or firefighting uses, also qualifies for the extended placed-in-service date, if at the time of the contract for purchase, the purchaser made a nonrefundable deposit of the lesser of 10 percent of the cost or $100,000, and which has an estimated production period exceeding four months and a cost exceeding $200,000. Sec. 168(k)(2)(C).

[58] Sec. 168(k). The bonus depreciation deduction is generally subject to the rules regarding whether a cost must be capitalized under section 263A.

[59] Sec. 168(k)(6)(A) and (B).

[60] Secs. 168(k)(2)(G) and 312(k)(3).

[61] Sec. 168(k)(1).

[62] Treas. Reg. sec. 1.168(k)-2(e)(1)(ii).

[63] For the definition of a class of property, see Treas. Reg. sec. 1.168(k)-2(f)(1)(ii). Treas. Reg. sec. 1.168(k)-2(f)(1) provides the procedures for making an election not to deduct the bonus depreciation deduction. See also Rev. Proc. 2020-50, 2020-48 I.R.B. 1122, Rev. Proc. 2020-25, 2020-19 I.R.B. 785, as modified by Rev. Proc. 2020-50, 2020-48 I.R.B. 1122, sec. 6 of Rev. Proc. 2019-43, 2019-48 I.R.B. 1107, as modified by Rev. Proc. 2020-25, 2020-19 I.R.B. 785, and Rev. Proc. 2020-50, 2020-48 I.R.B. 1122, for special procedures to make late a late election under section 168(k)(7) by the taxpayer during its taxable years ending on or after September 28, 2017, and before the taxpayer's first taxable year that begins on or after January 1, 2021.

[64] Sec. 168(k)(7). See also Treas. Reg. sec. 1.168(k)-2(f)(5), and Rev. Proc. 2020-50, 2020-48 I.R.B. 1122, Rev. Proc. 2020-25, 2020-19 I.R.B. 785, as modified by Rev. Proc. 2020-50, 2020-48 I.R.B. 1122, sec. 6 of

Qualified property

Property qualifying for the bonus depreciation deduction must meet all of the following requirements:

- The property must be:

  1. property to which MACRS applies with an applicable recovery period of 20 years or less,

  2. computer software other than computer software covered by section 197,

  3. water utility property,[65] or

  4. a qualified film, television, or live theatrical production,[66] for which a deduction otherwise would have been allowable under section 181 without regard to the dollar limitation or termination of such section.[67]

- Either (i) the original use of the property must commence with the taxpayer,[68] or (ii) the property must not have been used by the taxpayer at any time prior to acquisition and such acquisition must meet the requirements of section 179(d)(2)(A)-(C) and (3).[69]

Rev. Proc. 2019-43, 2019-48 I.R.B. 1107, as modified by Rev. Proc. 2020-25, 2020-19 I.R.B. 785, and Rev. Proc. 2020-50, 2020-48 I.R.B. 1122, for special procedures to revoke an election under section 168(k)(7) by the taxpayer during its taxable years ending on or after September 28, 2017, and before the taxpayer's first taxable year that begins on or after January 1, 2021.

[65] As defined in section 168(e)(5).

[66] As defined in section 181(d) and (e).

[67] Under section 181, a taxpayer may generally elect to deduct up to $15 million of the aggregate production costs ($20 million in the case of productions in certain areas) of any qualified film, television or live theatrical production, commencing prior to January 1, 2026, in the year the costs are paid or incurred by the taxpayer, in lieu of capitalizing the costs and recovering them through depreciation allowances once the production is placed in service. The costs of the production in excess of the applicable dollar limitation are capitalized and recovered under the taxpayer's method of accounting for the recovery of such property once placed in service (*e.g.*, under section 168(k) if eligible). For a description of section 181, see Joint Committee on Taxation, *General Explanation of Certain Tax Legislation Enacted in the 115th Congress* (JCS-2-19), October 2019, pp. 48-50. This document can be found on the Joint Committee on Taxation website at www.jct.gov. Note that subsequent to that publication, section 181 was extended through 2020 by Public Law 116-94, and most recently through 2025 by Public Law 116-260.

[68] See Treas. Reg. sec. 1.168(k)-2(b)(3)(ii).

[69] See Treas. Reg. sec. 1.168(k)-2(b)(3)(iii). A special rule applies in the case of a syndication transaction. See sec. 168(k)(2)(E)(iii) and Treas. Reg. sec. 1.168(k)-2(b)(3)(vi).

- The property must be placed in service before January 1, 2027.[70]

The bonus depreciation deduction is not available for any property that is required to be depreciated under ADS,[71] or for listed property where the business use is not greater than 50 percent (as determined under section 280F(b)).[72]

In the case of longer production period property and certain aircraft, the property must also be acquired (or acquired pursuant to a written binding contract entered into) before January 1, 2027, and placed in service before January 1, 2028. With respect to such property that is manufactured, constructed, or produced by the taxpayer for use by the taxpayer, the taxpayer must begin the manufacture, construction, or production of the property before January 1, 2027.[73] Additionally, a special rule limits the amount of costs of longer production period property eligible for bonus depreciation. With respect to such property, only the portion of the basis that is properly attributable to the costs incurred before January 1, 2027 ("progress expenditures") is eligible for the bonus depreciation deduction.[74]

Exception for certain businesses not subject to the limitation on interest expense

Qualified property does not include any property which is primarily used in the trade or business of the furnishing or sale of (1) electrical energy, water, or sewage disposal services, (2) gas or steam through a local distribution system, or (3) transportation of gas or steam by pipeline, if the rates for such furnishing or sale, as the case may be, have been established or approved by a State or political subdivision thereof, by any agency or instrumentality of the United States, by a public service or public utility commission or other similar body of any State or political subdivision thereof, or by the governing or ratemaking body of an electric cooperative.[75]

In addition, qualified property does not include any property used in a trade or business that has had floor plan financing indebtedness[76] if the floor plan financing interest related to such

[70] A qualified production is considered placed in service, and thus eligible for the bonus depreciation allowance, at the time of initial release, broadcast, or live staged performance. Treas. Reg. sec. 1.168(k)-2(b)(4)(iii).

[71] See sec. 168(g) (determined without regard to an election to use ADS under sec. 168(g)(7)). See also Treas. Reg. sec. 1.168(k)-2(b)(2)(ii)(B).

[72] Sec. 168(k)(2)(D). For a description of section 280F, see Joint Committee on Taxation, *General Explanation of Public Law No. 115-97* (JCS-1-18), December 2018, pp. 128-130. This document can be found on the Joint Committee on Taxation website at www.jct.gov.

[73] Sec. 168(k)(2)(E)(i).

[74] Sec. 168(k)(2)(B)(ii). See also Treas. Reg. sec. 1.168(k)-2(e)(1)(iii).

[75] Secs. 168(k)(9)(A) and 163(j)(7)(A)(iv). See also Treas. Reg. sec. 1.168(k)-2(b)(2)(ii)(F).

[76] As defined in section 163(j)(9).

indebtedness was taken into account to increase the taxpayer's interest limitation under section 163(j)(1)(C).[77]

Special rules

Passenger automobiles

The limitation under section 280F on the amount of depreciation deductions allowed with respect to certain passenger automobiles is increased in the first year by $8,000 for automobiles that qualify (and for which the taxpayer does not elect out of bonus depreciation).[78] While the underlying section 280F limitation is indexed for inflation,[79] the section 280F increase amount is not indexed for inflation.

Certain plants bearing fruits and nuts

A special election is provided for certain plants bearing fruits and nuts.[80] Under the election, the applicable percentage of the adjusted basis of a specified plant which is planted or grafted after September 27, 2017, and before January 1, 2027, is deductible for regular tax and AMT purposes in the year planted or grafted by the taxpayer (rather than in the year the specified plant is placed in service by the taxpayer[81]), and the adjusted basis is reduced by the amount of the deduction.[82] The applicable percentage is 100 percent for specified plants planted or grafted after September 27, 2017, and before January 1, 2023, and then is phased down by 20 percent

[77] Sec. 168(k)(9)(B). See also Treas. Reg. sec. 1.168(k)-2(b)(2)(ii)(G).

[78] Sec. 168(k)(2)(F). See Rev. Proc. 2019-13, 2019-09 I.R.B. 744, for a safe harbor method of accounting for determining depreciation deductions for passenger automobiles that qualify for bonus depreciation and are subject to the section 280F depreciation limitations.

[79] Sec. 280F(d)(7). See Rev. Proc. 2020-37, 2020-33 I.R.B. 381, for the section 280F limitations that apply to passenger automobiles placed in service during calendar year 2020.

[80] Sec. 168(k)(5). Treas. Reg. sec. 1.168(k)-2(f)(2) provides the procedures for making a section 168(k)(5) election. See also Rev. Proc. 2020-50, 2020-48 I.R.B. 1122, Rev. Proc. 2020-25, 2020-19 I.R.B. 785, as modified by Rev. Proc. 2020-50, 2020-48 I.R.B. 1122, sec. 6 of Rev. Proc. 2019-43, 2019-48 I.R.B. 1107, as modified by Rev. Proc. 2020-25, 2020-19 I.R.B. 785, and Rev. Proc. 2020-50, 2020-48 I.R.B. 1122, for special procedures to make late elections, or revoke elections, for specified plants planted or grafted after September 27, 2017, by the taxpayer during its taxable years ending on or after September 28, 2017, and before the taxpayer's first taxable year that begins on or after January 1, 2021.

[81] In the case of any tree or vine bearing fruits or nuts, the placed in service date generally does not occur until the tree or vine first reaches an income-producing stage. See Treas. Reg. sec. 1.46-3(d)(2). See also, Rev. Rul. 80-25, 1980-1 C.B. 65; and Rev. Rul. 69-249, 1969-1 C.B. 31.

[82] Any amount deducted under this election is not subject to capitalization under section 263A. Sec. 263A(c)(7).

per calendar year beginning in 2023.[83] Thus, the percentage is 80 percent for 2023, 60 percent for 2024, 40 percent for 2025, and 20 percent for 2026.

A specified plant is (i) any tree or vine that bears fruits or nuts, and (ii) any other plant that will have more than one crop or yield of fruits or nuts and which generally has a pre-productive period of more than two years from the time of planting or grafting to the time it begins bearing a marketable crop or yield of fruits or nuts.[84] A specified plant does not include any property that is planted or grafted outside of the United States. If the election is made with respect to any specified plant, such plant is not treated as qualified property eligible for bonus depreciation in the subsequent taxable year in which it is placed in service.[85] Once made, the election is revocable only with the consent of the Secretary.[86]

Long-term contracts

In general, in the case of a long-term contract, the taxable income from the contract is determined under the percentage-of-completion method.[87] Solely for purposes of determining the percentage of completion under section 460(b)(1)(A), the cost of qualified property with a MACRS recovery period of seven years or less is taken into account as a cost allocated to the contract as if bonus depreciation had not been enacted for property placed in service before January 1, 2027 (January 1, 2028, in the case of longer production period property).[88]

4. Recapture rules

In general

Upon disposition of most property used in a business with respect to which depreciation or amortization deductions were taken, the treatment of the resulting gain or loss as ordinary or capital depends on whether there is a net gain or a net loss under section 1231.[89] If the netting of

[83] Sec. 168(k)(6)(C).

[84] Sec. 168(k)(5)(B).

[85] Sec. 168(k)(5)(D). However, when placed in service, the remaining adjusted basis of the specified plant may be eligible for expensing under section 179.

[86] Sec. 168(k)(5)(C). See also Treas. Reg. sec. 1.168(k)-2(f)(5).

[87] Sec. 460.

[88] Sec. 460(c)(6).

[89] Section 1231 applies to gains and losses on the sale, exchange, or involuntary conversion of certain assets used in the taxpayer's trade or business. These assets are not capital assets, as that term is generally defined in the Code (see sec. 1221(a)). The assets eligible for this treatment include depreciable property or real property held for more than one year and used in a trade or business (if not includible in inventory, held primarily for sale to customers in the ordinary course of business, or property described in section 1221(a)(3) or (5)). Also included are certain special assets important in particular industries, such as interests in timber, coal, domestic iron ore, certain livestock, and certain unharvested crops.

gains and losses results in a net gain, then, subject to the depreciation recapture rules, long-term capital gain treatment generally results.[90] If the netting of gains and losses results in a loss, the loss is fully deductible against ordinary income.[91]

The depreciation recapture rules require taxpayers to recognize ordinary income in an amount equal to all or a portion of the gain realized as a result of the disposition of property. The purpose of the rules is to limit a taxpayer's ability to reduce ordinary income via depreciation deductions and then receive capital gain treatment for the portion of any gain on the disposition of the depreciated property that resulted from the taking of depreciation deductions. There are two regimes that dictate depreciation recapture, sections 1245 and 1250.[92] In addition, sections 1245 and 1250 generally override various nonrecognition provisions in the Code.[93]

Section 1245

Depreciable personal property, whether tangible or intangible, and certain depreciable real property (typically real property that performs specific functions in a business, but not buildings or structural components of buildings) disposed of at a gain are known as section 1245 property.[94] In addition to depreciation under section 167, the section 1245 recapture rules apply to other cost recovery provisions, including first-year expensing provisions.[95] For example, any deduction allowed under section 179 or 181 is treated as if it were a deduction allowable for amortization. Similarly, for recapture purposes, an amortizable section 197 intangible is considered section 1245 property and is subject to the section 1245 recapture rules.[96]

When a taxpayer disposes of section 1245 property, the taxpayer must recapture the gain on disposition of the property as ordinary income to the extent of earlier depreciation or

[90] Sec. 1231(a)(1). However, net section 1231 gain is converted into ordinary income to the extent net section 1231 losses in the previous five years were treated as ordinary losses. Sec. 1231(c). In addition, net gains may be denied capital gains treatment (and taxed as ordinary income) if the transaction is between certain related taxpayers. See sec. 1239.

[91] Sec. 1231(a)(2).

[92] Cost recovery deductions taken under the Accelerated Cost Recovery System ("ACRS") (for property placed in service after 1980 and before 1987 (before August 31, 1986, if the taxpayer so elected)) generally are subject to recapture; however, properties are not necessarily classified as section 1245 or 1250 property in the same manner as similar properties placed in service before or after ACRS.

[93] See Treas. Reg. secs. 1.1245-6(b) and 1.1250-1(c)(2).

[94] Sec. 1245(a)(3); Treas. Reg. sec. 1.1245-3.

[95] See sec. 1245(a)(2)(C) and (a)(3)(C).

[96] Secs. 197(f)(7) and 1245(b)(8).

amortization deductions taken with respect to the asset.[97] Any remaining gain recognized upon the sale of section 1245 property is generally treated as section 1231 gain.

Section 1250

Depreciable real property, other than that included within the definition of section 1245 property, disposed of at a gain is known as section 1250 property.[98] Gain on the disposition of section 1250 property is treated as ordinary income, rather than capital gain, only to the extent of the excess depreciation or amortization taken over what would have been available under the straight-line method.[99] However, if section 1250 property is held for one year or less, all depreciation is recaptured, regardless of whether it exceeds the depreciation that would have been available under the straight-line method. Special rules phase out the recapture for certain types of property held over a specified period of time.[100]

Since section 1250 recaptures only the excess of accelerated depreciation taken over straight-line depreciation and MACRS requires straight-line depreciation for nonresidential real property and residential rental property placed in service after 1986, such property placed in service after 1986 generally will not be subject to recapture under section 1250. However, in the case of qualified real property for which the unadjusted basis is reduced by a section 179 deduction, the amount of such reduction is treated as section 1245 property, and the remaining unadjusted basis is treated as section 1250 property.[101] In addition, bonus depreciation allowed or allowable with respect to qualified improvement property constitutes additional depreciation for purposes of computing section 1250 recapture (*i.e.*, the bonus depreciation deduction is not a straight-line method).[102]

For corporations, the amount treated as ordinary income on the disposition of section 1250 property is increased by 20 percent of the additional amount that would be treated as

[97] Sec. 1245(a)(1). Generally, all depreciation or amortization adjustments allowed or allowable must be taken into account. However, if a taxpayer can establish by adequate records or other sufficient evidence that the amount allowed for depreciation or amortization for any period was less than the amount allowable for such period, the taxpayer may take into account only the amount allowed. Treas. Reg. sec. 1.1245-2(a)(7).

[98] Sec. 1250(c); Treas. Reg. sec. 1.1250-1(e).

[99] Sec. 1250(a).

[100] Sec. 1250(a)(1)(B). The special phase-out rule applies to residential rental property, certain types of subsidized housing, and property for which rapid depreciation of rehabilitation expenditures was claimed under section 167(k) as in effect on the date before the date of the enactment of the Revenue Reconciliation Act of 1990.

[101] See Notice 2013-59, 2013-40 I.R.B. 297, for special rules for determining the portion of the gain that is attributable to section 1245 property upon the sale or other disposition of qualified real property.

[102] See Treas. Reg. sec. 1.168(k)-2(g)(3).

ordinary income if the property were subject to recapture under the rules for section 1245 property.[103]

For individuals, any capital gain that would be treated as ordinary income if the property were subject to recapture under the rules for section 1245 property is generally taxed at a maximum rate of 25 percent.[104] This is referred to as "unrecaptured section 1250 gain."[105] The amount of unrecaptured section 1250 gain (before the reduction for the net loss) attributable to the disposition of property to which section 1231 applies may not exceed the net section 1231 gain for the year.[106]

Additional recapture rules

Recapture rules also apply to certain business credits. For example, if property eligible for an investment tax credit (such as property eligible for the section 48C credit, discussed more below) is disposed of, or otherwise ceases to be investment tax credit property (*e.g.*, casualty loss), before the close of the recapture period (five years), the tax for the year is increased by a recapture percentage.[107] Advance rehabilitation and certain energy credits also are subject to recapture provisions. In addition, in determining the amount of gain that is recaptured as ordinary income under section 1245 or 1250, the amount of an investment credit downward basis adjustment also is treated as a deduction allowed for depreciation.[108]

[103] Sec. 291(a)(1).

[104] Sec. 1(h)(1)(E).

[105] See section 1(h)(6), which defines "unrecaptured 1250 gain" as any long-term capital gain from the sale or exchange of section 1250 property held more than one year to the extent of the gain that would have been treated as ordinary income if section 1250 applied to all depreciation, reduced by the net loss (if any) attributable to the items taken into account in computing 28-percent rate gain of an individual.

[106] Sec. 1(h)(6)(B).

[107] Sec. 50(a). See also Notice 2013-12, 2013-10 I.R.B. 543 (the recapture and other special rules in section 50 apply to the section 48C qualifying advanced energy project credit).

[108] Sec. 50(c)(4). For further details on the investment tax credit recapture requirements and special rules, see the Instructions for Form 4255, Recapture of Investment Credit (Rev. December 2018).

C. Incentives for Research

1. Research and experimental expenditures

Public Law 115-97[109] modified section 174 for amounts paid or incurred in taxable years beginning after December 31, 2021 (with conforming changes made to sections 41 and 280C). Section 174 as applicable to amounts paid or incurred in taxable years beginning before January 1, 2022, is described first below, followed by a description of section 174 as applicable to amounts paid or incurred in taxable years beginning after December 31, 2021.

Amounts paid or incurred in taxable years beginning before January 1, 2022

Business expenses associated with the development or creation of an asset having a useful life extending beyond the current year generally must be capitalized and depreciated over such useful life.[110] However, with respect to taxable years beginning before January 1, 2022, taxpayers may elect to deduct currently the amount of certain reasonable research or experimental expenditures paid or incurred in connection with a trade or business.[111] Taxpayers may elect to forgo a current deduction, capitalize their research or experimental expenditures, and recover them ratably over the useful life of the research, but in no case over a period of less than 60 months.[112] Taxpayers, alternatively, may elect to amortize their research or experimental expenditures over a period of 10 years.[113] Research and experimental expenditures deductible under section 174 are not subject to capitalization under either section 263(a)[114] or section

[109] December 22, 2017.

[110] Secs. 167 and 263(a).

[111] Secs. 174(a) and (e).

[112] Sec. 174(b). Taxpayers generating significant short-term losses often choose to defer the deduction for their research and experimental expenditures under this section. Additionally, section 174 amounts are excluded from the definition of "start-up expenditures" under section 195 (section 195 generally provides that start-up expenditures in excess of $5,000 either are not deductible or are amortizable over a period of not less than 180 months once an active trade or business begins). So as not to generate significant losses before beginning its trade or business, a taxpayer may choose to defer the deduction and amortize its section 174 costs beginning with the month in which the taxpayer first realizes benefits from the expenditures (*i.e.*, the month in which its active trade or business begins).

[113] Secs. 174(f)(2) and 59(e). This special 10-year election is available to mitigate the effect of the AMT adjustment for research expenditures set forth in section 56(b)(2). Note that the corporate AMT was repealed for taxable years beginning after December 31, 2017. See Pub. L. No. 115-97, sec. 2001, December 22, 2017. Taxpayers with significant losses also may elect to amortize their otherwise deductible research and experimental expenditures.

[114] Sec. 263(a)(1)(B).

263A.[115] In addition, section 174 deductions are generally reduced by the amount of the taxpayer's research credit under section 41.[116]

Amounts defined as research or experimental expenditures under section 174 generally include all costs incurred in the experimental or laboratory sense related to the development or improvement of a product.[117] In particular, qualifying costs are those incurred for activities intended to discover information that would eliminate uncertainty concerning the development or improvement of a product.[118] Uncertainty exists when information available to the taxpayer is not sufficient to ascertain the capability or method for developing, improving, and/or appropriately designing the product.[119] The determination of whether expenditures qualify as deductible research expenses depends on the nature of the activity to which the costs relate, not the nature of the product or improvement being developed or the level of technological advancement the product or improvement represents. Examples of qualifying costs include salaries for those engaged in research or experimentation efforts, amounts incurred to operate and maintain research facilities (*e.g.*, utilities, depreciation, rent, *etc.*), and expenditures for materials and supplies used and consumed in the course of research or experimentation (including amounts incurred in conducting trials).[120] In addition, under administrative guidance, the costs of developing computer software have been accorded treatment similar to research and experimental expenditures.[121]

Research or experimental expenditures under section 174 do not include expenditures for quality control testing; efficiency surveys; management studies; consumer surveys; advertising or promotions; the acquisition of another's patent, model, production or process; or research in connection with literary, historical, or similar projects.[122] For purposes of section 174, quality control testing means testing to determine whether particular units of materials or products

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[115] Sec. 263A(c)(2).

[116] Sec. 280C(c). Taxpayers may alternatively elect to claim a reduced research credit amount under section 41 in lieu of reducing deductions otherwise allowed. Sec. 280C(c)(3), as effective for amounts paid or incurred in taxable years beginning before January 1, 2022.

[117] Treas. Reg. sec. 1.174-2(a)(1) and (2). Product is defined to include any pilot model, process, formula, invention, technique, patent, or similar property, and includes products to be used by the taxpayer in its trade or business as well as products to be held for sale, lease, or license. Treas. Reg. sec. 1.174-2(a)(11), Example 10, provides an example of new process development costs eligible for section 174 treatment.

[118] Treas. Reg. sec. 1.174-2(a)(1).

[119] *Ibid.*

[120] See Treas. Reg. sec. 1.174-4(c). The definition of research and experimental expenditures also includes the costs of obtaining a patent, such as attorneys' fees incurred in making and perfecting a patent application. Treas. Reg. sec. 1.174-2(a)(1).

[121] Rev. Proc. 2000-50, 2000-2 C.B. 601.

[122] Treas. Reg. sec. 1.174-2(a)(6).

conform to specified parameters, but does not include testing to determine if the design of the product is appropriate.[123]

Generally, no current deduction under section 174 is allowable for expenditures for the acquisition or improvement of land or of depreciable or depletable property used in connection with any research or experimentation.[124] In addition, no current deduction is allowed for any expenditure incurred for the purpose of ascertaining the existence, location, extent, or quality of any deposit of ore or other mineral, including oil and gas.[125]

Amounts paid or incurred in taxable years beginning after December 31, 2021

With respect to taxable years beginning after December 31, 2021, amounts defined as specified research or experimental expenditures are required to be capitalized and amortized ratably over a five-year period, beginning with the midpoint of the taxable year in which the specified research or experimental expenditures were paid or incurred. Specified research or experimental expenditures that are attributable to research that is conducted outside of the United States[126] are required to be capitalized and amortized ratably over a period of 15 years, beginning with the midpoint of the taxable year in which such expenditures were paid or incurred. Specified research or experimental expenditures subject to capitalization include expenditures for software development.

Specified research or experimental expenditures do not include expenditures for the acquisition or improvement of land or for depreciable or depletable property used in connection with the research or experimentation, but do include the depreciation and depletion allowances of such property. Also excluded are exploration expenditures incurred for ore or other minerals (including oil and gas).

In the case of retired, abandoned, or disposed property with respect to which specified research or experimental expenditures are paid or incurred, any remaining basis may not be recovered in the year of retirement, abandonment, or disposal, but instead must continue to be amortized over the remaining amortization period.

The application of this rule is treated as a change in the taxpayer's method of accounting for purposes of section 481, initiated by the taxpayer, and made with the consent of the Secretary. This rule is applied on a cutoff basis to research or experimental expenditures paid or incurred in taxable years beginning after December 31, 2021 (hence there is no adjustment under

[123] Treas. Reg. sec. 1.174-2(a)(7).

[124] Sec. 174(c). However, depreciation and depletion allowances may be considered section 174 expenditures. *Ibid*.

[125] Sec. 174(d). Special rules apply with respect to geological and geophysical costs (section 167(h)), qualified tertiary injectant expenses (section 193), intangible drilling costs (sections 263(c) and 291(b)), and mining exploration and development costs (sections 616 and 617).

[126] For this purpose, the term "United States" includes the United States, the Commonwealth of Puerto Rico, and any possession of the United States.

section 481(a) for research or experimental expenditures paid or incurred in taxable years beginning before January 1, 2022).

If a taxpayer's research credit under section 41 (discussed more below) for a taxable year beginning after 2021 exceeds the amount allowed as an amortization deduction under section 174 for such taxable year, the amount chargeable to capital account under section 174 for such taxable year must be reduced by that excess amount. A taxpayer may alternatively elect to claim a reduced research credit amount under section 41 in lieu of reducing its section 174 expenditures for the taxable year. If such an election is made, the research credit is reduced by an amount equal to that credit multiplied by the highest corporate tax rate.

2. Research credit

General rule

For general research expenditures, a taxpayer may claim a research credit equal to 20 percent of the amount by which the taxpayer's qualified research expenses for a taxable year exceed its base amount for that year.[127] Thus, the research credit is generally available with respect to incremental increases in qualified research. An alternative simplified credit (with a 14-percent rate and a different base amount) may be claimed in lieu of this credit.[128]

A 20-percent research tax credit also is available with respect to the excess of (1) 100 percent of corporate cash expenses (including grants or contributions) paid for basic research conducted by universities (and certain nonprofit scientific research organizations) over (2) the sum of (a) the greater of two minimum basic research floors plus (b) an amount reflecting any decrease in nonresearch giving to universities by the corporation as compared to such giving during a fixed-base period, as adjusted for inflation.[129] This separate credit computation commonly is referred to as the basic research credit.

Finally, a research credit is available for a taxpayer's expenditures on research undertaken by an energy research consortium.[130] This separate credit computation commonly is referred to as the energy research credit. Unlike the other research credits, the energy research credit applies to all qualified expenditures, not just those in excess of a base amount.

Computation of general research credit

The general research tax credit applies only to the extent that the taxpayer's qualified research expenses for the current taxable year exceed its base amount. The base amount for the current year generally is computed by multiplying the taxpayer's fixed-base percentage by the

[127] Sec. 41(a)(1).

[128] Sec. 41(c)(5).

[129] Sec. 41(a)(2) and (e). The base period for the basic research credit generally extends from 1981 through 1983.

[130] Sec. 41(a)(3).

average amount of the taxpayer's gross receipts for the four preceding years. If a taxpayer both incurred qualified research expenses and had gross receipts during each of at least three years from 1984 through 1988, then its fixed-base percentage is the ratio that its total qualified research expenses for the 1984-1988 period bears to its total gross receipts for that period (subject to a maximum fixed-base percentage of 16 percent). Special rules apply to all other taxpayers (so called start-up firms).[131] In computing the research credit, a taxpayer's base amount cannot be less than 50 percent of its current-year qualified research expenses.

Alternative simplified credit

The alternative simplified credit is equal to 14 percent of qualified research expenses that exceed 50 percent of the average qualified research expenses for the three preceding taxable years.[132] The rate is reduced to 6 percent if a taxpayer has no qualified research expenses in any one of the three preceding taxable years.[133] An election to use the alternative simplified credit applies to all succeeding taxable years unless revoked with the consent of the Secretary.[134]

Eligible expenses

Qualified research expenses eligible for the research tax credit consist of: (1) in-house expenses of the taxpayer for wages and supplies attributable to qualified research; (2) certain time-sharing costs for computer use in qualified research; and (3) 65 percent of amounts paid or incurred by the taxpayer to certain other persons for qualified research conducted on the taxpayer's behalf (so-called contract research expenses).[135] Notwithstanding the limitation for contract research expenses, qualified research expenses include 100 percent of amounts paid or

[131] The Small Business Job Protection Act of 1996 expanded the definition of start-up firms under section 41(c)(3)(B)(i) to include any firm if the first taxable year in which such firm had both gross receipts and qualified research expenses began after 1983. A special rule (enacted in 1993) is designed to gradually recompute a start-up firm's fixed-base percentage based on its actual research experience. Under this special rule, a start-up firm is assigned a fixed-base percentage of three percent for each of its first five taxable years after 1993 in which it incurs qualified research expenses. A start-up firm's fixed-base percentage for its sixth through tenth taxable years after 1993 in which it incurs qualified research expenses is a phased-in ratio based on the firm's actual research experience. For all subsequent taxable years, the taxpayer's fixed-base percentage is its actual ratio of qualified research expenses to gross receipts for any five years selected by the taxpayer from its fifth through tenth taxable years after 1993. Sec. 41(c)(3)(B).

[132] Sec. 41(c)(5)(A).

[133] Sec. 41(c)(5)(B).

[134] Sec. 41(c)(5)(C).

[135] Under a special rule, 75 percent of amounts paid to a research consortium for qualified research are treated as qualified research expenses eligible for the research credit (rather than 65 percent under the general rule under section 41(b)(3) governing contract research expenses) if (1) such research consortium is a tax-exempt organization that is described in section 501(c)(3) (other than a private foundation) or section 501(c)(6) and is organized and operated primarily to conduct scientific research, and (2) such qualified research is conducted by the consortium on behalf of the taxpayer and one or more persons not related to the taxpayer. Sec. 41(b)(3)(C).

incurred by the taxpayer to an eligible small business, university, or Federal laboratory for qualified energy research.

To be eligible for the credit, the research not only has to satisfy the requirements of section 174, but also must be undertaken for the purpose of discovering information that is technological in nature, the application of which is intended to be useful in the development of a new or improved business component of the taxpayer, and substantially all of the activities of which constitute elements of a process of experimentation for functional aspects, performance, reliability, or quality of a business component. Research does not qualify for the credit if substantially all of the activities relate to style, taste, cosmetic, or seasonal design factors.[136] In addition, research does not qualify for the credit if: (1) conducted after the beginning of commercial production of the business component; (2) related to the adaptation of an existing business component to a particular customer's requirements; (3) related to the duplication of an existing business component from a physical examination of the component itself or certain other information; (4) related to certain efficiency surveys, management function or technique, market research, market testing, or market development, routine data collection or routine quality control; (5) related to software developed primarily for internal use by the taxpayer; (6) conducted outside the United States, Puerto Rico, or any U.S. possession; (7) in the social sciences, arts, or humanities; or (8) funded by any grant, contract, or otherwise by another person (or government entity).[137]

Relation to deduction

Deductions allowed to a taxpayer under section 174 (or any other section) are reduced by an amount equal to 100 percent of the taxpayer's research tax credit determined for the taxable year.[138] Taxpayers may alternatively elect to claim a reduced research tax credit amount under section 41 in lieu of reducing deductions otherwise allowed.[139]

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[136] Sec. 41(d)(3).

[137] Sec. 41(d)(4).

[138] Sec. 280C(c). For example, assume that a taxpayer makes credit-eligible research expenditures of $1 million during the year and that the base period amount is $600,000. Under the standard credit calculation (*i.e.*, where a taxpayer may claim a research credit equal to 20 percent of the amount by which its qualified expenses for the year exceed its base period amount), the taxpayer is allowed a credit equal to 20 percent of the $400,000 increase in research expenditures, or $80,000 (($1 million - $600,000) * 20% = $80,000). To avoid a double benefit, the amount of the taxpayer's deduction under section 174 is reduced by $80,000 (the amount of the research credit), leaving a deduction of $920,000 ($1 million - $80,000).

[139] Sec. 280C(c)(3). Taxpayers making this election reduce the allowable research credit by a percentage equal to the maximum corporate tax rate (currently 21 percent). Continuing with the example from the prior footnote, an electing taxpayer would have its credit reduced to $63,200 ($80,000 - ($80,000 * 0.21)) but would retain its $1 million deduction for research expenses. This option might be desirable for a taxpayer who cannot claim the full amount of the research credit otherwise allowable due to the limitation imposed by the alternative minimum tax.

Specified credits allowed against alternative minimum tax for small businesses

In the case of an eligible small business,[140] the research credit determined under section 41 for taxable years beginning after December 31, 2015, is a specified credit. Thus, the research credits of an eligible small business may offset both regular tax and alternative minimum tax liabilities.

Payroll tax credit for small businesses

In general

For taxable years beginning after December 31, 2015, a qualified small business may elect for any taxable year to claim a certain amount of its research credit as a payroll tax credit against its employer Old Age, Survivors, and Disability Insurance ("OASDI") liability, rather than against its income tax liability.[141] If a taxpayer makes an election, the amount so elected is treated as a research credit for purposes of section 280C.[142]

A qualified small business is defined, with respect to any taxable year, as a corporation (including an S corporation) or partnership (1) with gross receipts of less than $5 million for the taxable year,[143] and (2) that did not have gross receipts for any taxable year before the five taxable year period ending with the taxable year. An individual carrying on one or more trades or businesses also may be considered a qualified small business if the individual meets the conditions set forth in (1) and (2), taking into account its aggregate gross receipts received with respect to all trades or businesses. A qualified small business does not include an organization exempt from income tax under section 501.

The payroll tax credit portion is the least of (1) an amount specified by the taxpayer that does not exceed $250,000, (2) the research credit determined for the taxable year, or (3) in the case of a qualified small business other than a partnership or S corporation, the amount of the business credit carryforward under section 39 from the taxable year (determined before the application of this rule to the taxable year).

All members of the same controlled group or group under common control are treated as a single taxpayer.[144] The $250,000 amount is allocated among the members in proportion to

[140] Defined in section 38(c)(5)(A), after application of rules similar to the rules of section 38(c)(5)(B)).

[141] Sec. 41(h).

[142] Thus, taxpayers are either denied a section 174 deduction in the amount of the credit or may elect a reduced research credit amount. The election is not taken into account for purposes of determining any amount allowable as a payroll tax deduction.

[143] For this purpose, gross receipts are determined under the rules of section 448(c)(3), without regard to subparagraph (A) thereof.

[144] For this purpose, all persons or entities treated as a single taxpayer under section 41(f)(1) are treated as a single person.

each member's expenses on which the research credit is based. Each member may separately elect the payroll tax credit, but not in excess of its allocated dollar amount.

A taxpayer may make an annual election under this section, specifying the amount of its research credit not to exceed $250,000 that may be used as a payroll tax credit, on or before the due date (including extensions) of its originally filed return.[145] A taxpayer may not make an election for a taxable year if it has made such an election for five or more preceding taxable years. An election to apply the research credit against OASDI liability may not be revoked without the consent of the Secretary of the Treasury ("Secretary"). In the case of a partnership or S corporation, an election to apply the credit against its OASDI liability is made at the entity level.

Application of credit against OASDI tax liability

The payroll tax portion of the research credit is allowed as a credit against the qualified small business's employer OASDI tax liability for the first calendar quarter beginning after the date on which the qualified small business files its income tax or information return for the taxable year.[146] The credit may not exceed the OASDI tax liability for a calendar quarter on the wages paid with respect to all employees of the qualified small business.[147]

If the payroll tax portion of the credit exceeds the qualified small business's OASDI tax liability for a calendar quarter, the excess is allowed as a credit against the OASDI liability for the following calendar quarter.

[145] In the case of a qualified small business that is a partnership, this is the return required to be filed under section 6031. In the case of a qualified small business that is an S corporation, this is the return required to be filed under section 6037. In the case of any other qualified small business, this is the return of tax for the taxable year.

[146] Sec. 3111(f).

[147] The credit does not apply against its employer HI liability or against the employee portion of FICA taxes the employer is required to withhold and remit to the government.

D. Credit for Investment in Advanced Energy Property Used in Certain Manufacturing Projects

A 30-percent credit is provided for investment in qualified property used in a qualified advanced energy manufacturing project.[148] The 30-percent credit is allocated among applicants whose investment meets certification criteria. The total allocable amount of credits is limited to $2.3 billion.

A qualified advanced energy project is a project that re-equips, expands, or establishes a manufacturing facility for the production: (1) property designed to be used to produce energy from the sun, wind, or geothermal deposits (within the meaning of section 613(e)(2)), or other renewable resources; (2) fuel cells, microturbines, or an energy storage system for use with electric or hybrid-electric motor vehicles; (3) electric grids to support the transmission of intermittent sources of renewable energy, including storage of such energy; (4) property designed to capture and sequester carbon dioxide; (5) property designed to refine or blend renewable fuels (but not fossil fuels) or to produce energy conservation technologies (including energy-conserving lighting technologies and smart grid technologies); (6) new qualified plug-in electric drive motor vehicles, qualified plug-in electric vehicles, or components which are designed specifically for use with such vehicles, including electric motors, generators, and power control units, or (7) other advanced energy property designed to reduce greenhouse gas emissions as may be determined by the Secretary. Qualified property does not include property designed to manufacture equipment for use in the refining or blending of any transportation fuel other than renewable fuels.

Qualified property must be depreciable (or amortizable) property used in a qualified advanced energy project. Only tangible personal property and other tangible property (not including a building or its structural components) are credit-eligible. The basis of qualified property must be reduced by the amount of credit received.

Credits are available only for projects certified by the Secretary, in consultation with the Secretary of Energy. Beginning in 2009, the Secretary had authority to allocate up to $2.3 billion in credits. All credits have been allocated; $150 million in credits that were not fully utilized after the initial allocation were reallocated in 2013.[149]

In selecting projects, the Secretary may consider only those projects where there is a reasonable expectation of commercial viability. In addition, the Secretary must consider other selection criteria, including which projects (1) will provide the greatest domestic job creation; (2) will provide the greatest net impact in avoiding or reducing air pollutants or anthropogenic emissions of greenhouse gases; (3) have the greatest potential for technological innovation and commercial deployment; (4) have the lowest levelized cost of generated or stored energy, or of measured reduction in energy consumption or greenhouse gas emission; and (5) have the shortest project time from certification to completion.

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[148] Sec. 48C.

[149] Notice 2013-12.

Each project application must be submitted during the two-year period beginning on the date such certification program is established. An applicant for certification has one year from the date the Secretary accepts the application to provide the Secretary with evidence that the requirements for certification have been met. Upon certification, the applicant has three years from the date of issuance of the certification to place the project in service. Not later than four years after the date of enactment of the credit, the Secretary is required to review the credit allocations and redistribute any credits that were not used either because of a revoked certification or because of an insufficient quantity of credit applications.

E. Domestic Production Activities Deduction (Former Section 199)

Public Law 115-97 repealed the deduction for income attributable to domestic production activities (former section 199) for taxable years beginning after December 31, 2017. The discussion below describes former section 199 as in effect before its repeal.

In general

Former section 199[150] provides a deduction from taxable income (or, in the case of an individual, adjusted gross income[151]) that is equal to nine percent of the lesser of the taxpayer's qualified production activities income or taxable income (determined without regard to the section 199 deduction) for the taxable year.[152] The amount of the deduction for a taxable year is limited to 50 percent of the W-2 wages paid by the taxpayer, and properly allocable to domestic production gross receipts, during the calendar year that ends in such taxable year.[153] W-2 wages are the total wages subject to wage withholding,[154] elective deferrals,[155] and deferred compensation[156] paid by the taxpayer with respect to employment of its employees during the calendar year ending during the taxable year of the taxpayer.[157] W-2 wages do not include any amount that is not properly allocable to domestic production gross receipts as a qualified item of deduction.[158] In addition, W-2 wages do not include any amount that was not properly included

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[150] All references to former section 199 in this document refer to section 199 as in effect before its repeal.

[151] For this purpose, adjusted gross income is determined after application of sections 86, 135, 137, 219, 221, 222, and 469, and without regard to the section 199 deduction. Sec. 199(d)(2).

[152] Sec. 199(a).

[153] Sec. 199(b).

[154] Defined in sec. 3401(a).

[155] Within the meaning of sec. 402(g)(3).

[156] Deferred compensation includes compensation deferred under section 457, as well as the amount of any designated Roth contributions (as defined in section 402A).

[157] Sec. 199(b). In the case of a taxpayer with a short taxable year that does not contain a calendar year ending during such short taxable year, the following amounts are treated as the W-2 wages of the taxpayer for the short taxable year: (1) wages paid during the short taxable year to employees of the qualified trade or business; (2) elective deferrals (within the meaning of section 402(g)(3)) made during the short taxable year by employees of the qualified trade or business; and (3) compensation actually deferred under section 457 during the short taxable year with respect to employees of the qualified trade or business. Amounts that are treated as W-2 wages for a taxable year are not treated as W-2 wages of any other taxable year. See Treas. Reg. sec. 1.199-2(b) (issued under former section 199). In addition, in the case of a taxpayer who is an individual with otherwise qualified production activities income from sources within the commonwealth of Puerto Rico, if all the income for the taxable year is taxable under section 1 (income tax rates for individuals), the determination of W-2 wages with respect to the taxpayer's trade or business conducted in Puerto Rico is made without regard to any exclusion under the wage withholding rules (as provided in section 3401(a)(8)) for remuneration paid for services in Puerto Rico. See sec. 199(d)(8)(B).

[158] Sec. 199(b)(2)(B).

in a return filed with the Social Security Administration on or before the 60th day after the due date (including extensions) for such return.[159]

In the case of oil related qualified production activities income, the deduction is reduced by three percent of the least of the taxpayer's oil related qualified production activities income, qualified production activities income, or taxable income (determined without regard to the section 199 deduction) for the taxable year.[160] For this purpose, oil related qualified production activities income for any taxable year is the portion of qualified production activities income attributable to the production, refining, processing, transportation, or distribution of oil, gas, or any primary product thereof[161] during the taxable year.

In general, qualified production activities income is equal to domestic production gross receipts reduced by the sum of: (1) the cost of goods sold that are allocable to those receipts;[162] and (2) other expenses, losses, or deductions which are properly allocable to those receipts.[163] Domestic production gross receipts generally are gross receipts of a taxpayer that are derived from: (1) any sale, exchange, or other disposition, or any lease, rental, or license, of qualifying production property[164] that was manufactured, produced, grown, or extracted by the taxpayer in whole or in significant part within the United States;[165] (2) any sale, exchange, or other

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[159] Sec. 199(b)(2)(C).

[160] Sec. 199(d)(9).

[161] Within the meaning of sec. 927(a)(2)(C), as in effect before its repeal.

[162] For this purpose, any item or service brought into the United States is treated as acquired by purchase, and its cost is treated as not less than its value immediately after it entered the United States. A similar rule applies in determining the adjusted basis of leased or rented property where the lease or rental gives rise to domestic production gross receipts. In addition, for any property exported by the taxpayer for further manufacture, the increase in cost or adjusted basis may not exceed the difference between the value of the property when exported and the value of the property when brought back into the United States after the further manufacture. See sec. 199(c)(3)(A) and (B).

[163] Sec. 199(c)(1). In computing qualified production activities income, the domestic production activities deduction itself is not an allocable deduction. Sec. 199(c)(1)(B)(ii). See Treas. Reg. secs. 1.199-1 through 1.199-9 (issued under former section 199) where the Secretary has prescribed rules for the proper allocation of items of income, deduction, expense, and loss for purposes of determining qualified production activities income.

[164] Qualifying production property generally includes any tangible personal property, computer software, and sound recordings. Sec. 199(c)(5).

[165] When used in the Code in a geographical sense, the term "United States" generally includes only the States and the District of Columbia. Sec. 7701(a)(9). A special rule for determining domestic production gross receipts, however, provides that for taxable years beginning after December 31, 2005, and before January 1, 2018, in the case of any taxpayer with gross receipts from sources within the Commonwealth of Puerto Rico, the term "United States" includes the Commonwealth of Puerto Rico, but only if all of the taxpayer's Puerto Rico-sourced gross receipts are taxable under the Federal income tax for individuals or corporations for such taxable year. Sec. 199(d)(8)(A) and (C). In computing the 50-percent wage limitation, the taxpayer is permitted to take into account wages paid to bona fide residents of Puerto Rico for services performed in Puerto Rico. Sec. 199(d)(8)(B).

disposition, or any lease, rental, or license, of any qualified film[166] produced by the taxpayer; (3) any sale, exchange, or other disposition, or any lease, rental, or license, of electricity, natural gas, or potable water produced by the taxpayer in the United States; (4) construction of real property performed in the United States by a taxpayer in the ordinary course of a construction trade or business; or (5) engineering or architectural services performed in the United States by the taxpayer for the construction of real property in the United States.[167]

Domestic production gross receipts do not include any gross receipts of the taxpayer derived from property leased, licensed, or rented by the taxpayer for use by any related person.[168] In addition, domestic production gross receipts do not include gross receipts which are derived from (1) the sale of food and beverages prepared by the taxpayer at a retail establishment, (2) the transmission or distribution of electricity, natural gas, or potable water, or (3) the lease, rental, license, sale, exchange, or other disposition of land.[169]

Special rules

All members of an expanded affiliated group[170] are treated as a single corporation and the deduction is allocated among the members of the expanded affiliated group in proportion to each member's respective amount, if any, of qualified production activities income. In addition, for purposes of determining domestic production gross receipts, if all of the interests in the capital and profits of a partnership are owned by members of a single expanded affiliated group at all times during the taxable year of such partnership, the partnership and all members of such group are treated as a single taxpayer during such period.[171]

For a tax-exempt taxpayer subject to tax on its unrelated business taxable income by section 511, the section 199 deduction is determined by substituting unrelated business taxable income for taxable income where applicable.[172]

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[166] Qualified film includes any motion picture film or videotape (including live or delayed television programming, but not including certain sexually explicit productions) if 50 percent or more of the total compensation relating to the production of the film (including compensation in the form of residuals and participations) constitutes compensation for services performed in the United States by actors, production personnel, directors, and producers. Sec. 199(c)(6).

[167] Sec. 199(c)(4)(A).

[168] Sec. 199(c)(7). For this purpose, a person is treated as related to another person if such persons are treated as a single employer under subsection (a) or (b) of section 52 or subsection (m) or (o) of section 414, except that determinations under subsections (a) and (b) of section 52 are made without regard to section 1563(b).

[169] Sec. 199(c)(4)(B).

[170] For this purpose, an expanded affiliated group is an affiliated group as defined in section 1504(a) determined (i) by substituting "more than 50 percent" for "more than 80 percent" each place it appears, and (ii) without regard to paragraphs (2) and (4) of section 1504(b). See sec. 199(d)(4)(B).

[171] Sec. 199(d)(4)(D).

[172] Sec. 199(d)(7).

The section 199 deduction is determined by only taking into account items that are attributable to the actual conduct of a trade or business.[173]

Partnerships and S corporations

With regard to the domestic production activities income of a partnership or S corporation, the deduction is determined at the partner or shareholder level. Each partner or shareholder generally takes into account such person's allocable share of the components of the calculation (including domestic production gross receipts; the cost of goods sold allocable to such receipts; and other expenses, losses, or deductions allocable to such receipts) from the partnership or S corporation, as well as any items relating to the partner or shareholder's own qualified production activities income, if any.[174]

In applying the wage limitation, each partner or shareholder is treated as having been allocated wages from the partnership or S corporation in an amount that is equal to such person's allocable share of W-2 wages.[175]

Specified agricultural and horticultural cooperatives

In general

With regard to specified agricultural and horticultural cooperatives, section 199 provides the same treatment of qualified production activities income derived from agricultural or horticultural products that are manufactured, produced, grown, or extracted by such cooperatives,[176] as it provides for qualified production activities income of other taxpayers, including non-specified cooperatives (*i.e.*, the cooperative may claim a deduction for qualified production activities income). The cooperative is treated as having manufactured, produced, grown, or extracted in whole or significant part any qualifying production property marketed by the cooperative if such items were manufactured, produced, grown, or extracted in whole or significant part by its patrons.[177] In addition, the cooperative is treated as having manufactured, produced, grown, or extracted agricultural products with respect to which the cooperative performs storage, handling, or other processing activities (other than transportation activities) within the United States related to the sale, exchange, or other disposition of agricultural products, provided the products are consumed in connection with or incorporated into the

[173] Sec. 199(d)(5).

[174] Sec. 199(d)(1)(A).

[175] In the case of a trust or estate, the components of the calculation are apportioned between (and among) the beneficiaries and the fiduciary. See sec. 199(d)(1)(B) and Treas. Reg. sec. 1.199-5(d) and (e) (issued under former section 199).

[176] For this purpose, agricultural or horticultural products also include fertilizer, diesel fuel, and other supplies used in agricultural or horticultural production that are manufactured, produced, grown, or extracted by the cooperative. See Treas. Reg. sec. 1.199-6(f) (issued under former section 199).

[177] Sec. 199(d)(3)(D) and Treas. Reg. sec. 1.199-6(d) (issued under former section 199).

manufacturing, production, growth, or extraction of qualifying production property (whether or not by the cooperative).[178] Finally, for purposes of determining the cooperative's section 199 deduction, qualified production activities income and taxable income are determined without regard to any deduction allowable under section 1382(b) and (c) (relating to patronage dividends, per-unit retain allocations, and nonpatronage distributions) for the taxable year.[179]

Definition of a specified agricultural or horticultural cooperative

A specified agricultural or horticultural cooperative is an organization to which part I of subchapter T applies that is engaged in (a) the manufacturing, production, growth, or extraction in whole or significant part of any agricultural or horticultural product, or (b) the marketing of agricultural or horticultural products that its patrons have so manufactured, produced, grown, or extracted.[180]

Allocation of the cooperative's deduction to patrons

Any patron that receives a qualified payment from a specified agricultural or horticultural cooperative is allowed as a deduction for the taxable year in which such payment is received an amount equal to the portion of the cooperative's deduction for qualified production activities income that is (i) allowed with respect to the portion of the qualified production activities income to which such payment is attributable, and (ii) identified by the cooperative in a written notice mailed to the patron during the payment period described in section 1382(d).[181] A qualified payment is any amount that (i) is described in paragraph (1) or (3) of section 1385(a) (*i.e.*, patronage dividends and per-unit retain allocations), (ii) is received by an eligible patron from a specified agricultural or horticultural cooperative, and (iii) is attributable to qualified production activities income with respect to which a deduction is allowed to such cooperative.[182]

The cooperative cannot reduce its income under section 1382 for any deduction allowable to its patrons under this rule (*i.e.*, the cooperative must reduce its deductions allowed for certain

[178] See Treas. Reg. sec. 1.199-3(e)(1) (issued under former section 199).

[179] See sec. 199(d)(3)(C) and Treas. Reg. sec. 1.199-6(c) (issued under former section 199).

[180] Sec. 199(d)(3)(F). For this purpose, agricultural or horticultural products also include fertilizer, diesel fuel and other supplies used in agricultural or horticultural production that are manufactured, produced, grown, or extracted by the cooperative. See Treas. Reg. sec. 1.199-6(f) (issued under former section 199).

[181] Sec. 199(d)(3)(A) and Treas. Reg. sec. 1.199-6(a) (issued under former section 199). The written notice must be mailed by the cooperative to it patrons no later than the 15th day of the ninth month following the close of the taxable year. The cooperative must report the amount of the patron's section 199 deduction on Form 1099-PATR, "Taxable Distributions Received From Cooperatives," issued to the patron. Treas. Reg. sec. 1.199-6(g) (issued under former section 199).

[182] Sec. 199(d)(3)(E). For this purpose, patronage dividends and per-unit retain allocations include any advances on patronage and per-unit retains paid in money during the taxable year. Treas. Reg. sec. 1.199-6(e) (issued under former section 199).

payments to its patrons in an amount equal to the section 199 deduction allocated to its patrons).[183]

Although section 199 was repealed, specified agricultural and horticultural cooperatives are eligible for a similar deduction under section 199A(g) for taxable years beginning after December 31, 2017.[184]

[183] Sec. 199(d)(3)(B) and Treas. Reg. sec. 1.199-6(b) (issued under former section 199).

[184] For a discussion of section 199A(g), see Joint Committee on Taxation, *General Explanation of Certain Tax Legislation Enacted in the 115th Congress* (JCS-2-19), July 2019.

II. ECONOMIC ANALYSIS

A. User Cost of Capital and Effective Marginal Tax Rates

In general

A tax system is considered efficient if it does not distort the choices that would be made in the absence of the tax system. Generally, no tax system will be fully efficient as individuals and business entities alter their behavior in response to taxation. Thus, a tax system puts a "wedge" between the full economic return from an activity and the return that is available to the individual or entity after tax is imposed. Such a tax wedge generally leads to a reduction in the amount of the taxed activity. One goal of a tax system is to minimize these inefficiencies, which must be balanced against satisfying other goals for a tax system, such as raising a desired level of revenue, achieving an equitable distribution of taxes, and creating a tax system that is reasonably administrable.

Economists focus on the effective marginal tax rate to determine the effect of taxes at the margin of behavior. By "marginal," economists mean an incremental unit of a given activity. In the capital income context, that margin of behavior is the decision whether to invest in an incremental unit of capital of the business, and the effective marginal tax rate on that investment is the lifetime tax owed on that investment expressed as a share of the economic (before-tax) returns to that investment. While the statutory corporate tax rate is an important element in determining effective marginal tax rates on capital invested in the corporate sector, many other factors come in to play as well, including discrepancies between true economic depreciation of the asset and depreciation deductions that are allowed by statute for that class of asset, tax credits or other special rules that may apply to the investment, and whether the asset is financed by debt or equity.

The corporate income tax is a separate entity-level tax on income earned from capital invested in the corporate sector. As such, it is but one component of taxes on capital income, as capital may be deployed in other organizational forms, such as partnerships, S corporations, or sole proprietorships, which do not face a separate entity level tax. The existence of a separate tax on asset income earned in corporate form is itself a distortion in the efficient allocation of capital, as it creates a disincentive to organize as a corporation.

The individual income tax also affects the returns to capital income. In addition to the marginal tax rate on capital income at the corporate level, the effective marginal tax rate on an incremental unit of investment must reflect the marginal tax rate on returns at the individual level. In the case of an individual supplying savings, the marginal unit of supply is an additional dollar of capital above what the individual is currently saving. While such an individual may face an average tax rate on income that is low, due to the standard deduction, special rates on dividend or capital gain income, low initial rates on taxable income, and other factors, his or her marginal rate of tax on investment—the tax on the marginal unit of savings supplied—could be substantially higher due to the progressive structure of the statutory individual tax rate schedule. Furthermore, the individual's effective marginal tax rate on an additional unit of capital supplied could be different from the statutory marginal rate due to opportunities to shelter some of the income from tax through, for example, retirement plan arrangements.

Economists emphasize the effective marginal tax rates because it is these rates that determine the incentives (or disincentives) for taxpayers to work, to save and invest, or to take advantage of various tax preferences. These incentives could distort taxpayer choices away from those made in the absence of government intervention. A less efficient allocation of labor and capital resources leaves society with lower output of goods and services than it would otherwise have. For this reason, economists believe that increasing efficiency in an economy results in increased growth in the economy.

The distorted choices that may result from increased effective marginal tax rates may change saving and investment. For example, taxation of income from capital may distort incentives to save by reducing the after-tax return to saving. Substantial disagreement exists among economists as to the effect on saving of changes in the after-tax return to saving. Empirical investigation of the responsiveness of personal saving to after-tax returns provides no conclusive results. If saving is reduced, capital available for investment is reduced. Investment in technology, equipment, and structures drives future productivity increases and growth in an economy. Increases in productivity increase wage rates, which provide incentives for increased labor supply and further saving. For this reason, tax policy affecting marginal tax rates on asset income can also have a significant effect on the economy's capacity for future growth.

User cost of capital

A fundamental concept for analyzing the effects of capital taxation and for calculating effective marginal tax rates is the user cost of capital.[185] The user cost of capital is the opportunity cost that the firm (user) incurs as a consequence of owning a capital asset.[186] A firm will purchase an asset only if the value of the goods produced by the asset meets or exceeds the user cost. If the marginal return exceeds the user cost of capital, a firm can increase its profits by undertaking the investment. If the marginal return is less than the user cost, the firm decreases profits by undertaking the investment. Firms invest up to the point where the marginal return to capital assets just equals the user cost of capital. Thus, the user cost of capital is the return that equates the discounted present value of the investment's expected cash flow with the investment's cost, *i.e.*, it is the real before-tax internal rate of return on a marginally profitable investment.[187] If a firm can choose between production technologies, for example between one that is labor-intensive and another that is capital-intensive, then a key variable for the firm to consider in its choice of production technology is the user cost of capital. If the user cost of capital is relatively high, the firm may choose a less capital-intensive technology and vice versa.

[185] The classic exposition of this concept is found in Robert Hall and Dale W. Jorgenson, "Tax Policy and Investment Behavior," *American Economic Review*, 57, June 1967, pp. 391-414.

[186] Harvey Rosen, *Public Finance*. Homewood, Illinois: Richard D. Irwin, Inc., 1985, p. 436.

[187] James B. Mackie, III, "Unfinished Business of the 1986 Tax Reform Act: An Effective Tax Rate Analysis of Current Issues in the Taxation of Capital Income," *National Tax Journal*, 55, June 2002, pp. 293-337.

The user cost of capital may be represented by the following equation:

$$user\ cost = \frac{(1-\theta-\tau*(x))}{(1-\tau)} * [(i-\pi)+\delta-(\alpha-\pi)],$$

where θ is any investment tax credit,

τ is the statutory corporate tax rate,

x is the present value of the tax depreciation deductions,

i is the nominal corporate discount rate, reflecting the mix of debt and equity financing,

π is the inflation rate,

δ is the present value of the economic depreciation, and

α is the appreciation or revaluation in the asset.

The equation illustrates how various factors affect the user cost of capital. Higher financing costs, represented by the nominal corporate discount rate, increase the cost of capital. The faster an asset wears out with age – that is, the higher the rate of economic depreciation--the higher is the user cost of capital. Higher inflation-adjusted appreciation or revaluation in the asset reduces the user cost of capital. Higher investment tax credits and more generous tax depreciation deductions also reduce the cost of capital. A higher tax rate increases the user cost of capital as the firm must give a greater portion of its return to the government. This demonstrates that there are tradeoffs in tax policy that affect the user cost of capital. For example, if to achieve a revenue neutral tax change, the corporate tax rate were reduced at the same time that tax depreciation were made less generous, these two changes would have offsetting effects on the user cost of capital. The net impact could increase, decrease, or have no net effect on the user cost of capital.

Financing costs

The user cost of capital is the financial cost of capital--that is, the opportunity cost of funds--adjusted for expected inflation. Therefore, the user cost of capital depends on how the investment is financed, *i.e.*, with debt, equity, retained earnings, or some combination thereof. In other words, the financing cost, denoted by *i* in the equation, is the real before-tax rate of interest the firm must pay to acquire the asset if debt-financed, the real before-tax rate of return required by shareholders if the asset is equity-financed, the real before-tax cost of internal equity if the asset is financed with retained earnings, or some weighted average of the three.[188] Investment

[188] Robert S. Chirinko, "Corporate Taxation, Capital Formation, and the Substitution Elasticity between Labor and Capital," *National Tax Journal*, 55, June 2002, pp. 339-355. A more complete treatment would also include the tax treatment of the financiers. See Mackie, "Unfinished Business," June 2002.

tax credits lower the user cost of capital by reducing the effective acquisition cost of a capital asset.

Economic depreciation and tax depreciation

The user cost of capital also incorporates the rate of economic depreciation of the asset.[189] Economic depreciation reflects the rate at which a capital asset falls in value as it ages.[190] Firms must earn enough from capital investments to recover this economic depreciation; otherwise they would be better off investing in some other asset.

Greater tax depreciation allowances tend to lower the user cost of capital. Tax depreciation often differs from economic depreciation,[191] and since 1981 tax depreciation has generally been accelerated relative to economic depreciation.[192] To the extent that tax depreciation has a larger (smaller) present value than does economic depreciation—accelerated depreciation or in the extreme case, expensing—the user cost of capital may be lower (higher) than in the absence of the tax allowances. The tax law can promote an inefficient distribution of investment if it specifies tax depreciation rates that deviate from economic depreciation rates. Some have argued, for instance, that depreciation provisions are more favorable to investment in equipment than investment in structures, which could result in a bias in favor of investment in equipment.[193] In addition, tax rules can encourage more aggregate investment if tax depreciation rates, as a whole, are faster than economic depreciation rates.

Measuring economic depreciation

While tax depreciation rates are defined by tax rules and are relatively straightforward to calculate, measuring economic depreciation rates, the change in market value of income-producing property, is more difficult. Although economists have attempted to estimate economic depreciation rates for particular investments, no consensus has emerged regarding a general representation of a depreciation method applicable across broad classes of assets.[194] One method based on early estimates of economic depreciation is the ADS.[195] ADS assigns each investment a recovery period reflecting its useful life and assumes that the investment depreciates in a straight-line pattern. The dollar amount of economic depreciation is assumed to be the same

[189] The rate of economic depreciation is denoted by δ in the user cost of capital equation.

[190] The definition of depreciation relevant to measurement of true economic income is economic depreciation, the true loss of economic value. Paul A. Samuelson, "Tax Deductibility of Economic Depreciation to Insure Invariant Valuations," *Journal of Political Economy*, vol. 72, December 1964, pp. 604-606.

[191] Tax depreciation deductions are denoted by x in the user cost of capital equation.

[192] The legislative background of the tax depreciation rules is described in section II.A. of this document.

[193] Jane G. Gravelle, Congressional Research Service, *Depreciation and the Taxation of Real Estate* (Report RL3063), 2000.

[194] Jane G. Gravelle, "Whither Tax Depreciation," *National Tax Journal*, September 2001, pp. 513-526.

[195] See sec. 168(g).

each year. For example, agricultural machinery is generally assumed to have a useful life, and recovery period, of 10 years under ADS.[196] However, some economists argue that assets do not depreciate by a constant dollar amount each year, but rather depreciate at a constant rate, that is, in a geometric pattern. Assets depreciate the most in the first year of their useful life and by declining amounts in subsequent years. In particular, some economists have found that economic depreciation follows a geometric pattern, as opposed to a straight-line pattern, because data suggest that a geometric pattern more closely matches the actual pattern of price declines for most asset types.

For example, one of the earliest and most prominent studies estimated that agricultural machinery depreciates at a 9.71-percent rate with a useful life of 17 years, which is longer than the ADS life.[197] The Bureau of Economic Analysis of the Department of Commerce ("BEA") currently estimates an 11.79-percent rate of economic depreciation for agricultural machinery with a useful life of 14 years. In the case of agricultural machinery, the useful life under ADS may understate the economic useful life and therefore provide tax depreciation that is more generous than economic depreciation. A full comparison would need to adjust for the method of depreciation as well as the useful life.

BEA introduced a new methodology for calculating economic depreciation for purposes of the National Income and Product Accounts ("NIPA") in 1997 that relies on a constant rate of decay over estimated useful lives to compute rates of economic depreciation.[198] The purpose of these estimates is to measure the consumption of fixed capital for purposes of accurately measuring components of GDP. Instead of a small number of recovery periods for asset classes, as under the present income tax depreciation rules, several hundred types of assets are identified. Each of these types is assigned a depreciation rate equal to the appropriate declining balance rates divided by the service life. BEA bases its economic depreciation patterns on empirical evidence of used asset prices in resale markets for each asset type wherever possible. The BEA describes its methodology for estimating economic depreciation as follows:

> BEA assumes most assets have depreciation patterns that decline geometrically over time. For any given year, the constant-dollar depreciation charge on an existing asset is obtained by multiplying the depreciation charge in the preceding year by one minus the annual depreciation rate.[199] BEA's geometric depreciation rates are derived by dividing declining balance rates by service lives . . . Declining-balance rates are multiples of the comparable rate of depreciation that would be obtained for the first period of an asset's life using the straight-line method. Thus, when the declining balance rate is equal to 2

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[196] Sec. 168(g)(3)(B).

[197] Frank C. Wykoff and Charles R. Hulten, "The Measurement of Economic Depreciation," *Depreciation, Inflation, and the Taxation of Capital* (ed. Charles R. Hulten), 1981, pp. 81-125.

[198] For a detailed discussion of the BEA methodology, see Barbara M. Fraumeni, "The Measurement of Depreciation in the U.S. National Income and Product Accounts," *Survey of Current Business*, 77, July 1997, pp. 7–23.

[199] New assets are assumed, on average, to be placed in service at midyear, so that depreciation on them in the first year is equal to one-half the new investment times the depreciation rate.

(referred to as a "double-declining balance"), the rate of depreciation in the first period of an asset's life is equal to twice the rate that would have been obtained using the straight-line method.[200]

On average the declining balance rate is 1.65 for equipment and 0.91 for private nonresidential structures. These serve as the default declining balance rates for assets for which no data are available. Table 1 provides the rate of economic depreciation, service life, and declining balance rate for selected types of assets, as estimated by the BEA.[201]

Table 1.−BEA Economic Depreciation Rates and Service Lives for Selected Asset Types

Type of Asset	Depreciation rates	Service life (years)	Declining-balance rates
Private nonresidential equipment			
Ships and boats	0.0611	27	1.65
Railroad equipment	0.0589	28	1.65
Farm tractors	0.1452	9	1.3064
Construction tractors	0.1633	8	1.3064
Agricultural machinery, except tractors	0.1179	14	1.65
Construction machinery, except tractors	0.155	10	1.5498
Private nonresidential structures			
Office buildings	0.0247	36	0.8892
Educational buildings	0.0188	48	0.9024
Hospital and institutional buildings	0.0188	48	0.9024
Residential capital			
1-to-4 unit structures-new	0.0114	80	0.91
1-to-4 unit structures-additions and alterations	0.0227	40	0.91
1-to-4 unit structures-major replacements	0.0364	25	0.91

Source: Bureau of Economic Analysis,

[200] U.S. Department of Commerce, Bureau of Economic Analysis, *Fixed Assets and Consumer Durable Goods in the United States, 1925-97*, Washington, DC: U.S. Government Printing Office, September, 2003, p. M-6, M-7.

[201] The BEA provides depreciation rate data at https://apps.bea.gov/scb/account_articles/national/0597niw/tablea.htm.

Statutory corporate rate

The corporate tax system also influences the user cost of capital through the statutory corporate income tax rate. The corporate income tax raises the user cost of capital by increasing the required before-tax return to generate the same after-tax revenue. This requires more productive assets than would be needed without this additional cost. If asset prices reflect their productivity, these new assets may be more expensive, taking account of corporate income tax. A greater total cost for assets may increase the value of economic depreciation. To the extent that financing costs are not deductible, they also increase the opportunity cost of funds.

User cost of capital and investment

While the tax system directly affects the user cost of capital, the impact of the tax system on investment depends on how sensitive investment is to changes in the user cost of capital. If investment is relatively responsive to the user cost of capital, then policymakers can influence the level of investment by enacting changes in the corporate tax rate, depreciation allowances, investment tax credits, and/or taxation of returns to investment at the individual level.

Effective marginal tax rates

One way to measure the potential inefficiency in the allocation of capital is to calculate the effective marginal tax rate on investment. The effective marginal tax rate is the rate that would offer the same incentives implied by various features of the Code, if that rate were applied directly to economic income.[202] The effective marginal tax rate may be calculated from the user cost of capital.[203] The effective marginal tax rate is the rate that would leave an after-tax real rate of return sufficient to cover the real financing costs of the investment and economic depreciation. Effective marginal tax rates are often used as a measure of investment incentives in lieu of the user cost of capital upon which it is based. Tax changes that increase the user cost of capital also increase the effective marginal tax rate. Similarly, tax changes that reduce the user cost of capital also reduce the effective marginal tax rate. Increases (decreases) in the effective marginal tax rate tend to decrease (increase) investment in the long run, and thus decrease (increase) the size of the aggregate capital stock.

Economic output, however, depends not only on the size of the capital stock but also on its composition. In the absence of taxes, the operation of a competitive economy causes capital to flow to sectors where it is expected to earn the highest rate of return. This results in an allocation of investment that produces the largest amount of national income. However, if effective marginal tax rates differ across sectors of the economy, more capital may accumulate in

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[202] While useful for measuring marginal incentive effects, effective marginal tax rates are not relevant for purposes of comparing tax burdens on investors in particular activities or industries. The calculation of effective marginal tax rates depends on a concept of long-run equilibrium in which all investors earn the same risk-adjusted after-tax rate of return; therefore, differences in effective marginal tax rates do not reflect differences in investor returns. Mackie, "Unfinished Business," June 2002.

[203] For a detailed description of the methodology and calculations involved, see Congressional Budget Office, *Computing Effective Tax Rates on Capital Income*, December 2006, available at http://www.cbo.gov/ftpdocs/76xx/doc7698/12-18-TaxRates.pdf.

lightly taxed sectors, and less capital may be invested in highly taxed sectors. This may result in an inefficient allocation of capital to sectors in which it earns a lower pre-tax rate of return, reducing total productivity and potential output across all sectors. Thus, the effect of a reduction in the economy-wide effective marginal tax rate on investment could be partially offset if the disparity in effective marginal tax rates across sectors increases.

Table 2 reports a 2020 estimate of effective marginal tax rates on capital income.[204] The overall effective marginal tax rate on capital income is 15.7 percent. However, the rate varies significantly depending on the type of investment, the form of business organization, and the source of financing. The effective marginal tax rate on all business investment is 19.8 percent, with different effective rates within the corporate and noncorporate sector depending on the source of financing. Investment for owner-occupied housing is tax-favored relative to business investment as a whole, with an effective marginal tax rate of 6.7 percent.

Table 2.−Effective Marginal Tax Rates on Capital Income, 2020

Overall	15.7
Business	19.8
Corporate	21.3
Equity-financed	22.6
Debt-financed	13.6
Noncorporate	21.3
Equity-financed	23.4
Debt-financed	7.1
Owner-occupied housing	6.7
Equity-financed	-0.3
Debt-financed	26.4

Source: Congressional Budget Office.

[204] See Congressional Budget Office, *The Budget and Economic Outlook: 2020*-2030, January 2020, available at https://www.cbo.gov/publication/56020.

B. Data and Analysis of Specific Tax Provisions

1. Cost recovery

Use of expensing and bonus depreciation in 2017 by industrial sector

The discussion below includes several tables that show the distribution of the section 179 deduction and bonus depreciation.[205] These tables are broken down by the industry of the taxpayer, by size of the taxpayer's gross receipts, and by the form of the reporting entity. Included in the tables are several usage measures that provide an estimate of the intensity of section 179 and bonus depreciation usage.

Table 3 shows the distribution of section 179 deductions by industry. The aggregate amount of deductions across all industries totaled $83.1 billion in 2017. Agriculture and related industries, construction, wholesale and retail trade, manufacturing and professional, scientific and technical services reported the largest share of section 179 deductions.

Table 3.−Section 179 Expense Deduction by Industrial Sector, 2017
(Billions of Dollars)

Sector	Total Sec. 179 Deduction Reported	Percentage Distribution of Sec. 179 Reported	Approximation of Sec. 179 Eligible Base	Sec. 179 Usage Index
Agriculture, Forestry, Fishing and Hunting	13.3	16.0	96.50	13.8
Mining	1.2	1.4	54.50	2.2
Utilities	0.1	0.1	125.20	0.1
Construction	15.5	18.7	47.20	32.8
Manufacturing	7.9	9.5	252.80	3.1
Wholesale and Retail Trade	9.8	11.8	170.30	5.8
Transportation and Warehousing	4.6	5.5	109.80	4.2
Information	1.0	1.2	100.60	1.0
Finance and Insurance	1.7	2.0	48.50	3.5
Real Estate and Rental and Leasing	3.6	4.3	154.70	2.3
Professional, Scientific, and Technical Services	6.3	7.6	32.70	19.3
Management of Companies	0.6	0.7	33.20	1.8
Administrative and Support and Waste Management and Remediation Services	4.4	5.3	20.40	21.6
Education Services	0.3	0.4	1.70	17.6
Health Care and Social Assistance	4.9	5.9	24.10	20.3
Arts, Entertainment, and Recreation	1.4	1.7	15.00	9.3
Accomodation and Food Services	3.4	4.1	41.40	8.2
Other Services	2.8	3.4	12.30	22.8
Unclassified	0.0	0.0	0.3	0.0
TOTAL	**83.1**	**100**	**1341.1**	**6.2**

NOTE: Totals may not equal sum of components due to rounding.

[205] Data on section 179 deductions and bonus depreciation are from Form 4562, *Depreciation and Amortization*, attached to returns filed by C corporations, S corporations, partnerships and individuals. In the case of individuals, section 179 deductions reported on page 2 of Schedule E, *Supplemental Income and Loss*, are not included as those deductions are attributed to S corporations and partnerships.

Table 3 also shows a section 179 usage index. The reported "usage index" is the percentage of section 179 deductions divided by the Joint Committee staff's estimate of the eligible base.[206] The eligible base for 2017 was approximately $1.34 trillion. Taxpayers that make substantial annual purchases of eligible assets are not eligible to expense those acquisitions under section 179 because of the phase-out threshold ($2,030,000 in 2017). Consequently, the section 179 usage index is generally low for sectors with concentrations of larger or more capital-intensive businesses such as utilities.

Table 4 shows the distribution of bonus depreciation by business sector. Across all sectors, $531.9 billion of bonus depreciation was reported in 2017. Bonus depreciation was concentrated in the manufacturing, wholesale and retail trade, transportation and warehousing, information, utilities, and real estate and rental and leasing sectors.

A bonus depreciation usage index is also shown that is calculated as the amount of bonus depreciation taken divided by the maximum potential bonus deduction (up to 100 percent of the eligible base).[207] Measurement limitations make this usage index a somewhat imprecise measure.[208]

[206] This eligible base is approximated by the sum of section 179 expense deductions reported, bonus depreciation reported, and the remaining three- through 20-year MACRS investment basis excluding listed property placed in service during the 2017 tax year using the general depreciation system.

[207] The eligible base is approximated as the sum of bonus depreciation taken plus the basis of three through 20-year MACRS property placed in service in 2017 computed after being reduced by section 179 deductions.

[208] Expenditures for certain property eligible for bonus depreciation in 2017 are not reported separately on the depreciation form.

Table 4.−Bonus Depreciation by Industrial Sector, 2017
(Billions of Dollars)

Sector	Total Bonus Depreciation Reported	Percentage Distribution Bonus Depreciation	Approximation of Bonus Eligible Base	Bonus Usage Index
Agriculture, Forestry, Fishing and Hunting	12.6	2.4	49.7	25.4
Mining	19.3	3.6	52.9	36.5
Utilities	51.3	9.6	125.1	41.0
Construction	12.6	2.4	31.0	40.6
Manufacturing	117.3	22.1	244.7	47.9
Wholesale and Retail Trade	79.5	14.9	159.4	49.9
Transportation and Warehousing	38.2	7.2	104.7	36.5
Information	50.6	9.5	99.5	50.9
Finance and Insurance	24.4	4.6	46.4	52.6
Real Estate and Rental and Leasing	57.2	10.8	150.0	38.1
Professional, Scientific, and Technical Services	11.3	2.1	25.0	45.2
Management of Companies	18.9	3.6	32.6	58.0
Administrative and Support and Waste Management and Remediation Services	6.1	1.1	15.4	39.6
Education Services	0.5	0.1	1.2	41.7
Health Care and Social Assistance	8.1	1.5	18.5	43.8
Arts, Entertainment, and Recreation	5.3	1.0	13.0	40.8
Accomodation and Food Services	15.1	2.8	37.8	39.9
Other Services	3.3	0.6	8.5	38.8
Unclassified	0.0	0.0	0.2	0.0
TOTAL	**531.9**	**100**	**1215.50**	**43.8**

NOTE: Totals may not equal sum of components due to rounding.

As shown, the bonus depreciation usage index across all taxpayers in 2017 is 43.8 percent, that is, taxpayers did not benefit from bonus depreciation for approximately 56.2 percent of potentially eligible property. Low bonus depreciation usage rates tend to be associated with:

1. taxpayers in a tax net operating loss position;

2. taxpayers with deferred tax assets such as net operating loss or credit carryforwards; and

3. multinational businesses where the taxpayer would be in a domestic net operating loss position if bonus depreciation were taken in full.

Bonus depreciation accelerates deductions which otherwise would be taken in later years and thus provides a potential timing benefit to taxpayers. In some cases, bonus depreciation may introduce some undesirable volatility in taxable incomes. Another possible explanation for the low bonus usage rate is that some taxpayers may anticipate higher tax rates in the future and, for them, there may be a disincentive to speed up deductions into a low tax-rate year.

Use of expensing and bonus depreciation in the 2017 tax year by entity size

Table 5 shows the distribution of section 179 deductions by size of the reporting entity's gross business receipts. Due to the phase-out threshold, section 179 is limited to taxpayers with qualified investment below specified levels. As a result, larger businesses have a clear drop off in section 179 deductions. As shown, $65.0 billion of the total $83.1 billion section 179 deductions, or approximately 78 percent of these deductions, are reported by businesses with less than $10 million in total business receipts.

The overall measure of section 179 usage is 16.9 percent for businesses with less than $10 million in gross business receipts. The section 179 usage index falls off to 8.4 percent for businesses with gross business receipts between $10 million and $250 million. Usage is negligible for business with gross business receipts in excess of $250 million.

Table 5.−Section 179 Expense Deduction by Size of Business Receipts, 2017, (Billions of Dollars)

Sector	Less than $10 million			$10 million to $250 million			Over $250 million		
	Total Sec. 179 Deduction Reported	Percentage Distribution of Sec. 179 Reported	Sec. 179 Usage Index	Total Sec. 179 Deduction Reported	Percentage Distribution of Sec. 179 Reported	Sec. 179 Usage Index	Total Sec. 179 Deduction Reported	Percentage Distribution of Sec. 179 Reported	Sec. 179 Usage Index
Agriculture, Forestry, Fishing and Hunting	13.1	20.1	14.3	0.2	1.4	6.5	0.0	0.0	0.0
Mining	1.0	1.5	13.3	0.2	1.4	1.2	0.0	0.2	0.0
Utilities	0.1	0.2	0.6	0.0	0.1	0.0	0.0	0.4	0.0
Construction	11.8	18.1	46.1	3.7	20.9	22.7	0.1	19.1	1.9
Manufacturing	4.1	6.3	28.5	3.8	21.3	10.4	0.0	6.4	0.0
Wholesale and Retail Trade	4.9	7.5	27.8	4.9	27.3	17.8	0.1	47.0	0.1
Transportation and Warehousing	4.1	6.2	18.9	0.6	3.2	2.5	0.0	2.6	0.0
Information	0.7	1.1	20.0	0.3	1.6	3.7	0.0	3.1	0.0
Finance and Insurance	1.4	2.1	20.9	0.3	1.9	3.8	0.0	6.3	0.0
Real Estate and Rental and Leasing	3.5	5.4	3.5	0.1	0.8	0.6	0.0	0.2	0.0
Professional, Scientific, and Technical Services	5.0	7.7	34.7	1.3	7.2	15.9	0.0	8.0	0.0
Management of Companies	0.5	0.8	19.2	0.1	0.4	1.9	0.0	0.0	0.0
Administrative and Support and Waste Management and Remediation Services	3.9	6.1	36.1	0.5	2.6	11.1	0.0	4.2	0.0
Education Services	0.3	0.5	30.0	0.0	0.2	0.0	0.0	0.0	0.0
Health Care and Social Assistance	4.3	6.6	34.1	0.6	3.5	13.6	0.0	2.1	0.0
Arts, Entertainment, and Recreation	1.3	1.9	16.9	0.2	1.0	5.1	0.0	0.3	0.0
Accomodation and Food Services	2.6	4.0	11.8	0.7	4.1	6.6	0.0	0.0	0.0
Other Services	2.6	4.1	28.6	0.2	1.2	10.5	0.0	0.2	0.0
Unclassified	0.0	0.0	0.0	0.0	0.0	n/a	0.0	0.0	n/a
TOTAL	**65.0**	**100**	**16.9**	**17.8**	**100**	**8.4**	**0.3**	**100**	**0.0**

NOTE: Totals may not equal sum of components due to rounding.

Table 6 presents the distribution of bonus depreciation by size of the reporting entities' gross business receipts. Two thirds of the deductions for bonus depreciation were taken by businesses with total business receipts greater than $250 million. As shown, small, medium, and large businesses reported bonus depreciation of $88.9 billion, $80.1 billion, and $363.0 billion, respectively. The bonus usage index increases with the size class of the business as well, 32.2 percent, 41.2 percent, and 48.7 percent, respectively.

Table 6.−Bonus Depreciation by Size of Business Receipts, 2017
(Billions of Dollars)

Sector	Less than $10 million			$10 million to $250 million			Over $250 million		
	Total Bonus Deduction Reported	Percentage Distribution Bonus Depreciation	Bonus Usage Index	Total Bonus Deduction Reported	Percentage Distribution Bonus Depreciation	Bonus Usage Index	Total Bonus Deduction Reported	Percentage Distribution Bonus Depreciation	Bonus Usage Index
Agriculture, Forestry, Fishing and Hunting	10.5	11.8	23.4	1.2	1.4	41.4	1.0	0.3	55.6
Mining	2.4	2.7	38.7	6.1	7.7	38.1	10.7	3.0	34.9
Utilities	5.1	5.8	32.5	3.7	4.6	21.8	42.5	11.7	46.0
Construction	4.1	4.7	31.1	5.9	7.4	47.2	2.5	0.7	47.2
Manufacturing	3.3	3.8	33.0	15.9	19.9	48.3	98.0	27.0	48.6
Wholesale and Retail Trade	3.6	4.0	30.8	10.2	12.8	45.1	65.7	18.1	52.5
Transportation and Warehousing	4.4	5.0	25.6	9.2	11.5	38.7	24.6	6.8	38.6
Information	1.2	1.4	44.4	3.3	4.2	42.3	46.0	12.7	51.7
Finance and Insurance	2.1	2.3	42.0	2.7	3.4	35.1	19.6	5.4	58.0
Real Estate and Rental and Leasing	31.7	35.7	33.6	5.9	7.4	37.6	19.6	5.4	49.0
Professional, Scientific, and Technical Services	3.2	3.6	40.0	3.2	4.0	46.4	5.0	1.4	49.5
Management of Companies	0.9	1.0	42.9	2.8	3.5	52.8	15.2	4.2	60.1
Administrative and Support and Waste Management and Remediation Services	2.0	2.3	32.3	1.6	2.0	39.0	2.4	0.7	47.1
Education Services	0.2	0.2	33.3	0.2	0.2	66.7	0.1	0.0	33.3
Health Care and Social Assistance	3.1	3.5	40.3	1.7	2.1	44.7	3.3	0.9	47.1
Arts, Entertainment, and Recreation	2.1	2.4	35.6	1.6	2.0	43.2	1.6	0.5	45.7
Accomodation and Food Services	6.9	7.8	35.8	4.1	5.1	41.8	4.1	1.1	47.1
Other Services	1.8	2.1	32.1	0.8	1.0	50.0	0.7	0.2	53.8
Unclassified	0.0	0.1	0.0	0.0	0.0	n/a	0.0	0.0	n/a
TOTAL	**88.9**	**100**	**32.2**	**80.1**	**100**	**41.2**	**363.0**	**100**	**48.7**

NOTE: Totals may not equal sum of components due to rounding.

Use of expensing and bonus depreciation in the 2017 tax year by entity type

Tables 7 and 8 present the section 179 deduction and bonus depreciation aggregates and usage index measures broken down by the underlying reporting entity: sole proprietor and farm (grouped together), partnership, S corporation, and C corporation. As shown in Table 7, S corporations account for $38.7 billion of section 179 deductions, followed by sole proprietorships and farms with $23.7 billion of section 179 deductions, followed by C corporations with $10.6 billion, and partnerships with $10.1. In percentage terms, S corporations account for 46.6 percent of section 179 deductions, followed by sole proprietorships and farms with 28.5 percent of section 179 deductions, followed by C corporations with 12.8 percent, and partnerships with 12.2 percent.

The section 179 deduction usage index for S corporations and sole proprietorships and farms are higher than that of other entities due to the generally smaller scale of these businesses. The section 179 deduction usage index for S corporations is 25.9 percent. Sole proprietorships and farms have the next highest usage index, 18.5 percent, followed by partnerships with 2.8 percent and by C corporations with 1.5 percent.

Table 7.–Section 179 Expense Deduction by Reporting Entity, 2017
(Billions of Dollars)

Sector	Sole Prop & Farm			Partnerships			Subchapter S Corporations			C Corporations		
	Total Sec. 179 Deduction Reported	Percentage Distribution of Sec. 179 Reported	Sec. 179 Usage Index	Total Sec. 179 Deduction Reported	Percentage Distribution of Sec. 179 Reported	Sec. 179 Usage Index	Total Sec. 179 Deduction Reported	Percentage Distribution of Sec. 179 Reported	Sec. 179 Usage Index	Total Sec. 179 Deduction Reported	Percentage Distribution of Sec. 179 Reported	Sec. 179 Usage Index
Agriculture, Forestry, Fishing and Hunting	8 9	37 5	12 5	1 7	17 2	13 5	1 8	4 6	22 2	0 9	8 7	20 5
Mining	0 3	1 2	18 8	0 2	1 7	0 7	0 7	1 8	21 2	0 1	0 9	0 4
Utilities	0 0	0 1	0 0	0 0	0 3	0 0	0 1	0 2	50 0	0 0	0 3	0 0
Construction	2 9	12 3	35 8	1 3	12 6	21 3	9 5	24 6	39 9	1 8	17 3	19 6
Manufacturing	0 5	2 0	29 4	0 8	8 1	2 2	4 7	12 1	20 4	1 9	18 3	1 0
Wholesale and Retail Trade	1 3	5 4	23 6	1 0	10 1	5 1	5 6	14 5	20 5	1 9	18 1	1 6
Transportation and Warehousing	1 7	7 2	21 0	0 5	4 5	1 2	1 9	5 0	16 0	0 5	5 2	1 1
Information	0 3	1 3	37 5	0 1	1 2	0 4	0 3	0 8	18 8	0 2	2 3	0 3
Finance and Insurance	0 4	1 8	28 6	0 4	4 3	3 3	0 5	1 4	25 0	0 3	3 0	0 9
Real Estate and Rental and Leasing	0 8	3 5	14 0	1 1	11 0	1 2	1 4	3 5	12 8	0 3	3 1	0 7
Professional, Scientific, and Technical Services	1 7	7 2	29 3	0 7	7 1	12 1	3 1	8 0	43 1	0 8	7 2	5 8
Management of Companies	0 0	0 0	0 0	0 1	1 0	0 0	0 2	0 0	0 0	0 3	2 7	0 0
Administrative and Support and Waste Management and Remediation Services	1 5	6 4	35 7	0 3	2 6	8 6	2 3	5 9	33 8	0 4	3 4	6 8
Education Services	0 1	0 5	20 0	0 0	0 5	0 0	0 1	0 3	33 3	0 0	0 3	0 0
Health Care and Social Assistance	1 0	4 2	34 5	0 6	6 2	9 0	3 0	7 7	45 5	0 3	3 3	3 8
Arts, Entertainment, and Recreation	0 6	2 7	23 1	0 2	1 7	2 8	0 5	1 3	19 2	0 1	1 2	3 7
Accomodation and Food Services	0 5	2 1	16 1	0 8	8 0	4 2	1 8	4 7	19 4	0 2	2 2	2 0
Other Services	1 1	4 8	26 2	0 2	2 1	10 5	1 2	3 1	32 4	0 3	2 7	11 5
Unclassified	0 0	0 1	0 0	0 0	0 0	n/a	0 0	0 0	n/a	0 0	0 0	n/a
TOTAL	**23.7**	**100**	**18.5**	**10.1**	**100**	**2.8**	**38.7**	**100**	**25.9**	**10.6**	**100**	**1.5**

NOTE: Totals may not equal sum of components due to rounding.

Table 8 presents bonus depreciation by type of entity. As shown, C corporations claimed $337.3 billion of the bonus depreciation deductions or 63.4 percent of the total. This follows from the relatively higher capital intensity of many C corporations. Partnerships reported $129.6 billion or 24.4 percent of the total; S corporations reported $48.8 billion or 9.2 percent of the total, and sole proprietorships and farms reported $16.2 billion or 3.0 percent of total bonus depreciation deductions. Partnerships have the highest aggregate bonus usage index, 52.9 percent. This is followed closely by C corporations with an aggregate bonus usage index of 49.1 percent. Next in line are S corporations at 48.8 percent and sole proprietorships and farms at 26.1 percent.

Table 8.–Bonus Depreciation by Reporting Entity, 2017
(Billions of Dollars)

Sector	Sole Prop & Farm			Partnerships			Subchapter S Corporations			C Corporations		
	Total Bonus Deduction Reported	Percentage Distribution Bonus Depreciation	Bonus Usage Index	Total Bonus Deduction Reported	Percentage Distribution Bonus Depreciation	Bonus Usage Index	Total Bonus Deduction Reported	Percentage Distribution Bonus Depreciation	Bonus Usage Index	Total Bonus Deduction Reported	Percentage Distribution Bonus Depreciation	Bonus Usage Index
Agriculture, Forestry, Fishing and Hunting	6 6	40 6	22 8	2 7	2 1	25 0	2 3	4 7	36 5	1 1	0 3	32 4
Mining	0 3	2 0	33 3	9 7	7 5	35 9	1 0	2 0	38 5	8 4	2 5	37 5
Utilities	0 0	0 2	0 0	12 1	9 4	30 0	0 1	0 2	50 0	39 1	11 6	46 3
Construction	1 3	8 0	28 3	1 7	1 3	35 4	6 3	12 9	44 1	3 3	1 0	44 6
Manufacturing	0 2	1 5	20 0	15 1	11 7	41 7	9 2	18 8	50 3	92 8	27 5	49 0
Wholesale and Retail Trade	0 8	5 0	25 8	7 0	5 4	37 2	10 5	21 6	48 6	61 2	18 2	52 8
Transportation and Warehousing	1 3	8 0	21 7	12 8	9 9	29 8	4 4	8 9	44 0	19 7	5 9	42 9
Information	0 1	0 8	33 3	13 2	10 2	48 9	0 6	1 3	46 2	36 6	10 8	51 6
Finance and Insurance	0 2	1 5	28 6	3 1	2 4	26 7	0 8	1 7	53 3	20 2	6 0	61 8
Real Estate and Rental and Leasing	1 2	7 5	31 6	34 0	26 2	36 6	3 8	7 7	40 0	18 2	5 4	41 5
Professional, Scientific, and Technical Services	1 0	6 4	37 0	2 2	1 7	43 1	2 0	4 0	48 8	6 1	1 8	46 9
Management of Companies	0 0	0 1	0 0	0 8	0 0	0 0	0 3	0 6	0 0	17 8	5 3	0 0
Administrative and Support and Waste Management and Remediation Services	0 6	3 5	28 6	1 1	0 9	34 4	1 9	3 8	42 2	2 6	0 8	46 4
Education Services	0 1	0 5	33 3	0 1	0 1	50 0	0 1	0 3	50 0	0 2	0 1	40 0
Health Care and Social Assistance	0 5	3 0	38 5	2 7	2 1	44 3	1 5	3 1	40 5	3 4	1 0	45 9
Arts, Entertainment, and Recreation	0 4	2 7	26 7	3 0	2 4	43 5	0 7	1 5	33 3	1 1	0 3	42 3
Accomodation and Food Services	0 7	4 2	28 0	7 5	5 8	41 2	2 5	5 1	33 3	4 4	1 3	45 4
Other Services	0 7	4 5	33 3	0 6	0 5	37 5	0 9	1 8	36 0	1 1	0 3	47 8
Unclassified	0 0	0 3	0 0	0 0	0 0	n/a	0 0	0 0	n/a	0 0	0 0	n/a
TOTAL	**16.2**	**100**	**26.1**	**129.6**	**100**	**52.9**	**48.8**	**100**	**44.1**	**337.3**	**100**	**49.1**

NOTE: Totals may not equal sum of components due to rounding.

Economic analysis of expensing and bonus depreciation

Changes in tax depreciation schedules may affect the overall level of investment in the economy. However, the magnitude of the effect is an empirical question. Bonus depreciation provisions enacted in recent years have generally had the effect of substantially raising the first-year depreciation a taxpayer could take, thereby increasing an investment's rate of tax depreciation substantially. Although these provisions lowered the user cost of capital, the overall effect depends on the degree to which taxpayers respond to the lower cost of capital by making investments they otherwise would not have made. If the drop in the user cost of capital mainly benefits taxpayers who make a level of investment similar to the level that they would have made without bonus depreciation, then the effect on investment from the change in tax law is muted.

The literature on the effects of more generous cost recovery methods and on the sensitivity of capital investment to its user cost more generally, on balance, supports the theory that investment is responsive to taxes. A recent study showed that firms with immediate section 179 deduction benefits (*i.e.*, firms with positive net income) increased investment relative to firms with large losses that did not benefit as proximately from the provision.[209]

Studies analyzing the effects of bonus depreciation have found a wider range of investment responses. One study of the bonus depreciation provisions enacted in 2002 and 2003 concluded that the provisions had little impact on investment spending.[210] These smaller effects may result from firms that face high fixed costs of adjusting their capital stock,[211] or from a lack of taxpayer awareness or sophistication when deducting capital costs. Research on the bonus depreciation provisions enacted in 2002 and 2003 found a noticeable effect of tax incentives on investment in capital goods.[212] The authors argue that the demand for long-lived investment goods is extremely responsive to temporary changes in tax treatment because the value of these investments is not particularly sensitive to the date of purchase, while the cost could be if temporary tax incentives are in place. A more recent peer-reviewed study on bonus depreciation found even stronger investment effects in response to the reinstatement of bonus depreciation

[209] Eric Zwick and James Mahon, "Tax Policy and Heterogeneous Investment Behavior," *American Economic Review*, vol. 107, no. 1, 2017, pp. 217-248.

[210] Darrel Cohen and Jason Cummins, "A Retrospective Evaluation of the Effects of Temporary Partial Expensing," *Board of Governors of the Federal Reserve System Finance and Economics Discussion Series: 2006-19*, Divisions of Research of Statistics and Monetary Affairs, Federal Reserve Board, Washington, DC, April 2006. However, a subsequent study criticizes the authors' use of five-year property and seven-year property as a treatment and control group, neither of which gets much benefit from bonus depreciation. Christopher House and Matthew Shapiro, "Temporary Investment Tax Incentives: Theory with Evidence from Bonus Depreciation," *American Economic Review*, vol. 98, June 2008, pp. 737-768.

[211] Ricardo J. Caballero and Eduardo M.R.A. Engel, "Explaining Investment Dynamics in U.S. Manufacturing: A Generalized (*S*, *s*) Approach," *Econometrica* 67(4), 1999, pp. 783-826.

[212] Christopher House and Matthew Shapiro, "Temporary Investment Tax Incentives: Theory with Evidence from Bonus Depreciation," *American Economic Review*, vol. 98, June 2008, pp. 737-768.

between 2008 and 2010.[213] The authors show that small-sized firms' investment decisions are substantially more responsive to these bonus incentives, possibly because these incentives eased liquidity constraints or sufficiently encouraged firms to incur the costly adjustment of their capital stock.[214] Also, the authors find that firms only respond to bonus depreciation incentives that generate immediate cash flows, implying that firms with substantial tax losses do not take advantage of future tax benefits resulting from bonus depreciation.

2. Incentives for research

Scope of tax expenditures and government subsidies for research activities

The most recent tax expenditure estimate for the research credit was estimated at $14.4 billion in 2020, with $13 billion from corporations and $1.4 billion from individuals. This tax expenditure is projected to grow to $19.2 billion by 2024 ($17.3 billion for corporations and $1.9 billion for individuals). The related tax expenditure estimate for expensing of research and experimental expenditures is $2.9 billion in 2020, with $2.8 billion from corporations and $0.1 billion from individuals.[215]

The Federal government also directly subsidizes research activities. Direct government outlays for research have substantially exceeded the annual estimated value of the tax expenditure provided by either the research and experimentation tax credit or the expensing of research and development expenditures. For example, in fiscal year 2019, the National Science Foundation's gross outlays for research and related activities were $5.9 billion, the Department of Defense's gross outlays for research, development, and test and evaluation was $102.4 billion, the Department of Energy's science gross outlays were $6.3 billion, and the Department of Health and Human Services' budget for the National Institutes of Health was $38.9 billion.[216] However, such direct government outlays are generally for directed research on projects selected by the government. By contrast, the research credit provides a tax subsidy to any qualified project of an eligible taxpayer with no application to a grant-making agency required. Projects are chosen based on the taxpayer's assessment of future profit potential.

Tables 9 and 10 present data for 2017 on those corporations that claimed the research tax credit by industry and asset size, respectively. Table 9 shows 2017 data on those corporations that claimed the research tax credit by industry. Corporations whose primary activity is manufacturing comprise 36.8 percent of taxpayers claiming the research credit. However, these manufacturing corporations claimed nearly 60 percent of the total dollar value of research credits

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[213] Eric Zwick and James Mahon, "Tax Policy and Heterogeneous Investment Behavior," *American Economic Review*, vol. 107, no. 1, 2017, pp. 217-248. .

[214] Thomas Winberry, "Lumpy Investment, Business Cycles, and Stimulus Policy," *American Economic Review*, vol. 111, no. 1, 2021, pp. 394-396.

[215] Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2020-2024* (JCX-23-20), November 5, 2020, p. 24s.

[216] Office of Management and Budget, *Appendix, Budget of the United States Government, Fiscal Year 2021*, pp. 1187, 278-281, 392, and 452.

in 2017. Table 10 shows the distribution of 2017 research credits by asset size. Firms with $50 million or more account for 15.7 percent of all corporations claiming a credit but represent more than 87 percent of the credits claimed. Nevertheless, Table 10 documents that many small firms are able to claim the research tax credit.

Table 9.–Percentage Distribution of Corporations Claiming Research Tax Credit and Percentage of Credit Claimed by Sector, 2017

Industry	Percent of Corporations Claiming Credit	Percent of Total R&D Credit
Manufacturing	40.30	51.42
Information	9.45	19.82
Professional, Scientific, and Technical Services	19.21	12.14
Wholesale Trade	7.95	5.41
Retail Trade	2.19	3.37
Finance and Insurance	4.50	2.42
Holding Companies	4.95	1.37
Construction	3.90	1.03
Utilities	0.60	0.62
Administrative and Support and Waste Management and Remediation Services	1.29	0.61
Mining	0.74	0.44
Transportation and Warehousing	0.86	0.40
Real Estate and Rental and Leasing	0.97	0.26
Health Care and Social Services	0.91	0.24
Agriculture, Forestry, Fishing and Hunting	0.80	0.13
Accommodation and Food Services	0.35	0.12
Educational Services	0.27	(1)
Arts, Entertainment, and Recreation	0.39	(1)
Other Services	0.36	(1)

(1) Less than 0.1 percent.

Source: Joint Committee on Taxation staff calculations from Internal Revenue Service, Statistics of Income data.

Table 10.–Percentage Distribution of Corporations Claiming Research Tax Credit and of Credit Claimed by Corporation Size, 2017

Asset Size ($)	Percent of Firms Claiming Credit	Percent of Credit Claimed
0	3.1	1.7
1 thru 99,999	7.3	0.1
100,000 thru 249,999	4.2	0.1
250,000 thru 499,999	3.6	0.2
500,000 thru 999,999	6.3	0.4
1,000,000 thru 9,999,999	40.1	4.7
10,000,000 thru 49,999,999	19.6	5.6
50,000,000 +	15.7	87.2

Source: Joint Committee on Taxation staff calculations from Internal Revenue Service, Statistics of Income data.

Economic analysis of research tax incentives

Technological development is an important component of economic growth. However, although an individual business may find it profitable to undertake some research, it may not find it profitable to invest in research as much as it otherwise might because it is difficult to capture the full benefits from the research and prevent such benefits from being used by competitors. In general, businesses acting in their own self-interest will not necessarily invest in research to the extent that would be consistent with the best interests of the overall economy. This is because costly scientific and technological advances made by one firm may be cheaply copied by its competitors. Research is one of the areas where there is a consensus among economists that government intervention in the marketplace may improve overall economic efficiency.[217] However, this does not mean that increased tax benefits or more government spending for research always will improve economic efficiency. It is possible to decrease economic efficiency by spending too much on research. However, previous findings have suggested that there is inefficient underinvestment in research worldwide.[218] Nevertheless, even if there were agreement that additional subsidies for research are warranted as a general matter, misallocation of research dollars across competing sectors of the economy could diminish economic efficiency. It is difficult to determine whether, at the present levels and allocation of government subsidies for research, further government spending on research or additional tax benefits for research would increase or decrease overall economic efficiency.

If society is underinvesting in research, a tax subsidy is one method of offsetting the private-market bias against research, so that research projects undertaken approach the optimal level. Among the other policies employed by the Federal government to increase the aggregate level of research activities are direct spending and grants, favorable anti-trust rules, and patent protection. The effect of tax policy on research activity is largely uncertain because there is relatively little consensus regarding the magnitude of the responsiveness of research to changes in taxes and other factors affecting its price. To the extent that research activities are responsive to the price of research activities, the section 174 deduction and research and tax credit should increase research activities.

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[217] This conclusion does not depend upon whether the basic tax regime is an income tax or a consumption tax.

[218] See Zvi Griliches, "The Search for R&D Spillovers," *Scandinavian Journal of Economics*, vol. XCIV, 1992; M. Ishaq Nadiri, "Innovations and Technological Spillovers," National Bureau of Economic Research, Working Paper No. 4423, 1993; and Bronwyn Hall, "The Private and Social Returns to Research and Development," in Bruce Smith and Claude Barfield (eds.), *Technology, R&D and the Economy*: Brookings Institution Press 1996, pp. 1-14. These papers suggest that the rate of return to privately funded research expenditures is high compared to that in physical capital and the social rate of return exceeds the private rate of return. Griliches concludes, "in spite of [many] difficulties, there has been a significant number of reasonably well-done studies all pointing in the same direction: R&D spillovers are present, their magnitude may be quite large, and social rates of return remain significantly above private rates." Griliches, p. S43. Charles I. Jones and John C. Williams, "Measuring the Social Return to R&D," *Quarterly Journal of Economics*, vol. 113, November 1998, also conclude that "advanced economies like the United States substantially under invest in R&D" p. 1120.

Empirical results on the responsiveness of research expenditures to tax incentives

As with any other commodity, economists expect the amount of research expenditures a firm incurs to respond positively to a reduction in the price paid by the firm. Economists often refer to this responsiveness in terms of price elasticity, which is measured as the ratio of the percentage change in quantity to a percentage change in price. For example, if demand for a product increases by five percent as a result of a 10-percent decline in price paid by the purchaser, that commodity is said to have a price elasticity of demand of 0.5.[219] One way of reducing the price paid by a buyer for a commodity is to provide a tax credit for the cost of research. A tax credit of 10 percent is equivalent to a 10-percent price reduction. If the commodity for which a 10-percent tax credit is allowed has an elasticity of 0.5, the amount consumed will increase by five percent. Thus, if a flat research tax credit were provided at a 10-percent rate, and research expenditures had a price elasticity of 0.5, the credit could increase aggregate research spending by five percent.[220]

Most studies do not disentangle the effects of the section 174 deduction and the research and tax credit; instead, they analyze the joint effects of these policies as research tax incentives. A recent survey concludes that research tax incentives have significant effects overall, concluding that the literature supports an estimated elasticity of R&D spending with respect to its tax-adjusted user cost of one or greater.[221] A seminal study using U.S. corporate tax returns found that reductions in the user cost of R&D generated substantially increases in research spending both immediately and over a longer time horizon.[222] The author found that research tax incentives particularly aid liquidity-constrained firms' ability to finance R&D in the short run. Additional studies have furthered this argument that research tax incentives have heterogeneous impacts based on firm productivity rather than financial constraints. Economists debate the reasons for these firm productivity differences, claiming that they may result from better management practices;[223] participation in industries with more competitive exporters;[224] or from

[219] For simplicity, this analysis assumes that the product in question can be supplied at the same cost despite any increase in demand (*i.e.*, the supply is perfectly elastic). This assumption may not be valid, particularly over short periods of time, and particularly when the commodity−such as research scientists and engineers−is in short supply.

[220] It is important to note that not all research expenditures need be subject to a price reduction to have this effect. Only the expenditures that would not have been undertaken otherwise−so called marginal research expenditures−need be subject to the credit to have a positive incentive effect.

[221] Nicholas Bloom, John Van Reenen, and Heidi Williams, "A Toolkit of Policies to Promote Innovation," *Journal of Economic Perspectives*, vol. 33, no. 3, 2019, pp. 163-184.

[222] Nirupama Rao, "Do tax credits stimulate R&D spending? The effect of the R&D tax credit in its first decade," *Journal of Public Economics*, vol. 140, 2016, pp. 1-12.

[223] Nicholas Bloom and John Van Reenen, Measuring and Explaining Management Practices Across Firms and Countries, *The Quarterly Journal of Economics*, vol. 122, no. 4, November 2007, pp. 1351–1408, available at https://doi.org/10.1162/qjec.2007.122.4.1351.

[224] Bee Yan Aw, Mark J. Roberts, and Daniel Yi Xu, "R&D investment, exporting, and productivity dynamics," *American Economic Review*, vol. 101, no. 4, 2011, pp. 1312-1344.

positive feedback from internal increased R&D spending itself.[225] While the reasons for productivity differences are uncertain, they confirm the theory that research tax incentives substantially boost R&D spending.

3. Credit for investment in advanced energy property

The section 48C tax credit has the effect of lowering the user cost of capital, thereby incentivizing greater investment in qualified property. In addition to directly stimulating investment in qualified advanced energy projects, a section 48C credit indirectly influences companies to invest in technologies that complement these advanced energy projects and substitute away from investment projects that do not receive any tax credit benefits. Thus, a company that is initially indifferent between investing in advanced energy or a different investment would have a financial incentive to increase investment in qualified advanced energy projects and even substitute capital away from forms of nonqualified investments upon receipt of a section 48C credit.

The IRS initially announced the 48C Phase I program in 2010, awarding $2.3 billion worth of section 48C credits awarded to 183 domestic clean energy manufacturing facilities in 2010.[226] The median credit amount was $3.45 million, although the amounts varied widely. The 183 projects were awarded to 153 distinct applicants. The smallest total credit amount awarded to an applicant was $112,500, while the largest total credit amount was $154.8 million.

The projects span a wide range of energy technology areas that are consistent with Department of Energy rankings and recommendations.[227] Table 11 presents data on the distribution of 48C credits awarded by technology category.[228] The IRS awarded roughly half the total 48C credit value to solar photovoltaic projects.[229] Of the remaining credit totals, the

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[225] Ulrich Doraszelski, and Jordi Jaumandreu. "R&D and Productivity: Estimating Endogenous Productivity," *Review of Economic Studies*, vol. 80, no. 4, 2013, pp. 1338-1383.

[226] The full list of Section 48C recipients and credit amounts is available at https://obamawhitehouse.archives.gov/the-press-office/fact-sheet-23-billion-new-clean-energy-manufacturing-tax-credits.

[227] Treasury Inspector General for Tax Administration, *Assessment of the Internal Revenue Service's Interpretation of Section 1302 of the Recovery Act: Qualifying Advanced Energy Project Credit*, Reference Number: 2013-40-029, March 21, 2013. Available at https://www.treasury.gov/tigta/auditreports/2013reports/201340029fr html#advanced.

[228] The Joint Committee staff organized the 18 technology areas listed by the IRS into seven broader categories to calculate these credit distributions. The IRS publicly listed technology areas for 137 out of the 183 projects.

[229] Solar PV areas include the technology areas designated as "Solar PV," "Solar CSI," and "Solar Components and Materials."

IRS awarded 17.4 percent to wind projects,[230] 10.1 percent to Industrial projects, and 9.4 percent to Building Efficiency projects.[231]

In 2013, the IRS announced the section 48C Phase II program, in which it reallocated $150 million worth of credits that were never fully monetized by the 2010 recipients to twelve new projects.[232] The smallest Phase II award was $700,000 for a wind power project, while three companies each received the largest award total of $30 million to expand various manufacturing capacities.

The economics literature has found general evidence that firms substitute away from fossil fuels and toward clean energy sources with sufficient incentives in other contexts.[233] One recent study has argued that the American Recovery and Reinvestment Act's clean energy package, which includes the section 48C credits, directed boosted clean energy investments as well as overall economic activity.[234] However, the academic literature has not reached a consensus on the magnitude of stimulus and substitution attributable directly to section 48C credits rather than other policies that may have simultaneously incentivized taxpayer decision-making.

[230] Wind-related technology areas include wind blades, wind towers, and wind turbines.

[231] The main technology areas comprising the "other" category include battery, biomass, and smart grid projects.

[232] The Department of Energy provides a list of the 2013 projects that received a section 48C Phase II allocation at https://www.energy.gov/sites/prod/files/2013/12/f5/48C%20Phase%20II%20Selections%20Project%20Descriptions.pdf.

[233] Chris Papageorgiou, Marianne Saam, and Patrick Schulte, "Substitution between Clean and Dirty Energy Inputs: A Macroeconomic Perspective," *Review of Economics and Statistics*, vol. 99, no. 2, 2017, pp. 281-290.

[234] Joseph E. Aldy, "Policy Monitor: A Preliminary Assessment of the American Recovery and Reinvestment Act's Clean Energy Package," *Review of Environmental Economics and Policy*, 2020.

Table 11. –Percentage Distribution of Applicants Awarded Section 48C Credit by Technology Category 2010

Category	Percent of Applicants Claiming Credit	Percent of Total 48C Credit Awarded
Solar Photovoltaics	24.1	48.0
Wind	26.3	17.4
Industrial	5.8	10.1
Building Efficiency	16.1	9.4
Nuclear	1.5	4.5
Solar Thermal	8.0	3.0
Other	18.2	7.5

Source: Internal Revenue Service, JCT staff calculations.

Note: These percentage distributions are calculated using only the 137 Phase I projects that designated a specific technology area. The Joint Committee staff categorized the 18 technology areas provided by the IRS into the seven technology categories listed in the preceding table.

4. Domestic production activities deduction (former section 199)

For a corporation in the highest marginal tax bracket in 2017, the domestic production activities deduction ("DPAD"), which was repealed in 2017, had the effect of lowering the *marginal* tax rate from the prior-law 35-percent statutory corporate tax rate to 31.85 percent based on former section 199.[235] As a corporation's qualifying income increased, the *average* tax rate decreased as a result of the deduction.[236] Table 12 shows the amount of domestic production activities deduction claimed per $10,000 of overall income for C corporations by industrial sector.[237] The overall column presents the total DPAD deduction from 2005-2017 per

[235] With a nine percent deduction, a corporation is taxed at a rate of 35 percent on only 91 percent of qualifying income, resulting in an effective tax rate of 0.91 * 35, or 31.85 percent. Public Law 115-97 eliminated the graduated corporate rate structure and taxes corporate taxable income at 21 percent for taxable years beginning after December 31, 2017.

[236] Average tax rate for this purpose is calculated as the total amount of U.S. regular tax and alternative minimum tax divided by the sum of taxable income plus the domestic production activities deduction. For cases in which taxable income is zero, the denominator is net income less net operating loss deductions less special deductions plus the domestic production activities deduction. Variation in average tax rates based solely on taxable income would not account for variation in the usage of the domestic production activities deduction because the deduction is used to compute taxable income. Note that Public Law 115-97 repealed the corporate AMT for taxable years beginning after December 31, 2017.

[237] This gross income calculation subtracts out returns and allowances and cost of goods sold, roughly corresponding to operating profit.

$10,000 of overall income in that period. The overall row shows the total DPAD deduction for all sectors in the indicated year per $10,000 of overall income. While the DPAD is sometimes considered a manufacturing benefit, section 199 did not specifically limit "production" to manufacturing activities. Table 12 shows that, while manufacturing was the largest beneficiary, other sectors, notably the agriculture and construction sectors, were able to take advantage of the deduction as well.

The DPAD theoretically reduces the user cost of capital, which would reduce a firm's effective marginal tax rate and presumably boost investment. Economic studies have confirmed that corporations increased investment in response to the DPAD. One study concluded that while corporations shifted their taxable income forward as soon as the DPAD was enacted in 2004, they delayed their increased investment until as late as 2010.[238] In addition, the DPAD may have incentivized corporations to increase shareholder payouts and reduce debt.[239] Another study shows that firms with the largest DPAD benefits also engaged in more acquisition bids using cash, suggesting that the DPAD provided liquidity to these firms to carry out these transactions.[240]

[238] Rebecca Lester, "Made in the USA? A study of firm responses to domestic production incentives," *Journal of Accounting Research*, vol. 57, no. 4, 2019, pp. 1059-1114.

[239] Eric Ohrn, "The Effect of Corporate Taxation on Investment and Financial Policy: Evidence from the DPAD," *American Economic Journal: Economic Policy*, vol. 10, no. 2, 2018, pp. 272-301.

[240] Jennifer L. Blouin, et al, "Corporate tax cuts, merger activity, and shareholder wealth," *Journal of Accounting and Economics*, vol. 71, no. 1,2021, pp. 1013-1015.

Table 12.–Domestic Production Activities Deduction per $10,000 of Overall Income, by Sector

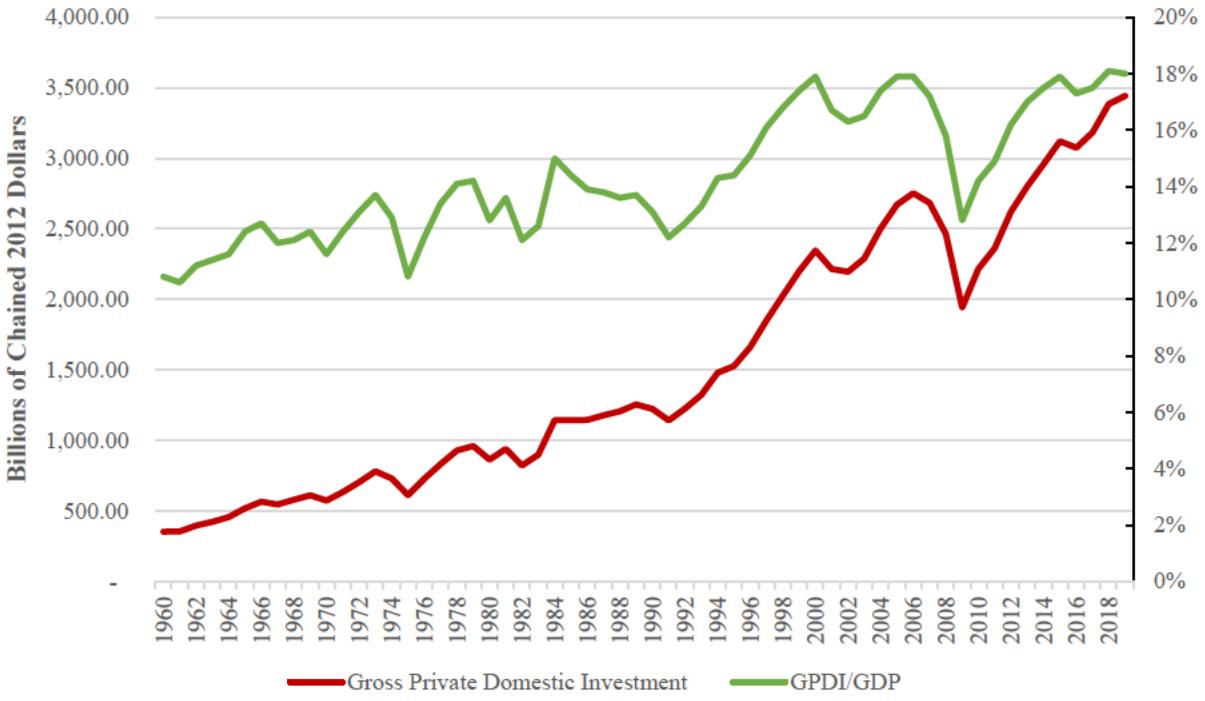
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Overall
Agriculture, Forestry, Fishing and Hunting	$5.54	$9.14	$25.81	$31.11	$31.67	$42.23	$41.12	$51.06	$60.41	$81.53	$82.64	$57.58	$82.12	$48.17
Mining	41.77	42.73	68.94	57.89	24.92	46.31	55.26	45.49	38.24	31.36	8.75	16.91	13.65	39.30
Utilities	10.89	15.59	34.26	20.45	19.63	15.31	4.93	3.81	4.27	9.52	7.62	5.76	7.38	12.41
Construction	22.88	30.66	34.87	36.13	37.35	40.50	34.48	39.20	44.19	58.42	68.84	80.01	70.22	45.11
Manufacturing	25.88	31.63	59.26	52.75	43.68	74.13	81.53	94.50	96.68	101.33	99.90	88.07	81.52	71.97
Wholesale Trade	10.12	7.76	18.63	15.80	12.71	21.21	21.58	28.54	28.02	27.60	27.97	30.23	30.43	22.58
Retail Trade	0.93	1.52	2.35	2.68	2.86	4.88	6.30	7.77	7.99	8.95	8.97	11.55	9.56	6.20
Transportation and Warehousing	0.11	0.16	0.19	0.16	0.24	0.32	0.43	0.32	0.33	0.29	0.47	0.98	1.63	0.45
Information	12.88	14.36	28.96	26.56	31.79	47.35	51.33	49.76	59.98	56.16	49.52	50.99	40.20	40.65
Finance and Insurance	0.59	0.35	0.31	0.33	0.47	1.16	1.41	2.26	3.52	4.25	6.68	7.55	5.83	2.65
Real Estate, Rental and Leasing	1.22	0.68	1.35	1.38	1.65	1.92	3.65	4.39	2.98	3.69	2.90	3.50	1.97	2.43
Professional, Scientific, and Technical Services	1.96	3.53	6.13	6.52	7.46	12.04	12.43	13.49	12.98	14.20	12.63	13.52	9.45	10.11
Management of Companies	0.43	0.59	0.77	0.77	0.53	1.40	2.00	3.31	3.99	4.50	3.41	3.80	2.16	1.98
Administrative and Support	0.38	0.78	1.85	0.89	1.39	1.84	1.64	1.40	2.44	4.87	3.80	6.23	6.45	2.84
Educational Services	0.66	0.24	0.38	1.73	4.42	10.44	8.22	6.50	9.41	10.60	4.72	8.05	3.92	5.97
Health Care and Social Assistance	0.19	0.12	0.09	0.21	0.32	0.38	0.39	0.44	0.49	0.38	0.58	0.68	0.78	0.40
Arts, Entertainment, and Recreation	2.38	1.06	2.73	0.97	1.26	1.79	2.27	5.67	6.30	9.88	8.78	1.58	1.30	3.66
Accommodation and Food Services	0.27	1.14	4.13	3.09	3.45	4.36	6.40	5.22	6.77	7.27	11.35	15.07	14.52	6.72
Other Services	1.15	1.17	2.50	3.27	2.34	2.19	2.89	2.04	2.32	4.91	3.31	4.87	3.36	2.85
Overall	$10.08	$11.30	$20.54	$19.17	$16.04	$27.12	$29.52	$32.89	$34.61	$36.00	$35.30	$32.72	$28.76	$25.92

C. Macroeconomic Data

Investment and GDP

Investment, along with consumption, government expenditures, and net exports, is one of the primary components of gross domestic product ("GDP"). On the left axis, Figure 1 shows the annual amount of real gross private domestic investment in billions of chained 2012 dollars since 1960. On the right axis, Figure 1 shows the share of real GDP attributable to investment. In general, the level of investment rose steadily from the 1960s through the late 1980s. From the trough after the 1990-1991 recession, real investment more than doubled over the next decade, rising from $1,142.1 billion in 1991 to $2,346.7 billion in 2000. In the following decade, the level of investment peaked at $2,752.4 billion in 2006 before falling over the next six years by more than 20 percent to $2,621.8 billion in 2012. Over 80 percent of that decline is attributable to a drop in residential fixed investment (housing). Following that decline, real investment increased by 31 percent over the next seven years to peak at $3,442.6 billion in 2019. As a share of GDP, investment fluctuated within a range of 11 to 14 percent from 1960-1996. In subsequent years, the investment share has fluctuated between 16 to 18 percent, except during the Great Recession, in which it dropped as low as 13 percent in 2009.

Figure 1.–Gross Private Domestic Investment, Levels and Share of GDP, 1960-2019

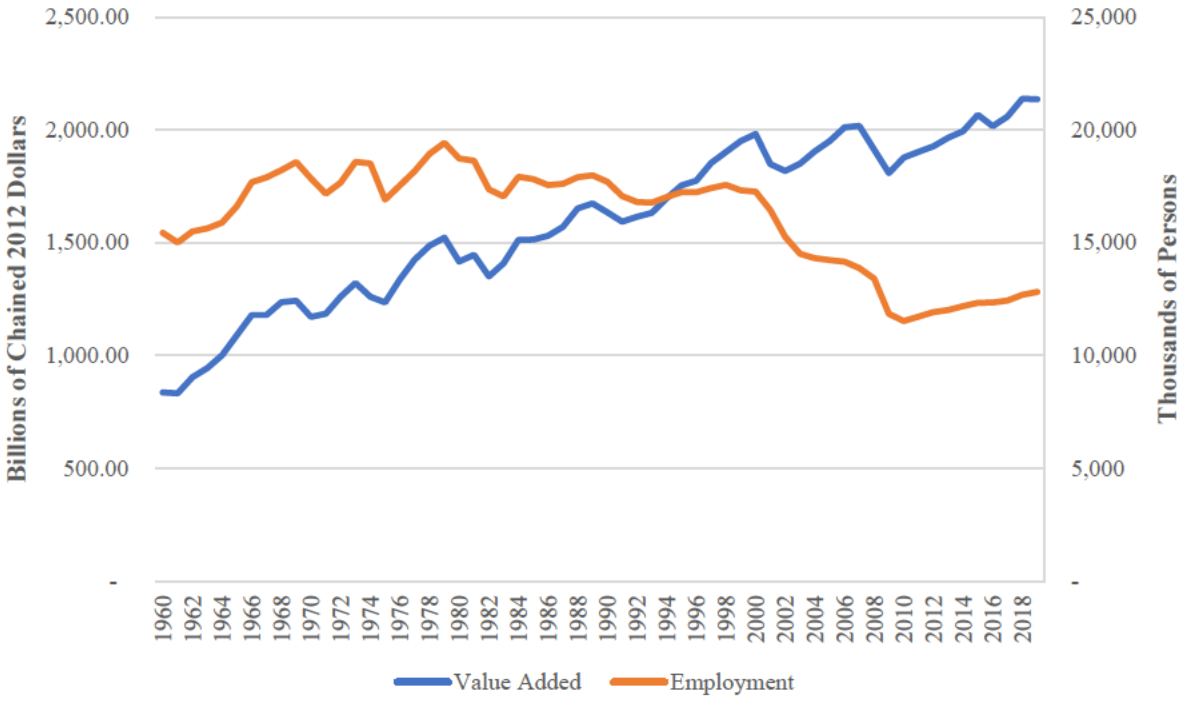


Source: Bureau of Economic Analysis, JCT staff calculations.

Manufacturing output and employment

Investment is often associated with the manufacturing sector of the economy. On the left axis, Figure 2 illustrates the amount of real gross value added attributable to manufacturing output in billions of chained 2012 dollars since 1960. On the right axis, Figure 2 shows total manufacturing employment in thousands of persons. Figure 2 illustrates a divergence between a large output growth and a substantial employment decline during the period 1960-2019. From 1960-1980, real value added increased by 69 percent while employment increased by 21 percent during the same period. Following this period of simultaneous growth, value added increased by 34 percent while total employment slightly decreased by six percent during 1980-1998. Since 1998, value added has fluctuated, yet increased overall by 12 percent after a decline during and following the Great Recession. In contrast, total manufacturing employment has decreased by 31 percent between 1998-2019. The divergence between the output growth and the employment decrease suggests that manufacturing labor productivity has substantially increased in the last two decades.

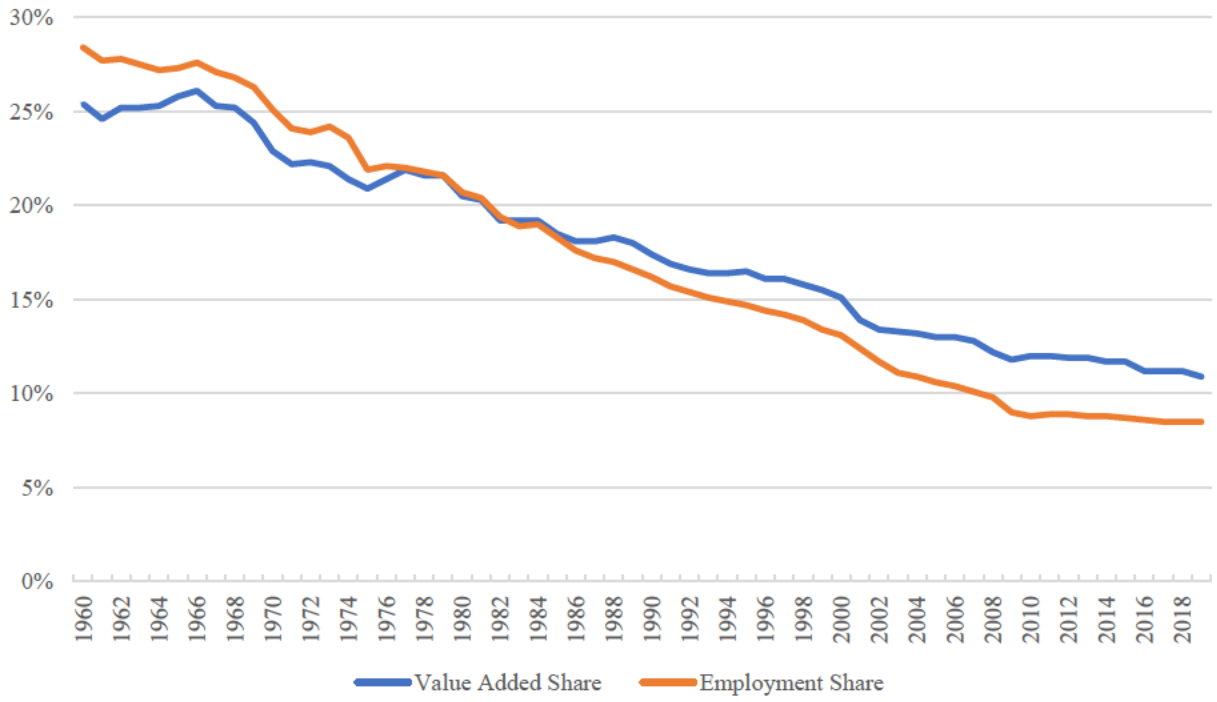
Figure 2.-Manufacturing Value Added and Employment, Levels, 1960-2019



Source: Bureau of Economic Analysis, Bureau of Labor Statistics, JCT staff calculations.

Figure 3 shows the shares of GDP and total employment attributable to the manufacturing sector since 1960. Manufacturing has steadily declined as a share of GDP throughout the period. However, as shown in Figure 1, the share of GDP attributable to investment has remained more stable. This suggests that investment in other sectors has offset any decline in investment in manufacturing as a share of GDP. Furthermore, relative to the change in output, the greater decline in the employment share throughout the period suggests that service-sector jobs have largely replaced manufacturing jobs in the United States.

Figure 3.-Manufacturing Value Added and Employment, Share of Total U.S. Economy, 1960-2019



Source: Bureau of Economic Analysis, Bureau of Labor Statistics, JCT staff calculations.