

Simultaneous Equations for Simpler Tax Analysis

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business interest expense, and the passthrough business income deduction.¹

Rev. Rul. 79-347

The IRS used algebra to resolve concurrent income-based deduction limitations in Rev. Rul. 79-347, 1979-2 C.B. 122. The ruling’s domestic corporation taxpayer was entitled to a dividends received deduction (DRD) under section 243, equal at the time to 85 percent of its dividends from other domestic corporations. The taxpayer was also entitled to a section 613A percentage depletion (PD) deduction for specified income from oil and gas wells. The DRD was limited under section 246(b) to 85 percent of pre-DRD taxable income, which was reduced by any allowed PD. The PD was limited by section 613A(d) to 65 percent of pre-PD taxable income, which was reduced by any allowed DRD. The taxpayer therefore couldn’t know its maximum DRD under the 85 percent limitation without knowing its PD, but it also couldn’t know its maximum PD under the 65 percent limitation without knowing its DRD.

The IRS recognized the problem as two simultaneous equations with two unknowns, DRD and PD, based on a constant (TI) that is the taxpayer’s taxable income before both deductions:

$$DRD = 85\% (TI - PD)$$

$$PD = 65\% (TI - DRD)$$

The ruling applied high-school algebra to determine that the maximum allowed DRD was 66.5 percent of TI, and the maximum allowed PD was 21.8 percent of TI.

For example, a taxpayer has \$1,000 of taxable income before any DRD or PD. The maximum

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The code limits some tax deductions to a fixed percentage of the taxpayer’s taxable income. When multiple income-based limitations apply to a taxpayer at the same time without specified ordering rules, the IRS has solved simultaneous equations to give proper effect to all the limitations.

This report discusses the simultaneous equation solutions for some new income-based limitations introduced by the Tax Cuts and Jobs Act (P.L. 115-97), which apply to net operating losses, global intangible low-taxed income, foreign-derived intangible income (FDII),

¹This report does not discuss state-level income-based limitations on the use of NOLs and other deductions, which may become more prevalent once states undertake their own efforts at tax reform and simplification in the wake of the TCJA.

DRD is \$665 and the maximum PD is \$218, which results in net taxable income of \$117.

The results can be checked to confirm that the \$665 maximum DRD is 85 percent of the taxpayer's \$782 pre-DRD taxable income (\$117 net taxable income plus \$665 DRD addback). Similarly, the \$218 maximum PD is 65 percent of the taxpayer's \$335 pre-PD taxable income (\$117 net taxable income plus \$218 PD addback). In fact, the taxpayer in the ruling had a lower amount of actual PD, which was applied before computing its maximum DRD.

Simultaneous equations appeared more recently in ILM 201226021, which involved a corporate taxpayer that had both charitable contribution deductions and an alternative minimum tax net operating loss (AMTNOL) deduction. The charitable contribution deduction was limited by section 170(b)(2) to 10 percent of a corporation's pre-contribution taxable income, while the AMTNOL deduction was limited by section 56(d) to 90 percent of pre-AMTNOL taxable income. The IRS solved the simultaneous equations to conclude, with more precision than in Rev. Rul. 79-347, that the taxpayer's two deductions were limited to 1.0989010989011 percent and 89.010989010989 percent, respectively, of taxable income before both deductions.²

NOL and GILTI or FDII

Before the TCJA, NOL carryovers from prior years could offset all of the taxpayer's taxable income in the current year. The TCJA amended section 172(a)(2) to provide that an NOL deduction is permitted to offset only 80 percent of the taxpayer's pre-NOL taxable income. The 80 percent limitation applies to NOLs generated in 2018 and later, while NOL carryovers from 2017 and earlier can continue to offset all of the taxpayer's pre-NOL taxable income. Unused NOL deductions are generally carried over to the next year.

²Simultaneous equations were mentioned, but not solved, by the IRS in AM 2009-009 for a taxpayer entitled to both the section 199 domestic production activities deduction and the section 114 exclusion for extraterritorial trading income. Section 114 was repealed by the American Jobs Creation Act of 2004, and section 199 was repealed by the TCJA.

The TCJA also newly imposes current U.S. tax on the GILTI of any U.S. taxpayer who generally owns 10 percent or more of the stock of a controlled foreign corporation. The GILTI inclusion under section 951A is generally the CFC's foreign earnings, less a 10 percent deemed return on tangible assets and some other exclusions. For a domestic C corporation, the TCJA enacted new section 250 to provide a 50 percent deduction for its GILTI inclusion, which reduces the 21 percent federal corporate income tax rate to an effective rate of 10.5 percent. The deduction is lowered to 37.5 percent in 2026 and later, which reduces the effective tax rate to 13.125 percent.

Section 250(a)(2) provides that the 50 percent (or 37.5 percent) GILTI-related section 250 deduction is limited to 50 percent (or 37.5 percent) of the taxpayer's pre-section 250 taxable income, which appears to be computed after NOL deductions.³ Absent any technical corrections or Treasury guidance to the contrary, a domestic C corporation can't know its allowed NOL deduction under the 80 percent limitation without knowing its section 250 deduction, and it can't know its section 250 deduction without knowing its allowed NOL deduction. Unused section 250 deductions are not carried to another year.

Section 250 serves double duty under the TCJA because new section 250(a)(1)(A) also provides a 37.5 percent deduction for a taxpayer's FDII. The deduction is lowered to 21.875 percent in 2026 and later. Very generally, and discussed later in more detail, FDII is the taxpayer's income from property sold to foreign persons for foreign use plus its income from services provided to persons located outside the United States, less a 10 percent deemed return on tangible assets and other adjustments.

Section 250(a)(2) similarly provides that the 37.5 percent (or 21.875 percent) FDII-related section 250 deduction is generally limited to 37.5 percent (or 21.875 percent) of the taxpayer's pre-

³The U.S. tax on a GILTI inclusion can be reduced by 80 percent of any indirect foreign tax credits from the CFC's GILTI-related foreign taxes. A section 78 gross-up causes the taxpayer to have income equal to 100 percent of the indirect FTCs, and section 250(a)(1)(B) provides a 50 percent (or 37.5 percent) deduction for the gross-up in a manner similar to the GILTI inclusion. Section 250(a)(2) is ambiguous on whether its 50 percent (or 37.5 percent) taxable income limitation applies to the 50 percent (or 37.5 percent) deduction for the gross-up.

section 250 taxable income. A domestic C corporation can't know its allowed NOL deduction under the 80 percent NOL taxable income limitation without knowing its section 250 deduction for FDII, but it can't know its FDII-related section 250 deduction without knowing its allowed NOL deduction.

Assuming that all of the taxpayer's NOL carryovers are subject to the 80 percent NOL taxable income limitation, simultaneous equations can be solved for the maximum NOL deduction and GILTI- or FDII-related section 250 deduction, as shown in Table 1.⁴

Table 1

	Section 250 Deduction as Percentage of Taxable Income Before Both Deductions	NOL Deduction As Percentage of Taxable Income Before Both Deductions
50% GILTI-related section 250 deduction	16.7%	66.7%
37.5% GILTI- or FDII-related section 250 deduction	10.7%	71.4%
21.875% FDII-related section 250 deduction	5.3%	75.8%

For example, a domestic C corporation has a \$1,000 NOL carryover from 2018 to 2019. The taxpayer in 2019 has \$1,000 of GILTI inclusions and no other income. Its maximum GILTI-related section 250 deduction is \$167 (16.7 percent), and its maximum NOL deduction is \$667 (66.7 percent). Its net taxable income is \$166 after the maximum amount of both deductions.⁵

Section 172(d)(9) provides that the section 250 deduction is not allowed in determining the taxpayer's NOL carryover to the next year. As a

⁴The solutions should be adjusted for a taxpayer with both GILTI and FDII-related deductions, which do not use the same percentages in any year.

⁵The results can be checked to confirm that the \$167 maximum section 250 deduction is 50 percent of the taxpayer's \$333 pre-section 250 taxable income (\$166 net taxable income plus \$167 section 250 deduction addback). The \$667 maximum NOL deduction is 80 percent of the taxpayer's \$833 pre-NOL taxable income (\$166 net taxable income plus \$667 NOL deduction addback).

result, the initial \$1,000 NOL carryover is reduced by both the \$667 NOL deduction and the \$167 section 250 deduction, with \$166 of remaining NOL carrying over to 2020.

GILTI, FDII, and New Interest Limitation

The TCJA enacted new section 163(j) to generally limit a taxpayer's net business interest deduction to 30 percent of adjusted taxable income (ATI) for the year. Disallowed business interest deductions are carried over to the next year. Section 163(j) is subject to several exceptions, including generally any taxpayer with less than \$25 million of average annual gross receipts; any real property trade or business that elects to use the alternative depreciation system for specified real property; and any funds borrowed to acquire motor vehicles, boats, and farm equipment for sale or lease.

ATI is generally the taxpayer's taxable income, but it's computed under section 163(j)(8)(A) without regard to (1) items not properly allocable to a trade or business, such as investment income and investment expenses; (2) any business interest expense or business interest income; (3) the NOL deduction; (4) the section 199A passthrough business income deduction for noncorporate taxpayers; and (5) any depreciation, amortization, or depletion in 2018 through 2021.

The TCJA's legislative history suggests that a corporation has neither investment income nor investment interest expense.⁶ A domestic corporation's ATI likely includes GILTI and related deductions. Its ATI and section 163(j) interest limitation are computed after the section 250 deduction, which can't be determined without knowing the interest deduction allowed under section 163(j).

Absent any technical corrections or Treasury guidance to the contrary, simultaneous equations can be used to resolve the interaction between section 163(j) and section 250. Table 2 shows the maximum interest deduction and GILTI- or FDII-related section 250 deduction for a domestic corporation that has ATI equal to its pre-interest taxable income:

⁶H. Rep. No. 115-466, at 386 n.688 (2017) (Conf. Rep.).

Table 2

	Section 250 Deduction as Percentage of Taxable Income Before Both Deductions	Interest Deduction as Percentage of Taxable Income Before Both Deductions
50% GILTI-related section 250 deduction	41.2%	17.6%
37.5% GILTI- or FDII-related section 250 deduction	29.6%	21.1%
21.875% FDII-related section 250 deduction	16.4%	25.1%

For example, a domestic corporation in 2018 has \$1,000 of taxable income and ATI before any interest deduction and section 250 deduction, all \$1,000 of which is GILTI inclusions. Its maximum section 250 deduction is \$412 (41.2 percent), and its maximum interest deduction under section 163(j) is \$176 (17.6 percent). Its net taxable income is \$412 after the maximum amount of both deductions.⁷

Similarly with FDII, a domestic corporation in 2018 has \$1,000 of taxable income and ATI before any interest deduction and section 250 deduction, of which \$800 is FDII and none is GILTI. Its maximum section 250 deduction is \$296 (29.6 percent), and its maximum interest deduction under section 163(j) is \$211 (21.1 percent). The corporation's net taxable income is \$493 after the maximum amount of both deductions.⁸

If the taxpayer instead has only \$600 of FDII, it would deduct \$225 under section 250, equal to 37.5 percent of the \$600 FDII. The maximum section 250 deduction limitation of \$296 would not apply. Its ATI would be the \$1,000 of pre-

⁷The results can be checked to confirm that the \$412 maximum section 250 deduction is 50 percent of the taxpayer's \$824 pre-section 250 taxable income (\$412 net taxable income plus \$412 section 250 deduction addback). The \$176 maximum interest deduction is 30 percent of the taxpayer's \$588 ATI (\$412 net taxable income plus \$176 interest deduction addback).

⁸The results can be checked to confirm that the \$296 maximum section 250 deduction is 37.5 percent of the taxpayer's \$704 pre-section 250 taxable income (\$493 net taxable income plus \$296 section 250 deduction addback). The \$211 maximum interest deduction is 30 percent of the taxpayer's \$789 ATI (\$493 net taxable income plus \$211 interest deduction addback).

interest income less the \$225 section 250 deduction, or \$775 of ATI, which allows up to \$233 (30 percent) as an interest deduction under section 163(j).

When the domestic corporation has differences between ATI and pre-interest taxable income, such as depreciation that is added back to ATI in 2018 through 2021, a second constant is introduced to the two simultaneous equations with two unknowns. Algebraically, the taxpayer has taxable income before both deductions of TI , and it also has depreciation addback of Δ in computing ATI. Its maximum GILTI-related section 250 deduction D is equal to 50 percent of its TI reduced by the interest deduction I . Its maximum interest deduction I is equal to 30 percent of its ATI, which is TI reduced by the section 250 deduction D and increased by the depreciation addback Δ :

$$D = 50\% (TI - I)$$

$$I = 30\% (TI - D + \Delta)$$

The two equations can be solved to arrive at:

$$D = 41.2\% TI - 17.6\% \Delta$$

$$I = 17.6\% TI + 35.3\% \Delta$$

For example, a domestic corporation has \$2,000 of gross income and \$1,000 of depreciation expense. It has \$1,000 of taxable income before any section 250 deduction or interest deduction. Based on the above formulas, the maximum 50 percent GILTI-related section 250 deduction is \$235, and the maximum interest deduction under section 163(j) is \$529. The corporation's net taxable income is \$235 after the maximum amount of both deductions.⁹

Section 246(b) and Percentage Depletion

Before the TCJA, section 243 generally provided a domestic corporation with an 80 percent or 70 percent DRD for dividends received from, respectively, 20 percent-owned domestic corporations and other domestic corporations. Section 245 allowed a similar 80 percent or 70 percent DRD for the U.S.-source portion of

⁹The results can be checked to confirm that the \$235 maximum section 250 deduction is 50 percent of the taxpayer's \$470 pre-section 250 taxable income (\$235 net taxable income plus \$235 section 250 deduction addback). The \$529 maximum interest deduction is 30 percent of the taxpayer's \$1,764 ATI (\$235 net taxable income plus \$529 interest deduction addback plus \$1,000 depreciation addback).

dividends received from some foreign corporations. With a 35 percent federal corporate income tax rate, the 80 percent or 70 percent DRD reduced the effective tax rate on dividends to 10.5 percent or 7 percent.

The TCJA lowered the federal corporate income tax rate to 21 percent in 2018 and later. To maintain approximately the same effective tax rate on dividends, the 80 percent or 70 percent DRD was reduced to a 65 percent or 50 percent DRD.¹⁰

The TCJA also amended section 246(b) to generally provide that the sum of the taxpayer's 50 percent DRD and section 250 deduction is limited to 50 percent of the taxpayer's taxable income before both deductions, and that the sum of the taxpayer's 65 percent DRD and section 250 deduction is limited to 65 percent of taxpayer's taxable income before both deductions. Ordering rules apply to a taxpayer with both types of DRDs.

For unclear reasons and with somewhat arbitrary results, the section 246(b) limitation doesn't apply at all if the taxpayer has a hypothetical net loss for the current year,¹¹ computed with an unlimited DRD and presumably an unlimited section 250 deduction.

The section 613A PD taxable income limitation remains unchanged at 65 percent of pre-PD taxable income in section 613(d). When there is a 65 percent limitation under section 246(b), the simultaneous equations in Rev. Rul. 79-347 can be solved to conclude that the maximum sum of the 65 percent DRD and section 250 deduction equals 39.4 percent of taxable income before all three deductions, and that the maximum PD is also 39.4 percent of taxable income before all three deductions. If the 50 percent limitation applies, the maximum sum of the 50 percent DRD and section 250 deduction equals 25.9 percent of taxable income before all three deductions, and the maximum PD equals 48.1 percent of taxable income before all three deductions.

Section 246(b) and New Interest Limitation

The section 250 deduction is subject to two income-based limitations as discussed earlier. Section 246(b) imposes a 50 percent or 65 percent taxable income limitation for the sum of the DRD and the section 250 deduction. Section 250(a)(2) imposes a 50 percent or 37.5 percent taxable income limitation for only the section 250 deduction.

For purposes of the 50 percent or 65 percent taxable income limitation, section 246(b) provides that the taxable income is computed without regard to any DRD, NOL deduction, section 250 deduction, or specified other items. As a result, the section 246(b) taxable income limitation is computed first, before the taxpayer determines the NOL deduction and the section 250 deduction subject to their own separate taxable income limitations. It appears that Congress knew how to provide ordering rules for income-based limitations when helpful for administrative simplicity.

In contrast, taxable income under section 246(b) is determined after any interest deduction, subject to the section 163(j) limitation of 30 percent of ATI. A taxpayer's ATI and section 163(j) interest limitation are thus computed after any DRD and section 250 deduction, which can't be determined under the section 246(b) limitation without knowing the interest deduction allowed under section 163(j).

Absent any technical corrections or Treasury guidance to the contrary, simultaneous equations can be used to resolve the interaction between section 163(j) and section 246(b). Table 3 shows that for a domestic corporation that has ATI equal to its pre-interest taxable income, its maximum sum of DRD and section 250 deduction, and its maximum interest deduction, are varying amounts of its taxable income before the three deductions:

¹⁰The 65 percent or 50 percent DRD reduces the effective corporate tax rate on dividends from 21 percent to 10.5 percent or 7.35 percent.

¹¹Section 246(b)(2). See S. Rep. 83-1622, at 223-224 (1954).

Table 3

	DRD and Section 250 Deduction as Percentage of Taxable Income Before All Three Deductions	Interest Deduction as Percentage of Taxable Income Before All Three Deductions
50% DRD and section 250 deduction	41.2%	17.6%
65% DRD and section 250 deduction	56.5%	13%

For example, a domestic corporation has \$1,000 of dividend income from its 30 percent of the stock of another domestic corporation, and no other income. It has interest expense and no other deductions. Its maximum 65 percent DRD is \$565 (56.5 percent), and the maximum interest deduction under section 163(j) is \$130 (13 percent), which results in net taxable income of \$305 after maximizing both deductions.¹²

NOL and Section 199A Deductions

Individuals, non-grantor trusts, and other noncorporate taxpayers are generally not entitled to any DRD or section 250 deduction. But they and their tax advisers are not left out, because simultaneous equations can apply to an individual who is claiming both an NOL deduction and the TCJA's new section 199A passthrough business income deduction in 2018 through 2025.

The section 199A passthrough business income deduction is generally equal to 20 percent of a noncorporate taxpayer's qualified business income from some trades or businesses, ordinary real estate investment trust dividends, and specified publicly traded partnership (PTP) income. Various limitations apply to qualified business income and PTP income, according to the taxpayer's total taxable income, the type of

business, and the business's Form W-2 wages and unadjusted basis in some depreciable property.

The total section 199A deduction is limited under section 199A(a)(2) to 20 percent of the taxpayer's taxable income, determined without regard to the section 199A deduction and any net capital gain under section 1(h) (presumably including qualified dividends). In other words, the section 199A deduction is the lesser of (1) 20 percent of the taxpayer's qualified business income, ordinary REIT dividends, and specified PTP income, or (2) 20 percent of the taxpayer's ordinary taxable income and short-term capital gain.

For an agricultural or horticultural cooperative, the Consolidated Appropriations Act of 2018 (P.L. 115-141) enacted a conceptually distinct deduction under section 199A(g), equal to 6 percent of oil-related qualified production activities income and 9 percent of other qualified production activities income in 2018 through 2025. The cooperative's deductions are subject to their own income-based limitations.¹³

An individual with an NOL carryover generated in 2018 or later, which is subject to the 80 percent NOL taxable income limitation, can be simultaneously subject to the section 199A(a)(2) 20 percent taxable income limitation. If all of the individual's income is ordinary taxable income and short-term capital gain, the simultaneous equations result in the section 199A deduction being limited to 4.8 percent of taxable income before both deductions, and the NOL deduction is limited to 76.2 percent of taxable income before both deductions.

For example, an individual has \$1,000 of taxable income in 2019, before any NOL deduction and section 199A deduction. She has a \$900 NOL carryover from 2018 to 2019. Even if the income is all ordinary REIT dividends eligible for the section 199A deduction, her section 199A deduction is capped at \$48 and her NOL deduction is limited to \$762. Her net taxable

¹²The results can be checked to confirm that the \$565 maximum DRD is 65 percent of the taxpayer's \$870 pre-DRD taxable income (\$305 net taxable income plus \$565 DRD addback). The \$130 maximum interest deduction is 30 percent of the taxpayer's \$435 ATI (\$305 net taxable income plus \$130 interest deduction addback).

¹³The 6 percent or 9 percent deduction is generally limited to 6 percent or 9 percent of the cooperative's taxable income, determined without regard to patronage dividends, per-unit retain allocations, and non-patronage distributions. The TCJA added that the section 199A deduction is subject to the 65 percent or 50 percent section 246(b) limitation. The section 246(b) limitation can affect a cooperative, which may also claim the DRD and section 250 deduction, although it's unclear how it can apply to an individual.

income is \$190 after maximizing both deductions.¹⁴

The section 199A deduction is not allowed in determining the individual's NOL carryover to the next year under section 172(d)(8). The NOL carryover is therefore reduced by both the \$48 section 199A deduction and the \$762 NOL deduction, with a remaining \$190 NOL carryover to 2020.

The section 199A deduction is limited to 20 percent of pre-section 199A ordinary taxable income and short-term capital gain only, whereas the NOL deduction is limited to 80 percent of pre-NOL taxable income that includes long-term capital gain. Algebraically, the taxpayer has taxable income before both deductions of TI , which includes some long-term capital gain Λ . Her maximum section 199A deduction D is equal to 20 percent of her TI reduced by the NOL deduction N and by the capital gain Λ . Her maximum NOL deduction N is equal to 80 percent of her TI reduced by the section 199A deduction D :

$$D = 20\% (TI - N - \Lambda)$$

$$N = 80\% (TI - D)$$

The two equations can be solved to arrive at:

$$D = 4.8\% TI - 23.8\% \Lambda$$

$$N = 76.2\% TI + 19\% \Lambda$$

For example, an individual has \$1,000 of taxable income in 2019, before any NOL deduction and section 199A deduction. The income includes \$100 of long-term capital gain. She has a \$900 NOL carryover from 2018 to 2019. Even if the ordinary income is all qualified PTP income eligible for the section 199A deduction, her section 199A deduction is capped at \$24, and her NOL deduction is limited to \$781. The net taxable income is \$195 after maximizing both deductions.¹⁵

¹⁴The results can be checked to confirm that the \$48 maximum section 199A deduction is 20 percent of the taxpayer's \$238 pre-section 199A taxable income (\$190 net taxable income plus \$48 section 199A deduction addback). The \$762 maximum NOL deduction is 80 percent of the taxpayer's \$952 pre-NOL taxable income (\$190 net taxable income plus \$762 NOL deduction addback).

¹⁵The results can be checked to confirm that the \$24 maximum section 199A deduction is 20 percent of the taxpayer's \$119 pre-section 199A ordinary taxable income (\$195 net taxable income plus \$24 section 199A deduction addback and less \$100 long-term capital gain). The \$781 maximum NOL deduction is 80 percent of the taxpayer's \$976 pre-NOL taxable income (\$195 net taxable income plus \$781 NOL deduction addback).

Section 199A and Section 250 Deductions

An individual may have GILTI inclusions from CFC stock, which are normally subject to individual income tax rates of up to 37 percent, with no indirect foreign tax credits and no section 250 deduction. The individual may make a section 962 election to generally subject the GILTI inclusions to the 21 percent corporate income tax rate, with an allowed 80 percent of indirect FTCs. It's unclear whether the electing individual is also entitled to a 50 percent (or 37.5 percent) section 250 deduction for those GILTI inclusions subject to corporate income tax, as if the taxpayer were a domestic corporation. Prop. reg. section 1.962-1(b) provides that the income subject to corporate income tax can be reduced by a section 965(c) deduction for deemed repatriation income but "not any other deductions or amounts." The preamble to the proposed regulations similarly states that no other deductions are allowed, though with the caveat of "subject to future guidance," which provides some hope that forthcoming regulations under section 250 may allow the deduction for an electing individual.¹⁶

If pending regulations provide that an electing individual can claim a GILTI-related section 250 deduction, the taxable income limitations for both the section 199A deduction and the section 250 deduction could apply to the same taxpayer at the same time, absent any isolation of the GILTI items or other guidance to the contrary.

For example, a single individual has \$10,000 of GILTI inclusions, \$12,000 of ordinary REIT dividends, and no other income in 2018. He claims the \$12,000 standard deduction. The individual makes a section 962 election, which is assumed to allow a \$5,000 (50 percent) section 250 deduction.

The individual has \$10,000 of taxable income before the section 250 deduction and the section 199A deduction. The section 250 and section 199A simultaneous equations can be solved to conclude that the maximum section 250 deduction is \$4,444

¹⁶REG-104226-18.

Table 4

	Section 163(j) Interest Limitation to 30% of ATI	Section 250(a)(2) Deduction Limitations	Section 246(b) Limitations On DRD and Section 250 Deduction	Section 172(a)(2) NOL Deduction Limitation	Section 613A(d) PD Limitation	Section 199A Deduction Limitation	Section 170(b)(2) Charitable Contribution Limitation
Section 163(j) interest limitation to 30% of ATI	—	Simultaneous	Simultaneous	163(j) first	163(j) first in 2018-2021, then simultaneous	163(j) first	Simultaneous
Section 250(a)(2) deduction limitations	Simultaneous	—	246(b) first	Simultaneous	Simultaneous	Simultaneous (if allowed)	170(b)(2) first
Section 246(b) limitations on DRD and section 250 deduction	Simultaneous	246(b) first	—	246(b) first	Simultaneous	No overlap	170(b)(2) first
Section 172(a)(2) NOL deduction limitation	163(j) first	Simultaneous	246(b) first	—	Simultaneous	Simultaneous	Simultaneous
Section 613A(d) PD limitation	163(j) first in 2018-2021, then simultaneous	Simultaneous	Simultaneous	Simultaneous	—	613A(d) first	Simultaneous
Section 199A deduction limitation	163(j) first	Simultaneous (if allowed)	No overlap	Simultaneous	613A(d) first	—	No overlap, 170(b)(2) first for cooperatives
Section 170(b)(2) charitable contribution limitation	Simultaneous	170(b)(2) first	170(b)(2) first	Simultaneous	Simultaneous	No overlap, 170(b)(2) first for cooperatives	—

and the maximum section 199A deduction is \$1,111.¹⁷

Three or More Limitations

The section 163(j) determination of ATI is made before any NOL deduction, section 199A deduction, or depreciation, amortization, or depletion (in 2018 through 2021). Accordingly, the section 163(j) determination of ATI and its 30

¹⁷The results can be checked to confirm that the maximum \$1,111 section 199A deduction is 20 percent of the individual's total \$5,556 pre-section 199A taxable income (\$22,000 gross income less \$12,000 standard deduction and less \$4,444 section 250 deduction). The maximum \$4,444 section 250 deduction is 50 percent of the individual's total \$8,889 pre-section 250 taxable income (\$22,000 gross income less \$12,000 standard deduction and less \$1,111 section 199A deduction).

percent interest deduction limitation should be computed first, before the taxpayer computes its income-based limitations for the NOL deduction, the section 199A deduction, and any percentage depletion in 2018 through 2021. Similar computational rules in the other income-based limitations suggest the ordering system between any two limitations as shown in Table 4, absent any technical corrections or Treasury guidance to the contrary.

Three or more deduction limitations may apply simultaneously. For example, a taxpayer has \$1,000 of taxable income and ATI in 2022 before any interest deduction, section 250 deduction, or PD, each of which is subject to its income-based limitations. The three simultaneous

equations with three unknowns can be solved to conclude that the taxpayer's maximum interest deduction is \$53 under section 163(j), the 50 percent section 250 deduction is limited to \$124, and the PD is limited to \$700.¹⁸

In other cases with three deduction limitations, two sets of deduction limitations may be applied at the same time, but the third pair has known ordering. A corporate taxpayer may have interest subject to the section 163(j) limitation, a section 250 deduction, and an NOL deduction. Sections 163(j) and 172(a) apply simultaneously, and sections 163(j) and 250 apply simultaneously. However, ATI is computed without regard to the NOL deduction, so the section 163(j) interest limitation is determined before the 80 percent NOL taxable income limitation. The resulting system of three simultaneous equations with three unknowns is simpler, with or without a Δ factor to adjust between taxable income and ATI.

For example, a taxpayer has \$1,000 of taxable income and ATI before any interest deduction, section 250 deduction, and NOL deduction. The three simultaneous equations conclude that the maximum interest deduction is \$263 under section 163(j), the 50 percent section 250 deduction is limited to \$123, and the NOL deduction is limited to \$491.¹⁹

If there's a \$100 amortization addback to adjust taxable income to ATI, each amount would be slightly changed, to a maximum interest deduction of \$295, a maximum 50 percent section 250 deduction of \$118, and a maximum NOL deduction of \$470.

In reality, a taxpayer is unlikely to have too many deductions up to the limits. A corporate

taxpayer's dividends received from domestic corporations would result in a DRD but would not increase its PD or GILTI-related section 250 deduction.

In contrast, a dividend from a domestic corporation may increase a taxpayer's FDII and therefore its FDII-related section 250 deduction. FDII is a function of the taxpayer's deduction-eligible income (*DEI*), foreign-derived deduction-eligible income (*FDDEI*), and qualified business asset investment (*QBAI*):

$$FDII = (DEI - 10\% QBAI) \frac{FDDEI}{DEI}$$

DEI is defined in section 250(b)(3) as taxable income with some exclusions, but without any exclusion for dividends from domestic corporations and non-CFC foreign corporations, even though those dividends can't be FDDEI. A first derivative of the FDII formula based on DEI shows that:

$$\frac{dFDII}{dDEI} = (10\% QBAI) \frac{FDDEI}{DEI^2}$$

A U.S.-source dividend increases DEI, which increases FDII and the FDII-related section 250 deduction at an asymptotically decreasing rate.

For the best results when there are four or more income-based limitations, a taxpayer would first determine its income-based limitations under all of the simultaneous equations; second, apply the deductions that are numerically below the maximum limits; third, redetermine its income-based limitations under a smaller set of simultaneous equations; and finally, apply the deductions that are numerically below the new maximum limits, and so on.

Old and New NOLs

If a corporation has an NOL carryover from before 2018 that isn't subject to the 80 percent NOL taxable income limitation, the pre-2018 NOL carryover can offset up to 100 percent of pre-NOL taxable income. There is no 90 percent AMTNOL limitation because the TCJA repealed the corporate AMT for 2018 and later.

The section 250 deduction is limited to 50 percent (or 37.5 percent) of pre-section 250 taxable

¹⁸ The results can be checked to confirm that the \$53 maximum interest deduction is 30 percent of the taxpayer's \$176 ATI (\$1,000 income less \$124 section 250 deduction and less \$700 PD). The \$124 maximum section 250 deduction is 50 percent of the taxpayer's \$247 pre-section 250 taxable income (\$1,000 income less \$53 interest deduction less \$700 PD). Lastly, the \$700 maximum PD is 85 percent of the taxpayer's \$823 pre-PD taxable income (\$1,000 income less \$53 interest deduction less \$124 section 250 deduction).

¹⁹ The results can be checked to confirm that the \$263 maximum interest deduction is 30 percent of the taxpayer's \$877 ATI (\$1,000 income less \$123 section 250 deduction, but not reduced by the NOL deduction). The \$123 maximum section 250 deduction is 50 percent of the taxpayer's \$246 pre-section 250 taxable income (\$1,000 income less \$263 interest deduction and less \$491 NOL deduction). Lastly, the \$491 maximum NOL deduction is 80 percent of the taxpayer's \$614 pre-NOL taxable income (\$1,000 income less \$263 interest deduction and less \$123 section 250 deduction).

income after using the old NOL carryover. For a 50 percent section 250 deduction D and an NOL deduction N , based on taxable income before both deductions of TI , the two simultaneous equations are:

$$D = 50\% (TI - N)$$

$$N = 100\% (TI - D)$$

The N formula can be substituted into the D formula to solve for D :

$$D = 50\% (TI - [TI - D]) = 50\% D$$

The only number that equals 50 percent of itself is zero, which is the maximum section 250 deduction. Accordingly, the maximum NOL deduction for pre-2018 NOL carryovers is all of the taxpayer's pre-NOL taxable income, with no section 250 deduction.

Treasury regulations should confirm the proper method when a taxpayer has a section 250 deduction and old (pre-2018) NOL carryovers, as well as new NOL carryovers (from 2018 and later). One reasonable ordering would be:

1. Apply all of the pre-2018 NOL carryovers against taxable income, with no section 250 deduction.
2. If there is remaining positive taxable income, simultaneous equation solutions can be used for the section 250 deduction and the NOL deduction for the new NOL carryovers. Taxable income for the section 250 income-based limitation is reduced by the old NOL deduction, whereas taxable income for the new NOLs' 80 percent taxable income limitation is determined without regard to the old NOL deduction.

Similar results apply to an individual taxpayer who is claiming the section 199A deduction and has an NOL carryover from 2017 and earlier, which is not subject to the 80 percent NOL taxable income limitation.

The NOL carryover's AMTNOL counterpart is limited to offsetting 90 percent of the individual's AMT taxable income under section 56(d)(1)(A), for which the AMT-specific simultaneous equations would normally generate a smaller section 199A deduction for AMT purposes. However, section 199A(f)(2) and prop. reg. section 1.199A-1(e)(4) simplify matters by providing that the section 199A deduction is the same for both AMT and regular tax purposes.

Conclusion

In *Shell Oil*,²⁰ the Tax Court required the use of simultaneous equations when it thought they were necessary in applying the former windfall profits tax. The court noted that substitute methods may result in differences that are "clearly material and distortive" and "will always result in a less than ideal" outcome.

The TCJA added new income-based deduction limitations for NOLs generated in 2018 and later, the GILTI-related and FDII-related section 250 deductions, and the section 163(j) interest deduction limitation. Individuals are subject to some of the limitations, as well as a limitation for the section 199A passthrough business income deduction.

Some taxpayers, many tax professionals, and the IRS should already be knowledgeable about solving the additional simultaneous equations as a result of their long experience with the existing income-based limitations on DRD, PD, corporate charitable contributions, and AMTNOL. The same computations can also be done manually through Goal Seek in Microsoft Excel and similar iterative calculations, though potentially with substantially more complexity and fewer generally useful results. ■

²⁰ *Shell Oil v. Commissioner*, 89 T.C. 371 (1987), *rev'd in part and remanded in part*, 952 F.2d 885 (5th Cir. 1992).