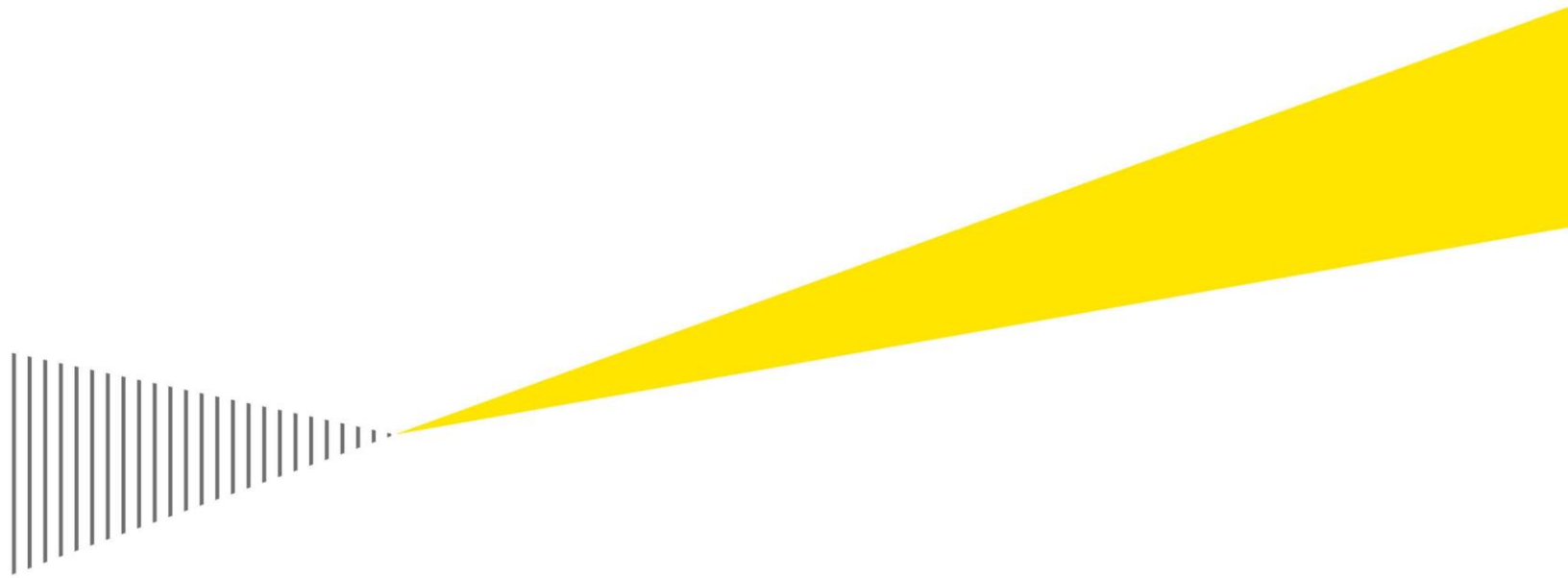
Economic impact of a stricter 163(j) interest expense limitation

Prepared on behalf of the National Association of Manufacturers (NAM)

September 2022



Building a better working world

(Page intentionally left blank)

Executive summary

This analysis estimates the economic impact of allowing the stricter 163(j) interest expense limitation to stay in effect. Specifically, it examines the earnings before interest and taxes (EBIT) based 163(j) limitation that went into effect in 2022 relative to the earnings before interest, taxes, depreciation, and amortization (EBITDA) based 163(j) limitation that was in effect from 2018 through 2021.

Background

Section 163(j) of the Internal Revenue Code limits the deduction for business interest expense. The Tax Cuts and Jobs Act (TCJA), enacted in December 2017, significantly altered Section 163(j) of the Internal Revenue Code. Specifically, it generally disallowed the deductibility for interest expense exceeding 30% of EBITDA. Beginning in 2022, and as enacted under the TCJA, a stricter EBIT-based limitation went into effect. Of the OECD countries with an earnings-based interest expense limitation, none other than the United States have an EBIT-based interest expense limitation.

The current law limitation, generally equivalent to interest expense exceeding 30% of EBIT, excludes companies' depreciation and amortization from the limitation calculation. This significantly reduces the total amount of interest that can be deducted. The change from EBITDA to EBIT can be especially impactful for taxpayers that make longer-term investments since depreciation and amortization generally arise from expenditures having a useful life of more than one year. Those taxpayers that have not incurred such longer-term investments would generally not see a difference in interest deductibility from the EBIT-based limitation. Notably, 81% of incremental disallowed interest expense is estimated to occur in the manufacturing, information, transportation, and mining industries.

By raising the tax burden on investment, limiting the deductibility of interest expense generally increases the cost of capital, discourages investment, and results in less capital formation. A significant portion of the stricter interest expense limitation is estimated to fall on workers through reduced labor productivity, wages, and employment.

This analysis presents two sets of results:

- First, the reduction in economic activity before market adjustments is estimated. The adverse effect before market adjustments measures the amount of economic activity disrupted by disallowing this interest expense. Market adjustments reflect the shifting of economic activity elsewhere in the economy to other companies, industries, and sectors.
- Second, the EY Macroeconomic Model is used to estimate the economic impact of the stricter interest expense limitation. This model simulates how markets respond to policy changes (e.g., workers leaving one business may then be employed by a different business, albeit at a potentially lower wage). This contrasts to the adverse effects before market adjustments.

Disrupted economic activity

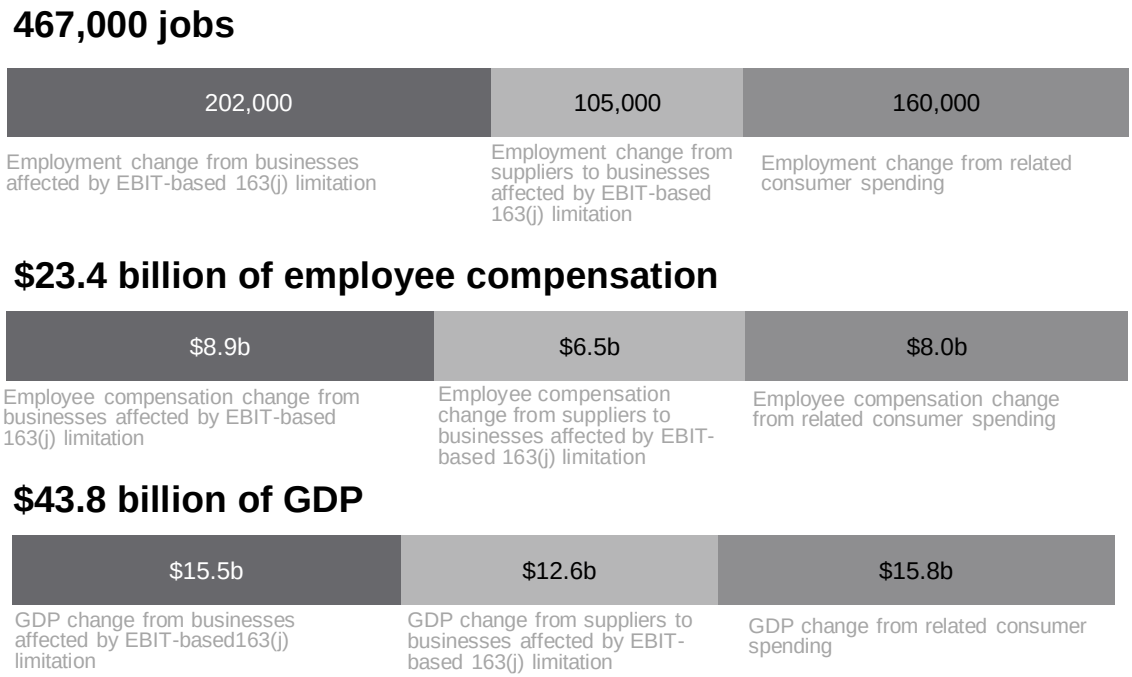
Further limiting interest expense via the stricter EBIT-based 163(j) interest expense limitation increases the cost of capital and, consequently, reduces investment in the US economy. This reduces jobs, employee compensation, and GDP.

The adverse effect before market adjustments measures the amount of economic activity disrupted by disallowing this interest expense. Before market adjustments this reduction is (Figure ES-1):

- 467,000 jobs,
- $23.4 billion of employee compensation, and
- $43.8 billion in GDP.

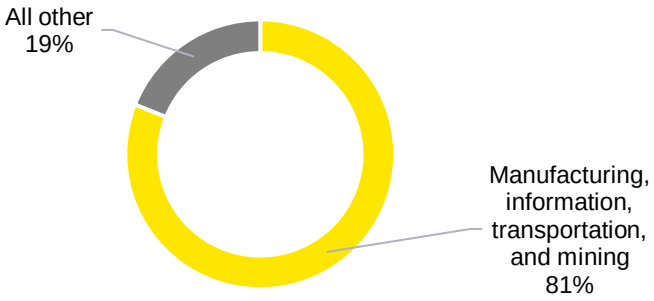
These reductions are the result of changes in the direct operations of US businesses with limited interest expense, suppliers to businesses affected by the stricter limitation, and related consumer spending. Generally, two-thirds to three-quarters of this adverse effect occurs within 10 years. Employee compensation is a component of GDP.

Figure ES-1. Reduction in jobs, employee compensation, and GDP from EBIT-based 163(j) interest expense limitation before market adjustments



Note: Market adjustments include, for example, that some workers adversely affected could find jobs elsewhere albeit with potentially lower wages. Estimates are scaled to the size of the US economy in 2023. Estimates are presented for the long run; generally, two-thirds to three-quarters of the long-run result occurs within 10 years. Estimates are relative to an EBITDA-based 163(j) limitation baseline. Figures are rounded.
Source: EY analysis.

Figure ES-2. Interest expense disallowed from EBIT-based limitation relative to EBITDA-based limitation, share by industry group



Note: Industry definitions follow the North American Industry Classification System (NAICS). Estimates are for the corporate sector. Figures are rounded.
Source: EY analysis.

Macroeconomic impact

The EY Macroeconomic Model is used to estimate the economic impact of the stricter interest expense limitation. This model simulates how markets respond to policy changes (e.g., workers leaving one business may then be employed by a different business, albeit at a potentially lower wage). This contrasts to the adverse effects before market adjustments.

Relative to the levels of economic activity under an EBITDA-based 163(j) baseline, the stricter EBIT-based 163(j) interest expense limitation is estimated to reduce job equivalents by 60,000 jobs in each of the first ten years and 130,000 jobs each year thereafter. Additionally, it is estimated to reduce US GDP by $10 billion annually over the first ten years and $15 billion annually in each year thereafter (relative to the size of the 2023 US economy).[i]

[i] The estimated effects on GDP depend to an extent on how the tax revenue is used by the government. The estimates in this report assume that the revenue is returned to the private sector by an increase in government transfer payments, which is a standard assumption. To the extent this revenue is used for other purposes (e.g., productivity-enhancing infrastructure spending) results could differ from those presented.

Contents

Economic impact of a stricter 163(j) interest expense limitation

I. Introduction

Section 163(j) of the Internal Revenue Code limits the deduction for business interest expense. The Tax Cuts and Jobs Act (TCJA), enacted in December 2017, significantly altered Section 163(j) of the Internal Revenue Code. Specifically, it generally disallowed the deductibility for interest expense exceeding 30% of earnings before interest, taxes, depreciation, and amortization (EBITDA). Beginning in 2022, and as enacted under the TCJA, a stricter limitation based on companies' earnings before interest and taxes (EBIT) went into effect. Of the OECD countries with an earnings-based interest expense limitation, none other than the United States have an EBIT-based interest expense limitation.[1]

The current law limitation, generally equivalent to interest expense exceeding 30% of EBIT, excludes companies' depreciation and amortization from the limitation calculation. This significantly reduces the total amount of interest that can be deducted. The change from EBITDA to EBIT can be especially impactful for taxpayers that make longer-term investments since depreciation and amortization generally arise from expenditures having a useful life of more than one year. Those taxpayers that have not incurred such longer-term investments would generally not see a difference in interest deductibility from the EBIT-based limitation.

By raising the tax burden on investment, limiting the deductibility of interest expense generally increases the cost of capital, discourages investment, and results in less capital formation. A significant portion of the stricter interest expense limitation is estimated to fall on workers through reduced labor productivity, wages, and employment.

This analysis estimates the economic impact of allowing the stricter 163(j) interest expense limitation to stay in effect. Specifically, it examines the EBIT-based 163(j) limitation that went into effect in 2022 relative to the EBITDA-based 163(j) limitation that was in effect from 2018 through 2021.[2]

This analysis presents two sets of results:

- First, the reduction in economic activity before market adjustments is estimated. The adverse effect before market adjustments measures the amount of economic activity disrupted by disallowing this interest expense. Market adjustments reflect the shifting of economic activity elsewhere in the economy to other companies, industries, and sectors.
- Second, the EY Macroeconomic Model is used to estimate the economic impact of the stricter interest expense limitation. This model simulates how markets respond to policy changes (e.g., workers leaving one business may then be employed by a different business, albeit at a potentially lower wage). This contrasts to the adverse effects before market adjustments.

II. 163(j) limitation on interest expense

As displayed in Table 1, the TCJA, enacted in December 2017, put in place a significantly altered 163(j) interest expense limitation. This limitation was relaxed in response to the COVID-19 pandemic. Beginning in 2022, and as enacted under the TCJA, a stricter EBIT-based limitation went into effect.

In particular, the major changes to the 163(j) limitation during this 2018 through 2022 period include:

- The TCJA, enacted in December 2017, significantly altered Section 163(j) of the Internal Revenue Code. Specifically, it generally disallowed tax deductions for interest expense exceeding 30% of EBITDA.
- The CARES Act, enacted in March 2020, temporarily eased the limitation on the deductibility of interest expense by increasing the threshold for tax deductibility from 30% to 50% for tax years 2019 and 2020 and further allowed the use of a company's 2019 EBITDA income in the 2020 calculation.
- In 2021, the interest expense deductibility threshold returned to 30% of EBITDA.
- Beginning in 2022, 163(j) became more restrictive, with the threshold being set to 30% of EBIT (instead of EBITDA).

Table 1. 163(j) interest expense limitation over time

2018	2019-2020	2021	2022 & after
Deductibility threshold is **30% of EBITDA**	Deductibility threshold is **50% of 2019 EBITDA**	Deductibility threshold is **30% of EBITDA**	Deductibility threshold is **30% of EBIT**
163(j) interest expense limitation **made more restrictive**	**CARES Act loosened** 163(j) interest expense limitation threshold	Interest expense deductibility threshold **returned to** 30% in 2021	163(j) interest expense limitation **became more restrictive** starting in 2022
Internal Revenue Code generally disallows tax deductions for interest expense exceeding 30% of EBITDA (i.e., operating profit)	Threshold to maintain tax deductibility loosened from 30% to 50%; further, allowed use of 2019's EBITDA in the 2020 calculation	Loosened threshold from the CARES Act expired	Current law disallows tax deductions for interest expense exceeding 30% of EBIT

Illustration of interest expense limitation

Table 2 displays a high-level example of how the 163(j) interest expense limitation is calculated. The example illustrates the change in tax liability due to a switch from an EBITDA-based 163(j) limitation to a stricter EBIT-based limitation.

The illustrative company is assumed to have constant EBITDA ($1,000,000), EBIT ($600,000), and interest expense ($250,000) in 2021 and 2022. In 2021, the company's interest expense ($250,000) is below the $300,000 deductibility threshold (EBITDA x 30% = $1,000,000 x 30% = $300,000). In 2022, the illustrative company now calculates its deductibility threshold as 30% of EBIT rather than 30% of EBITDA. Only $180,000 (EBIT x 30% = $600,000 x 30% = $180,000) of its $250,000 in interest expense can be deducted, increasing taxable income by $70,000 ($250,000 - $180,000 = $70,000). Therefore, the company's tax liability increases by $14,700 in 2022 ($70,000 x 21% = $14,700).

Table 2. Illustration of stricter 163(j) interest expense limitation

	2021	2022
EBITDA	$1,000,000	$1,000,000
EBIT	$600,000	$600,000
x Deductibility threshold (%)	30% of EBITDA	30% of EBIT
= Deductibility threshold ($)	$300,000	$180,000
Interest expense	$250,000	$250,000
- Deductible interest expense	$250,000	$180,000
= Disallowed interest expense	$0	$70,000
Change in taxable income	$0	$70,000
x tax rate	21%	21%
= Change in tax liability	$0	$14,700

Source: EY analysis.

Estimating disallowed interest expense

There are limited publicly available company-level data on EBITDA, EBIT, and net interest expense as they would appear on a company's tax return. While tax return data available from the Internal Revenue Service (IRS) allow for the calculation of EBITDA, EBIT, and net interest, those data are aggregated at the industry level and, therefore, do not provide a clear view of interest expense disallowed under the limitation. The aggregation across companies in the publicly available tax return data from the IRS generally prevents the computation of disallowed interest with any reasonable level of precision. For example, calculating the interest expense limitation for two individual companies separately can lead to a different result than calculating the interest expense limitation when aggregating their data and calculating the interest expense limitation.

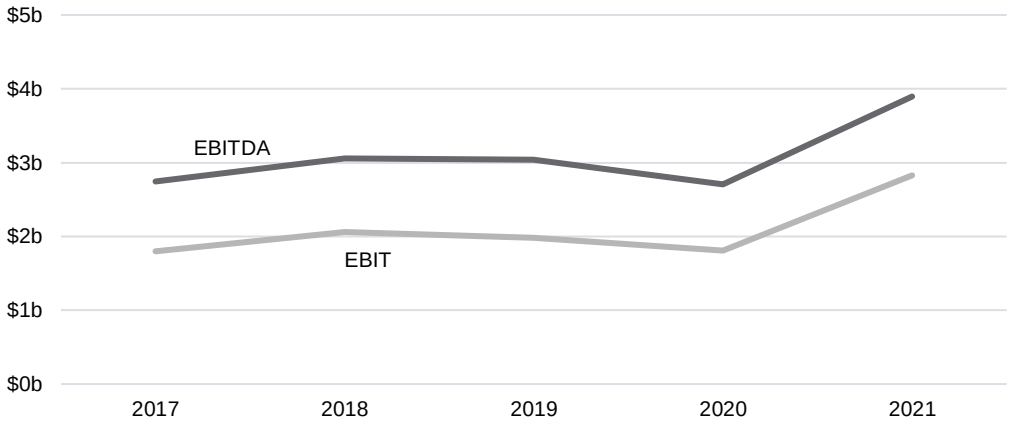
To address this shortcoming, this analysis combines the publicly available IRS tax return data with company-level financial statement data from S&P Capital IQ for more than 3,000 companies

in 2019.[3] The 2019 company level data, prior to the COVID-19 pandemic, were assumed to represent a normal operating year. The aggregated interest expense from IRS data are distributed to the S&P Capital IQ company-level data. This creates a company-level dataset with a level of interest expense that corresponds to the IRS tax return data. Estimates of the disallowed interest expense can then be made at the company level on the basis of the combined data. This approach takes the EBITDA, EBIT, interest expense, and interest income found in the company-level financial statement data but scales the levels to match the industry-level IRS tax return data, by industry. As a final step, these combined data are then calibrated to aggregate estimates produced by the Congressional Budget Office (CBO).[4]

Trends in company interest expense, EBITDA, and EBIT

The interest expense and cash flow of companies has fluctuated over the past five years with the onset of and recovery from the COVID-19 pandemic. Figure 1 displays the EBITDA (i.e., "operational income") and EBIT for public nonfinancial companies from 2017 through 2021.

Figure 1. EBITDA and EBIT of public nonfinancial companies



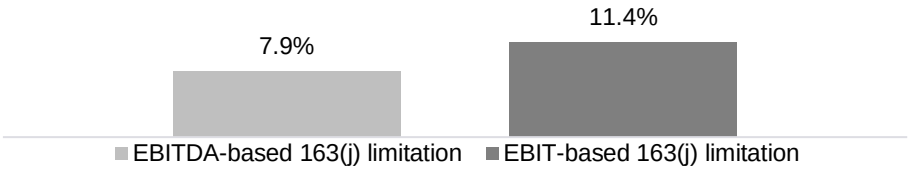
Source: S&P Capital IQ; EY analysis.

The interest expense of nonfinancial public companies prior to COVID-19 (2017-2019 period) was, on average, $337 billion annually. In 2020, the interest expense of public nonfinancial companies was $326 billion. It increased to $334 billion in 2021. Cash flow in the years prior to COVID-19 was, on average, $2.9 trillion (EBITDA) and $1.9 trillion (EBIT). In 2020, EBITDA was $2.7 billion, and EBIT was $1.8 billion. In 2021, these increased to $3.9 trillion (EBITDA) and $2.8 trillion (EBIT).

Estimating the incremental disallowed interest expense

This analysis finds that disallowed interest expense comprises about 7.9% of total interest expense in a normal operating year (defined in this analysis as 2019) under the 30% EBITDA-based 163(j) limitation and increases to about 11.4% of total interest expense under the 30% EBIT-based limitation, as shown in Figure 2.[5] This represents a 44% increase in disallowed interest expense.

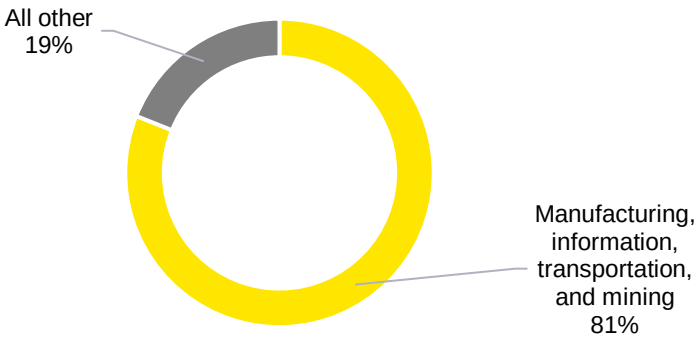
Figure 2. Disallowed interest under the 30% EBITDA-based and EBIT-based interest expense limitations in a normal operating year



Note: Estimates in figure are for the corporate sector. The share of interest expense disallowed in the pass-through sector is, on average, smaller than for the corporate sector. Most disallowed interest expense is in the corporate sector.
Source: EY analysis.

As displayed in Figure 3, 81% of incremental disallowed interest expense occurs in the manufacturing, information, transportation, and mining industries.[6]

Figure 3. Interest expense disallowed from EBIT-based limitation relative to EBITDA-based limitation, share by industry group



Note: Industry definitions follow the North American Industry Classification System (NAICS). Estimates are for the corporate sector. Figures are rounded.
Source: EY analysis.

III. Disrupted economic activity

This section presents the estimated reduction in economic activity before market adjustments. The adverse effect before market adjustments measures the amount of economic activity disrupted by disallowing this interest expense. Market adjustments include that, to some degree, affected economic activity will shift elsewhere in the economy to other companies, industries, and sectors.

Disallowing interest expense via the stricter EBIT-based 163(j) interest expense limitation increases the cost of capital and, consequently, reduces investment in the US economy and that adversely affects jobs, employee compensation, and GDP.

These estimates were produced using an input-output model of the US economy. Investment effects were used as an input to estimate the reduction in economic activity before market adjustments. See the appendix for more information on methodology.

Results are presented for employment, employee compensation, and GDP:

- **Employment.** Employment is measured as the total headcount of workers. For example, a company with three full-time workers and a company with two full-time workers and one part-time worker would both be measured as having three workers.
- **Employee compensation.** Employee compensation includes employee cash compensation and benefits. Employee compensation is a component of GDP.
- **GDP.** GDP measures a sector's contribution to the production of all final goods and services produced in the United States.

Economic activity is measured as the sum of direct, indirect (supplier-related), and induced (consumption-related) activity:

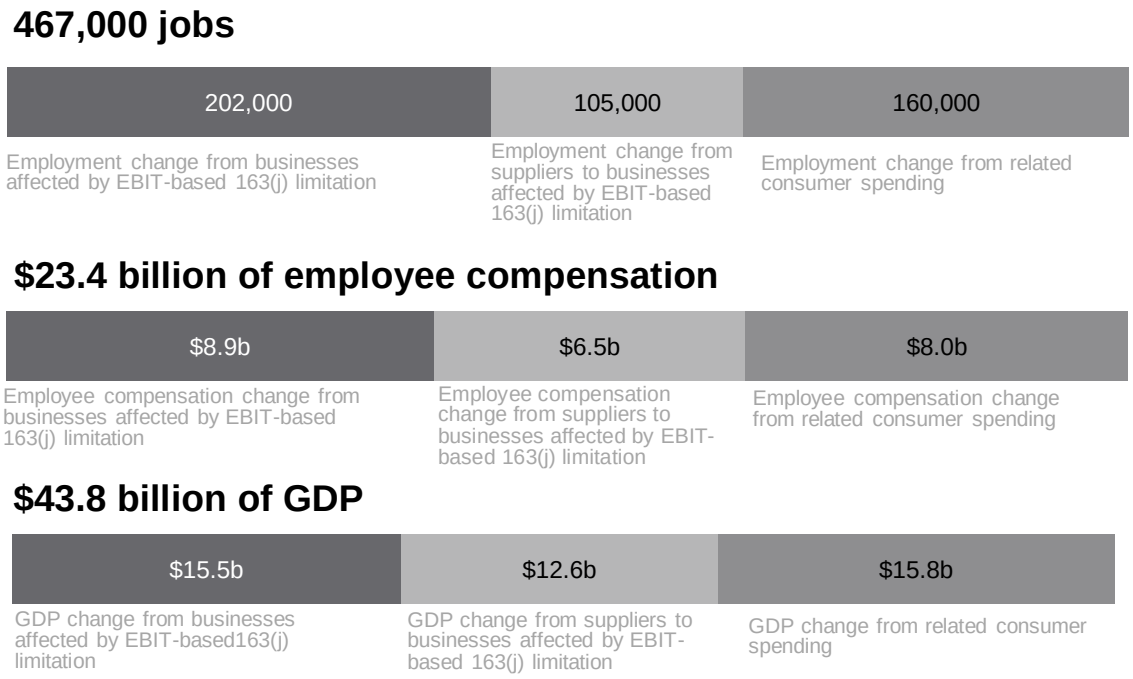
- **Direct economic effects** are the changes at companies where tax liability increases as a result of the stricter interest expense limitation.
- **Supply chain effects** occur when companies affected by the stricter interest expense limitation change their purchases of goods and services from suppliers, causing changes in their suppliers' economic activity. Purchases of these products and services can lead to additional rounds of economic activity as suppliers purchase operating inputs from their own suppliers.
- **Related consumer spending effects** occur when there is a change in the amount of employee compensation at companies affected by the stricter interest expense limitation and their suppliers, which in turn affects consumer spending that supports economic activity at other businesses (e.g., grocery stores and restaurants). The earnings spent on food at a restaurant, for example, support jobs at the restaurant as well as at farms, transportation companies, and other businesses involved in the restaurant's supply chain.

As seen in Figure 4, the reduction in economic activity before market adjustments is 467,000 workers earning $23.4 billion of compensation and generating $43.8 billion in GDP. This consists

of the direct operations from businesses making use of the interest expense, suppliers to businesses affected by the stricter limitation, and related consumer spending. Generally, two-thirds to three-quarters of this adverse effect occurs within 10 years. Employee compensation is a component of GDP.

The annual reduction in economic activity before market adjustments at directly affected companies is 202,000 workers earning $8.9 billion and generating $15.5 billion in GDP. The annual adverse effect at suppliers before market adjustments is 105,000 workers earning $6.5 billion and generating $12.6 billion in GDP. The annual adverse effect from a reduction in related consumer spending is 160,000 workers earning $8.0 billion of compensation and generating $15.8 billion of GDP.

Figure 4. Reduction in jobs, employee compensation, and GDP from EBIT-based 163(j) interest expense limitation before market adjustments



Note: Market adjustments include, for example, that some workers adversely affected could find jobs elsewhere albeit with potentially lower wages. Estimates are scaled to the size of the US economy in 2023. Estimates are presented for the long run; generally, two-thirds to three-quarters of the long-run result occurs within 10 years. Estimates are relative to an EBITDA-based 163(j) limitation baseline. Figures are rounded.
Source: EY analysis.

IV. Macroeconomic impact

This section presents the estimated macroeconomic impacts. Specifically, the EY Macroeconomic Model is used to estimate the macroeconomic impact of an EBIT-based 163(j) limitation relative to an EBITDA-based 163(j) limitation. This model simulates how markets respond to policy changes (e.g., workers leaving one business may then be employed by a different business, albeit at a potentially lower wage). This contrasts to the adverse effects before market adjustments (Section III).

By raising the tax burden on investment, a stricter interest expense limitation increases the cost of capital, which discourages investment and results in less capital formation. With less capital available per worker, labor productivity falls. This reduces the wages of workers and, ultimately, GDP and Americans' standard of living.

EY Macroeconomic Model

The economic impacts are estimated using the EY Macroeconomic Model, an overlapping generations model similar to models used by the CBO, Joint Committee on Taxation (JCT), and US Department of the Treasury to analyze changes in tax policy.[7]

The EY Macroeconomic Model includes a detailed modeling of industries and inter-industry linkages. Businesses choose the optimal mix of capital and labor based on relative prices and industry-specific characteristics. Each industry has a different relative size of capital, labor, and intermediate inputs associated with its output. This model is designed to include key economic decisions of businesses and households affected by tax policy, as well as major features of the US economy. The post-tax returns from work and savings are incorporated into business and households' decisions on how much to produce, save, and work.

A description of the EY Macroeconomic Model can be found in Appendix B.

Use of revenues

An important element of these policy simulations is that they generate revenue, which creates opportunities inherent with the use of these revenues. The revenue could be used, for example, to reduce preexisting taxes, fund additional government spending or transfers, or reduce the federal deficit. This analysis assumes that the revenue is used to fund government transfers. Government transfer programs are assumed not to boost private sector productivity or private sector output but could achieve other policy objectives.[8]

Macroeconomic estimates

Relative to levels under an EBITDA-based 163(j) baseline, the stricter EBIT-based 163(j) interest expense limitation is estimated to have the following economic impacts (relative to the size of the 2023 US economy):

> **Job equivalents.** A significant portion of the stricter interest expense limitation will fall on workers through reduced labor productivity, wages, and employment. The tax change is estimated to decrease job equivalents by approximately:[9]

- 60,000 jobs in each of the first ten years; and
- 130,000 jobs each year thereafter.

Gross domestic product. The stricter interest expense limitation is estimated to decrease US GDP by:

- $10 billion annually over the first 10 years; and
- $15 billion annually in each year thereafter.

More detailed results can be seen in Appendix B.

V. Caveats and limitations

Any modeling effort is only an approximate depiction of the economic forces it seeks to represent, and the economic models developed for this analysis are no exception. Although various limitations and caveats might be listed, several are particularly noteworthy:

- **Estimated macroeconomic impacts are based on a stylized depiction of the US economy.** The models used for this analysis are, by their very nature, a stylized depiction of the US economy. As such, they cannot capture all of the detail of the US economy, the existing US tax system, or the proposed tax changes.
- **This analysis presents estimates before and after market adjustments.** The adverse effect before market adjustments measures the amount of economic activity disrupted by disallowing this interest expense. Market adjustments reflect the shifting of economic activity elsewhere in the economy to other companies, industries, and sectors. In contrast, the EY Macroeconomic Model is used to estimate the economic impact of the stricter interest expense limitation. This model simulates how markets respond to policy changes (e.g., workers leaving one business may then be employed by a different business, albeit at a potentially lower wage).
- **Macroeconomic estimates are sensitive to how tax revenue from the policy change is used.** Because tax and spending policies must ultimately be funded (e.g., tax cuts must ultimately be paid for), it is not possible to separate entirely the impact of a given tax increase from the impact of the use of the revenues it may generate. Revenue raised in this analysis must eventually be used in some way and how the revenue is used can affect the estimated impacts. Typical uses of the revenue in analyses like this have included deficit reduction, government spending or transfer increases, tax reductions, or a combination thereof. Assuming different uses of the revenue could produce different results than those obtained in this analysis.
- **Full employment model.** The EY Macroeconomic Model, like many general equilibrium models, focuses on the longer-term incentive effects of policy changes. It also assumes that all resources throughout the economy are fully employed; that is, there is no slackness in the economy (i.e., a full employment assumption with no involuntary unemployment). Any increase in labor supply is a voluntary response to a change in income or the return to labor that makes households choose to substitute between consumption and leisure. To provide a high-level measure of the potential employment impacts, a job equivalents measure has been included in this analysis' results. Job equivalent impacts are defined as the change in total labor income divided by the baseline average labor income per job.
- **Estimated macroeconomic impacts limited by calibration.** This model is calibrated to represent the US economy and then forecast forward. However, because any particular year may reflect unique events and also may not represent the economy in the future, no particular baseline year is completely generalizable.
- **Industries are assumed to be responsive to normal returns on investment.** The industries comprising the United States economy in the EY Macroeconomic Model are assumed to be responsive to the normal returns on investment. This contrasts to industries that earn economic profits and thereby have an increased sensitivity to statutory tax rates relative to marginal effective tax rates.

Appendix A. Input-output model of the US economy

This analysis uses an input-output model of the US economy to estimate the economic contribution of the interest expense that would be deductible if not for the stricter interest expense limitation. The economic multipliers used for this analysis were estimated using the 2019 IMPLAN input-output model. IMPLAN is used by more than 500 universities and government agencies and includes the interaction of more than 500 industry sectors, thus identifying the interaction of specific industries affected by the stricter interest expense limitation. Direct investment effects were used as an input to estimate the overall economic activity supported by the interest expense that would be disallowed.

The multipliers in the IMPLAN model are based on the Leontief production function, which estimates the total economic requirements for every unit of direct output in a given industry based on detailed inter-industry relationships documented in the input-output model. The input-output framework connects commodity supply from one industry to commodity demand by another. The multipliers estimated using this approach capture all of the upstream economic activity (or backward linkages) related to an industry's production by attaching technical coefficients to expenditures. These output coefficients (dollars of demand) are then translated into dollars of value added and labor income and number of employees based on industry averages.

- **Employment.** Employment is measured as the total headcount of workers. For example, a company with three full-time workers and a company with two full-time workers and one part-time worker would both be measured as having three workers.
- **Employee compensation.** Employee compensation includes employee cash compensation and benefits. Employee compensation is a component of GDP.
- **GDP.** GDP measures a sector's contribution to the production of all final goods and services produced in the United States

Economic activity is measured as the sum of direct, indirect (supplier-related), and induced (consumption-related) activity:

- **Direct economic effects** are the changes at companies where tax liability increases as a result of the stricter interest expense limitation.
- **Supply chain effects** occur when companies affected by the stricter interest expense limitation change their purchases of goods and services from suppliers, causing changes in their suppliers' economic activity. Purchases of these products and services can lead to additional rounds of economic activity as suppliers purchase operating inputs from their own suppliers.
- **Related consumer spending effects** occur when there is a change in the amount of employee compensation at companies affected by the stricter interest expense limitation and their suppliers, which in turn affects consumer spending that supports economic activity at other businesses (e.g., grocery stores and restaurants). The earnings spent on food at a restaurant, for example, support jobs at the restaurant as well as at farms, transportation companies, and other businesses involved in the restaurant's supply chain.

Appendix B. EY Macroeconomic Model

The EY Macroeconomic Model used for this analysis is similar to those used by the CBO, JCT, and US Treasury Department.[10] In this model, changes in tax policy affect the incentives to work, save and invest, and to allocate capital and labor among competing uses. Representative individuals and firms incorporate the after-tax return from work, savings, and investment, into their decisions on how much to produce, save, and work.

The general equilibrium methodology accounts for changes in equilibrium prices in factor (i.e., capital and labor) and goods markets and simultaneously accounts for the behavioral responses of individuals and businesses to changes in taxation (or other policies). Behavioral changes are estimated in an overlapping generations (OLG) framework, whereby representative individuals with perfect foresight incorporate changes in current and future prices when deciding how much to consume and save in each period of their lives.

High-level description of model's structure

Production

Firm production is modeled with the constant elasticity of substitution (CES) functional form, in which firms choose the optimal level of capital and labor subject to the gross-of-tax cost of capital and gross-of-tax wage. The model includes industry-specific detail through use of differing costs of capital, factor intensities, and production function scale parameters. Such a specification accounts for differential use of capital and labor between industries as well as distortions in factor prices introduced by the tax system. The cost of capital measure models the extent to which the tax code discriminates by asset type, organizational form, and source of finance.

The industry detail included in this model corresponds approximately with three-digit North American Industry Classification System (NAICS) codes and is calibrated to a stylized version of the US economy. Each of 36 industries has a corporate and pass-through sector except for owner-occupied housing and government production. Because industry outputs are typically a combination of value added (i.e., the capital and labor of an industry) and the finished production of other industries (i.e., intermediate inputs), each industry's output is modeled as a fixed proportion of an industry's value added and intermediate inputs to capture inter-industry linkages. These industry outputs are then bundled together into consumption goods that consumers purchase.

Consumption

Consumer behavior is modeled through use of an OLG framework that includes 55 generational cohorts (representing adults aged 21 to 75). Thus, in any one year, the model includes a representative individual optimizing lifetime consumption and savings decisions for each cohort aged 21 through 75 (i.e., 55 representative individuals) with perfect foresight. The model also distinguishes between two types of representative individuals: those that have access to capital markets (savers) and those that do not (non-savers or rule-of-thumb agents).

Non-savers and savers face different optimization problems over different time horizons. Each period non-savers must choose the amount of labor they supply and the amount of goods they

consume. Savers face the same tradeoffs in a given period, but they must also balance consumption today with the choice of investing in capital or bonds. The model assumes 50% of US households are permanently non-savers and 50% are permanently savers across all age cohorts.

The utility of representative individuals is modeled as a CES function, allocating a composite commodity consisting of consumption goods and leisure over their lifetimes. Representative individuals optimize their lifetime utility through their decisions of how much to consume, save, and work in each period subject to their preferences, access to capital markets, and the after-tax returns from work and savings in each period. Representative individuals respond to the after-tax return to labor, as well as their overall income levels, in determining how much to work and thereby earn income that is used to purchase consumption goods or to consume leisure by not working. In this model the endowment of human capital changes with age — growing early in life and declining later in life — following the estimate of Altig et al. (2001).[11]

Government

The model includes a simple characterization of both federal and state and local governments. Government spending is assumed to be used for either: (1) transfer payments to representative individuals, or (2) the provision of public goods. Transfer payments are assumed to be either Social Security payments or other transfer payments. Social Security payments are calculated in the model based on the 35 years in which a representative individual earns the most labor income. Other transfer payments are distributed on a per capita basis. Public goods are assumed to be provided by the government in fixed quantities through the purchase of industry outputs as specified in a Leontief function.

Government spending in the model can be financed by collecting taxes or borrowing. Borrowing, however, cannot continue indefinitely in this model. Eventually, the debt-to-GDP ratio must stabilize so that the government's fiscal policy is sustainable. The model allows government transfers, government provision of public goods, or government tax policy to be used to achieve a selected debt-to-GDP ratio after a selected number of years. This selected debt-to-GDP ratio could be, for example, the initial debt-to-GDP ratio or the debt-to-GDP ratio a selected number of years after policy enactment.

Modeling the United States as a large open economy

The model is an open economy model that includes both capital and trade flows between the United States and the rest of the world. International capital flows are modeled through the constant portfolio elasticity approach of Gravelle and Smetters (2006).[12] This approach assumes that international capital flows are responsive to the difference in after-tax rates of return in the United States and the rest of the world through a constant portfolio elasticity expression. Trade is modeled through use of the Armington assumption, wherein products made in the United States versus the rest of the world are imperfect substitutes.

Table B-1. Key model parameters

Intertemporal substitution elasticity	0.4
Intratemporal substitution elasticity	0.6
Leisure share of time endowment	0.4
International capital flow elasticity	3.0
Capital-labor substitution elasticity	0.8
Adjustment costs	2.0

Source: Key model parameters are generally from Joint Committee on Taxation, *Macroeconomic Analysis of the Conference Agreement for H.R. 1, The 'Tax Cuts and Jobs Act,'* December 22, 2017 (JCX-69-17) and Jane Gravelle and Kent Smetters, "Does the Open Economy Assumption Really Mean that Labor Bears the Burden of a Capital Income Tax?" *Advances in Economic Analysis and Policy,* 6(1) (2006): Article 3.

Table B-2. Macroeconomic impact of a stricter interest expense limitation

	First ten years	Long run
Gross domestic product	-0.04%	-0.06%
Consumption	0.02%	-0.05%
Investment	-0.28%	-0.14%
After-tax wage rate	-0.01%	-0.06%
Labor supply	-0.03%	-0.02%
Private capital	-0.04%	-0.14%
Job equivalents	-0.04%	-0.08%
Annual impacts relative to 2023 US economy		
GDP	-$10b	-$15b
Job equivalents	-60k	-130k

Note: Macroeconomic impacts for an EBIT-based 163(j) interest expense limitation are presented relative to the level of economic activity under a baseline with an EBITDA-based 163(j) interest expense limitation. Job-equivalent impacts are defined as the change in labor income divided by baseline average income per job. Changes are relative to the 2023 US economy. Long-run denotes when the economy has fully adjusted to the policy change; generally, 2/3 to 3/4 of this long-run impact occurs within 10 years.
Source: EY analysis.

Endnotes

[1] The OECD is the Organisation for Economic Co-operation and Development. See, for example, OECD, *Corporate Tax Statistics Second Edition*, 2020. Also, see, PwC, *Economic analysis of EBIT-based business interest expense limitation*, June 2021 (Prepared for the American Investment Council).
[2] The scope of this study is limited to the federal tax impacts of the change in interest deductibility. Further impacts are likely in states that implement the federal interest limitation as a component of their state tax systems.
[3] The analysis includes public companies traded on a major US exchange. Companies in the finance and insurance industries are excluded.
[4] Specifically, the analysis was calibrated to be consistent with Congressional Budget Office, *CBO's Model for Estimating the Effect That Federal Taxes Have on Capital Income from New Investment: Working Paper 2022-01*, February 2022.
[5] Estimates in figure are for the corporate sector. The share of interest expense disallowed in the pass-through sector is, on average, smaller than for the corporate sector. Most disallowed interest expense is in the corporate sector.
[6] Industry results are for the corporate sector.
[7] See, for example, Shinichi Nishiyama, "Fiscal Policy Effects in a Heterogeneous-Agent Overlapping-Generations Economy With an Aging Population," Congressional Budget Office, Working Paper 2013-07, December 2013; Joint Committee on Taxation (JCT), *Macroeconomic Analysis of the 'Tax Reform Act of 2014,'* February 2014 (JCX-22-14); JCT, *Macroeconomic Analysis of Various Proposals to Provide $500 Billion in Tax Relief*, March 2005 (JCX-4-05); and, US Department of the Treasury, *The President's Advisory Panel on Federal Tax Reform, Simple, Fair, & Pro-Growth: Proposals to Fix America's Tax System*, November 2005.
[8] This analysis includes a stylized modeling of government transfer programs via a rebate to households. Any particular policy proposals should be explicitly modeled to estimate its effects.
[9] Job equivalents summarize the impact of both the reduction in hours worked and reduced wages. Specifically, the total change in labor income is divided by average labor income per job.
[10] See, for example, Shinichi Nishiyama, "Fiscal Policy Effects in a Heterogeneous-Agent Overlapping-Generations Economy With an Aging Population," Congressional Budget Office, Working Paper 2013-07, December 2013; Joint Committee on Taxation (JCT), *Macroeconomic Analysis of the 'Tax Reform Act of 2014,'* February 2014 (JCX-22-14); JCT, *Macroeconomic Analysis of Various Proposals to Provide $500 Billion in Tax Relief*, March 2005 (JCX-4-05); and, US Department of the Treasury, *The President's Advisory Panel on Federal Tax Reform, Simple, Fair, & Pro-Growth: Proposals to Fix America's Tax System*, November 2005.
[11] See David Altig, Alan Auerbach, Laurence Koltikoff, Kent Smetters, and Jan Walliser, "Simulating Fundamental Tax Reform in the United States," *American Economic Review,* 91(3) (2001): 574-595.
[12] See Jane Gravelle and Kent Smetters, "Does the Open Economy Assumption Really Mean That Labor Bears the Burden of a Capital Income Tax?" *Advances in Economic Analysis and Policy,* 6(1) (2006): 1-42.