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Expensing as a Tax Incentive for Business Investment

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Prepared for

Verizon Communications Inc.

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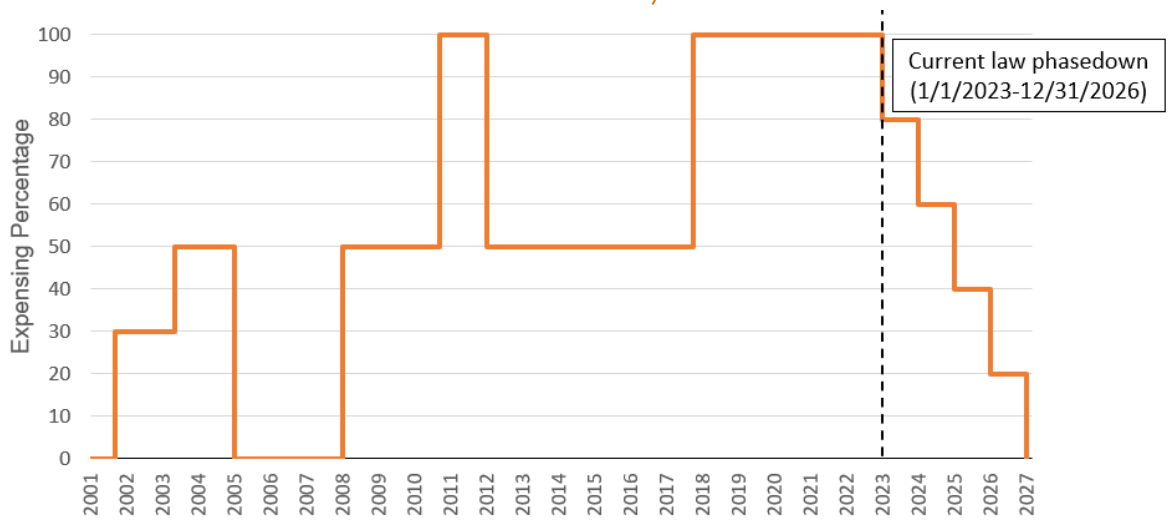
Executive Summary

Investment in certain depreciable property used in business activities in the United States is eligible for a first-year depreciation deduction for its full cost if placed in service prior to December 31, 2022.[1] This deduction is known as full expensing, 100-percent expensing, or 100-percent "bonus depreciation."

For eligible property placed in service after December 31, 2022, the amount of the asset's depreciable basis that may be expensed is scheduled to phase down by 20 percentage points each year, with the portion that is not expensed to be depreciated over the asset's normal recovery period.[2] Under this phasedown, the percentage of the cost of new investment that may be expensed will be 80 percent for investments made in 2023, 60 percent for investments made in 2024, 40 percent for investments made in 2025, and 20 percent for investments made in 2026. Investments made after 2026 will be depreciated over the assets' depreciable lives with no portion eligible to be expensed.

As shown in **Figure 1**, full or partial expensing has been provided as an investment incentive for eligible US business investment in all but three years since 2001, with rates ranging between 30 percent and 100 percent through 2022.

Figure 1. – Full and Partial Expensing, Prior Law and Current Law Phasedown, 2001-2027



Note: Expensing percentages are for qualified property. Certain property with longer production periods and transportation property remain eligible for a higher expensing percentage beyond the end dates shown.

This report provides a review of the use of accelerated depreciation and expensing as an investment incentive, how expensing lowers the user cost of capital and is intended to stimulate investment, and several recent economic studies evaluating the effectiveness of full and partial expensing.

[1] Certain property with longer production periods and transportation property are eligible for the deduction if placed in service by December 31, 2023.
[2] The starting year and ending year of the phasedown is extended by one year for certain property with longer production periods and transportation property.

Among the findings highlighted in this study:

- Accelerated depreciation and expensing can have a significant impact on business investment by lowering the after-tax cost of purchasing new capital. This result has been established in a large number of empirical studies. Macroeconomic estimates by the Joint Committee on Taxation also find that expensing increases business investment.[3]
- Expensing does not change the overall amount deducted by a business for the purchase of new investment, it merely accelerates the timing of those deductions to the first year. The first-year deduction creates an investment incentive because it is received immediately by the business whereas depreciation allowances received in later years are discounted by the business for the time value of money. Relative to depreciation taken over an asset's life, the incentive from expensing is greater when discount rates are higher, such as occurs with higher inflation.
- As noted by Summers (1987), when businesses value future depreciation allowances using higher discount rates than the government's borrowing rate, by accelerating depreciation deductions the government can create an investment incentive that has greater value to business than the present value cost to the government. This benefit is created without increasing the overall amount that a business may deduct for the cost of new investment.
- Expensing has been shown to have a substantial impact on investment in eligible property. One recent study finds that expensing raised investment in qualified property by 10.4 percent between 2001 and 2004 (when 30-percent and 50-percent expensing applied) and by 16.9 percent between 2008 and 2010 (when 50-percent expensing applied except for four months when 100-percent expensing applied).[4] Another recent study finds that expensing increased investment in qualified property by 15.8 percent between 2001 and 2011.[5]
- One recent study examines the effects of expensing on investment and employment. The study finds that manufacturing plants that are expected to receive the greatest incentive to increase investment from expensing increased their employment by 9.5 percent relative to other plants. The increase in employment is greatest for production workers. Expensing is found to increase the share of female workers by 3.2 percent, the share of Hispanic or Latino workers by 8.5 percent, and the share of Black workers by 1.6 percent.[6]

[3] See, for example, US House of Representatives (2014) and Joint Committee on Taxation (2017).
[4] Zwick and Mahon (2017).
[5] Curtis, Ohrn, Roberts, and Suárez Serrato (2022).
[6] Ibid.

1. Introduction

Investment in certain depreciable property used in business activities in the United States is eligible for a first-year depreciation deduction for its full depreciable basis if placed in service prior to December 31, 2022.[7] This deduction is known as "full expensing" (100-percent expensing) or 100-percent "bonus depreciation."

After 2022, under present law, the amount of an asset's depreciable basis that may be expensed is scheduled to phase down by 20 percentage points each year.[8] In 2023, 80 percent of the depreciable basis of newly placed-in-service eligible property may be expensed, with the remaining 20 percent of the asset's depreciable basis deducted over the asset's otherwise applicable depreciation schedule. In 2024, 60 percent of the depreciable basis of newly placed-in-service eligible property may be expensed, with the remaining 40 percent depreciated over the asset's depreciable life. In 2025, 40 percent of the depreciable basis of newly placed-in-service eligible property may be expensed, with the remaining 60 percent depreciated over the asset's depreciable life. In 2026, 20 percent of the basis of newly placed-in-service eligible property may be expensed, with the remaining 80 percent depreciated over the asset's depreciable life. After 2026, property will be depreciated over its depreciable life with no portion eligible to be expensed.

Full or partial expensing has been permitted on a temporary basis for eligible US business investment in all but three years since 2001.

- Partial expensing was first enacted in 2002 at a rate of 30 percent to help stimulate the economy by encouraging investment in eligible property. The provision was enacted with retroactive effect to September 2001.
- Legislation enacted in 2003 increased the percentage expensed to 50 percent through the end of 2004.
- Expensing was not in effect between 2005 and 2007.
- In response to the 2008-2009 recession, 50-percent expensing was reinstated in separate measures in 2008, 2009, and 2010.
- Following President Obama's proposal in 2010, the expensing percentage was increased to 100 percent through 2011 and returned to 50 percent in 2012.
- Subsequent legislation extended 50-percent expensing on a temporary basis after 2012, and these extensions continued until 100-percent expensing was reinstated for property placed in service after September 27, 2017.

Appendix A provides a legislative history of expensing.

[7] Certain property with longer production periods and meeting other requirements qualifies for full expensing if placed in service by December 31, 2023. Qualified property is generally defined to include tangible property with a Modified Accelerated Cost Recovery System (MACRS) recovery period of 20 years or less, certain computer software, water utility property, and property which is a qualified film, television, or theatrical production. Property predominantly used outside the United States is not eligible for expensing, with certain exceptions principally for transportation property operated to and from the United States.

[8] The starting year and ending year of the phase down is extended by one year for certain property with longer production periods and transportation property.

In addition to serving as a near-term fiscal policy tool to stimulate the economy, expensing and other incentives to increase business investment can provide long-term economic benefits. An increase in the amount of business capital, such as equipment and factories, increases labor productivity, defined as the amount of output that can be produced relative to the total hours worked by the labor force. Over time, increases in labor productivity are closely related to increases in real wages.[9]

Over the past 70 years, the increase in capital intensity in the US economy – that is, the amount of business capital relative to the size of the labor force – has increased labor productivity by an average of 0.9 percent per year.[10]

Another way in which labor productivity can increase is through total factor productivity growth, which reflects growth in output beyond producing with additional amounts of labor and capital. Total factor productivity growth reflects the efficiency with which capital and labor are used to produce output, including technological advances in production.[11] In some cases, technological advancements may be embodied in new capital, so that these advancements can only be incorporated in production through new investment. This may be another source of economic growth that can be attained by increasing investment.[12]

An increase in US business investment also increases the nation's capacity to produce goods and services within the United States, making the country more resilient to shortages in production from overseas suppliers.

President Obama's 2010 proposal for 100-percent temporary expensing included Treasury Department analysis explaining the proposal was designed to increase investment activity and "spur the growth of incomes and jobs for Americans."[13] The Treasury Department noted that "the weight of the empirical evidence" of the prior periods in which partial expensing had been in effect was that it had "produced a positive investment response."[14]

In adopting full expensing in 2017, the Senate Finance Committee stated that "The Committee believes that providing full expensing for certain business assets will accelerate purchases of equipment and other assets, and promote capital investment, modernization, and growth."[15] The House Ways and Means Committee also expressed its belief that increased capital investment

[9] Stansbury and Summers (2018) find that each percentage point increase in labor productivity is associated with a 0.7 to 1.0 percentage point increase in median and average wages.
[10] Sprague (2021). While the historical average annual contribution of capital intensity was 0.9 percent over the period 1948-2018, it increased at a higher rate of 1.3 percent from 1997 to 2005 and has slowed to 0.7 percent from 2005 to 2018.
[11] Solow (1957).
[12] Sakellaris and Wilson (2004) estimate that embodied technical change is responsible for a significant share of labor productivity growth, implying that new investment results in meaningful increases in output beyond that attainable from an equal amount of older capital.
[13] US Department of Treasury, Office of Tax Policy, *The Case for Temporary 100 Percent Expensing: Encouraging Business to Expand Now by Lowering the Cost of Investment*, October 29, 2010, p. 11.
[14] Ibid.
[15] Senate Finance Committee explanation included in US Senate, Committee on the Budget, *Reconciliation Recommendations Pursuant to H. Con. Res. 71* (S. Rpt. 115-20), December 2017, p. 140.

from expensing would promote economic growth and further noted that full expensing "will eliminate depreciation recordkeeping requirements" for qualifying assets.[16]

The outline of this paper is as follows. Section 2 discusses how accelerated depreciation and expensing can serve as an investment incentive. Section 3 discusses the existing economic research on investment incentives and research that focuses specifically on recent experience of expensing in the United States. Section 4 provides a brief conclusion.

2. Expensing and Accelerated Depreciation as an Investment Incentive

Depreciation and Expensing

Businesses are permitted to recover the cost of their investments in equipment and structures in determining taxable income. The cost of these investments is recovered through a deduction for depreciation. In the absence of a deduction for depreciation, business income would be overstated by representing just the revenue earned from making an investment, but not the expense incurred to generate that revenue.

The tax code's depreciation rules determine how the cost of an investment is recovered, specifically, the number of years over which depreciation deductions are claimed and the annual amount of the deductions. Under accelerated depreciation, the depreciation deductions are accelerated to the earlier years of an asset's useful life, while not changing the total amount that is ultimately deducted. Under full expensing, the cost of an investment is recovered fully in the year the investment is placed in service, with no further depreciation deductions permitted in later years. **Appendix B** provides examples showing how depreciation is deducted under the Modified Accelerated Cost Recovery System (MACRS) and with expensing.

Incentive Effects of Accelerated Depreciation and Expensing

For a business with positive taxable income, a given amount deducted in an earlier year has a greater present value than the same amount deducted in a later year.[17] As a result, the present value of a stream of depreciation deductions increases when those deductions are accelerated to the earlier years.

While the acceleration of depreciation deductions to earlier years does not increase the total amount of depreciation deductions taken over an asset's entire recovery period, the increase in present value has economic value to a business and can be viewed as reducing the required return to undertaking new investment, often referred to as the user cost of capital. The reduction in the user cost of capital from the acceleration of depreciation deductions increases the economic return for a business to undertake additional investment, and thereby serves as an investment incentive.

[16] US House of Representatives, Committee on Ways and Means, *Tax Cuts and Jobs Act* (H. Rpt. 115-409), November 13, 2017, p. 232.
[17] The present value depends on the discount rate a business applies to future amounts. The higher the discount rate, the smaller is the present value of the future amount. Discount rates increase with higher real interest rates and/or higher inflation rates.

In addition to reducing the user cost of capital, the acceleration of depreciation deductions improves the cash flow of the business in the year an investment is undertaken. Cash flow is also increased on an ongoing basis in future years for businesses that increase the amount they invest each year. For businesses that are cash-constrained and are either unable to obtain external financing or can only obtain it at a high cost, accelerated depreciation can provide the cash to undertake additional investment. Businesses with access to external financing can use the enhanced cash flow to reduce their reliance on external funds. Fazzari, Hubbard, and Petersen (1988) find that cash flow plays an important role in the determination of investment, especially for firms facing financing constraints.

Accelerated depreciation has long been understood by economists and policymakers to serve as an investment incentive by increasing the after-tax return to new investment and improving cash flow. US tax law over time has provided for increasingly accelerated forms of depreciation.[18] Full expensing can be seen as the most accelerated form of accelerated depreciation.

Accelerated depreciation is widely used in major countries around the world. Of 77 countries included in a 2022 survey conducted by the OECD, 65 provide some form of accelerated depreciation.[19] Countries currently providing temporary full expensing include Canada, Chile, and the United Kingdom.[20] A number of US states have also provided for expensing.[21]

The Importance of Expensing During Periods of Inflation

Inflation increases interest rates, including the interest rates businesses use to calculate the present value of the stream of future depreciation allowances on their investments. When an asset is depreciated over multiple years, a higher interest rate reduces the present value of the depreciation deductions. The smaller present value of these deductions effectively raises the after-tax cost of making an investment.[22]

In contrast, under full expensing, the entire cost of the investment is deducted in the same year the asset is placed in service, eliminating the effect of a higher interest rate from inflation affecting the present value of the expensing deduction.[23] Mathematically, under full expensing, the present value of depreciation per dollar of investment is always $1.00. The present value of

[18] Increasingly accelerated forms of depreciation were enacted in 1954, 1962, 1971, and 1981. The rate of accelerated depreciation was increased for some assets under the Tax Reform Act of 1986 from 150-percent declining balance to 200-percent declining balance for 3-year, 5-year, 7-year, and 10-year property, while extending the recovery periods for some property. Expensing is also provided for small businesses for limited amounts of investment under a separate and permanent tax provision under Internal Revenue Code section 179, which was first enacted in 1958.
[19] OECD, *Corporate Tax Statistics*, fourth edition, November 2022, p. .17.
[20] Canada provides full expensing for manufacturing property acquired after November 20, 2018 and before 2024. Chile provides full expensing for investments made between June 1, 2020 and December 31, 2022. The United Kingdom enacted a 130-percent super deduction for certain business property for investment made between April 1, 2021 and March 31, 2023. PwC, *Worldwide Tax Summaries* and HM Treasury, *Guidance, Super-deduction,* March 3, 2021.
[21] See Ohrn (2019) and Walczak (2019).
[22] The reduction in the present value of depreciation allowances was found to be the primary effect of inflation on the cost of capital in Cohen, Hassett, Hubbard (1999).
[23] This ignores any delay between the time the investment is made and the first-year tax deduction is claimed.

depreciation allowances under other depreciation methods, such as MACRS, is always less than $1.00 and decreases as the recovery period increases and decreases as the interest rate increases.

The difference in the present value of depreciation per dollar of investment under full expensing relative to MACRS depreciation is shown in **Table 1** for different assets under alternative inflation rates. Inflation rates are assumed to vary between 0 percent and 6 percent.

Table 1. – Increase in Present Value of Depreciation Allowances under Full Expensing Relative to MACRS Depreciation (Per Dollar of Investment)

Property	Inflation rate			
	0%	2%	4%	6%
3-year property	$0.04	$0.05	$0.07	$0.08
5-year property	$0.07	$0.10	$0.12	$0.15
7-year property	$0.09	$0.14	$0.17	$0.21
10-year property	$0.13	$0.19	$0.24	$0.28
15-year property	$0.22	$0.31	$0.37	$0.43
20-year property	$0.28	$0.38	$0.45	$0.51

Note: Present values are computed assuming a real interest rate of 4 percent and a nominal interest rate equal to the real interest rate plus the indicated inflation rate. There is no discounting of the depreciation allowance in the first year.

As shown in **Table 1**, the present value of expensing relative to MACRS depreciation increases as the inflation rate increases. This is because the present value of MACRS depreciation allowances decreases as the inflation rate increases. At a 6-percent inflation rate, the benefit from full expensing relative to MACRS depreciation is roughly twice as large as when there is no inflation for 3-year property through 15-year property.

Even when there is no inflation, full expensing confers a benefit relative to MACRS depreciation. This is because real interest rates are positive, and therefore the nominal interest rate used to discount future depreciation allowances is also positive.

The Benefit of Expensing When Businesses Use Higher Discount Rates than the Government

The cost of borrowing to a business is higher than the cost to the federal government given the federal government's ability to repay its debts through its taxing power. As a result, businesses may discount future depreciation allowances using a higher discount rate than the government's borrowing rate.

Summers (1987) surveyed chief financial officers of Fortune 500 companies on the discount rate that they used to value depreciation allowances. Summers finds these discount rates to be relatively high. He concludes that accelerated depreciation can be an efficient investment

incentive as the gain to the business from the accelerated deduction exceeds the revenue foregone by the government in present value:[24]

> If firms discount future tax benefits at a rate higher than the government borrowing rate, tax incentives can be enhanced with no increase in the government's permanent cost by restructuring tax incentives to move the benefits forward, without changing the present value of the revenue foregone. ... Still greater frontloading of tax incentives is possible through accelerating depreciation allowances, since this policy keeps the sum of the deductions that can be taken on an investment constant while increasing their present value.

Because full expensing provides an immediate deduction for the cost of an investment, it provides the greatest acceleration of deductions possible, while maintaining the same total amount of depreciation over the life of an asset.

Expensing is a Neutral Investment Incentive

A desirable feature of a tax system is for it not to alter the ranking of investment projects. That is, a project that is more profitable than another project on a pretax basis remains more profitable on an after-tax basis. A permanent system of expensing has this feature when tax rates are stable over time.[25] All other neutral systems of tax depreciation require precise knowledge of the rate of economic depreciation of all assets and appropriate consideration of the nominal discount rate used to calculate the present value of tax depreciation to not alter the ranking of investment projects.[26]

Depreciation systems such as MACRS are constructed with the intention of providing more rapid tax depreciation for assets with faster rates of economic depreciation and slower tax depreciation for assets with slower rates of economic depreciation, but true rates of economic depreciation are unknown, and the same asset may have different rates of economic depreciation depending on the particular use of the asset. The assignment of recovery periods and depreciation methods to particular assets under MACRS, as with any tax depreciation schedule other than full expensing, is based on broad assumptions and simplifications to minimize administrative complexity.

Full expensing is both simple to administer and results in an investment incentive that is neutral across expensed assets when tax rates do not change over time.

[24] Summers (1987), p. 302.
[25] Johansson (1969). Expensing is not neutral if tax rates change over time; see Lyon (1990).
[26] See Samuelson (1964) and Johansson (1969).

3. Recent Economic Studies on Expensing and Investment Incentives

This section provides an overview of the theory and evidence regarding the effects of taxation on investment. The empirical research generally finds that changes in the after-tax cost of investment affect the level and timing of investment activity.[27]

Overview and Summary of Investment Response to Tax Incentives

Auerbach (2005) provides a theoretical framework for analyzing the effects of tax policy on investment based on the user cost of capital. This framework demonstrates that the impact of tax policy will differ with respect to the type of policy (changes in tax rates versus depreciation deductions), the timing of the policy (immediate or deferred), and the duration of the policy (temporary versus permanent changes).

Because changes in the user cost of capital arising from changes in tax law can be estimated more precisely than changes from other components of the cost of capital, one method to estimate the responsiveness of investment to the user cost of capital is to focus on years in which a major tax reform occurred and to account for the varying impact of the tax reform on the user cost of capital of different assets. Using this approach, Auerbach and Hassett (1991) find significant effects from the Tax Reform Act of 1986 on investment. Cummins, Hassett, and Hubbard (1994) find that following every major tax reform since 1962, tax incentives have had a significant impact on business investment. Studies in other countries have also found significant effects of tax incentives on business investment.[28]

Recent Research on the Effectiveness of Expensing

This section focuses on studies examining the effect of expensing on business investment prior to 2017, when 30-percent, 50-percent, and 100-percent expensing applied in different years.

Zwick and Mahon (2017) estimate the effect of expensing between 2001 and 2010 on investment by over 120,000 public and private companies based on the companies' confidential tax return filings with the Internal Revenue Service.

Zwick and Mahon find that expensing had a substantial effect on investment, raising investment in eligible property by an average of 10.4 percent between 2001 and 2004 and by 16.9 percent between 2008 and 2010 relative to investment in property not eligible for expensing. Only 30-percent and 50-percent expensing were available in the 2001-2004 period and 50-percent expensing was available for most of the 2008-2010 period, except for four months in which 100-percent expensing was available.

House and Shapiro (2008) use quarterly data on economy-wide business investment in particular assets to examine the effectiveness of expensing between 2001 and 2004, a period during which only 30-percent and 50-percent expensing were available. House and Shapiro find

[27] For further details, see Hassett and Hubbard (2002).
[28] See, for example, Maffini, Xing, and Devereux (2019), who find enhanced first-year depreciation allowances in the United Kingdom resulted in increased business investment.

large investment responses for property for which the benefits of expensing relative to MACRS depreciation were greatest. House and Shapiro conclude that their results "clearly show that the policy had a substantial stimulative impact on investment."[29]

The Treasury Department (2010) used estimates by House and Shapiro (2008), and earlier analysis by House and Shapiro (2006), to extrapolate the likely response to the Obama Administration's 2010 proposal for temporary 100-percent expensing.[30] House and Shapiro estimate that 50-percent expensing increased aggregate business investment (including business investment not qualifying for 50-percent expensing) by 1.8 percent in the first quarter after enactment in 2003 and that investment continued to rise. Assuming a 1.8 percent increase in investment at 2010 investment levels and adjusting for 100-percent expensing, Treasury estimated that the Administration's proposal would increase investment by $50 billion. Treasury also noted that other research would suggest an even larger investment response.

A more recent study by Curtis et al. (2022) uses plant-level data of manufacturing firms to examine the response of investment to expensing between 2001 and 2011. Their analysis finds that manufacturing plants that benefited most from expensing – defined as those plants ranked in the top one-third of benefit from expensing relative to MACRS depreciation – increased investment by 15.8 percent relative to other plants. Since 100-percent expensing was only available from September 2010 through 2011, most of the analysis in this study relates to periods in which 30-percent and 50-percent expensing applied.

Some have suggested that the incentive effect of expensing may be reduced when the economy is weak or in recession. In February 2010 testimony, Douglas W. Elmendorf, Director of the Congressional Budget Office, stated that "firms may be less likely to increase investment when they have idle capacity and when they are less confident about the future demand for their products and services."[31]

If the incentive effects on investment are reduced during these periods, then the effect of expensing on business investment found in the 2001-2004 and 2008-2011 periods examined by researchers, which included recessions and were characterized in part by rising rates of unemployment, might understate the effect found during stable economic periods and periods such as experienced recently of high demand and under capacity.

The empirical results reported in Cummins, Hassett, and Hubbard (1994), however, suggest that investment incentives are equally important in stimulating investment in recession years as at other points in the business cycle.[32] Many of the historical periods of tax reform examined by Cummins, Hassett, and Hubbard were of tax incentives put in place during recessionary periods. Expensing also increases cash flow, which may be reduced during periods of low demand. The increase in cash flow may assist businesses facing financial constraints that would otherwise

[29] House and Shapiro (2008), p. 738.
[30] US Department of Treasury, Office of Tax Policy, *The Case for Temporary 100 Percent Expensing: Encouraging Business to Expand Now by Lowering the Cost of Investment*, October 29, 2010.
[31] Congressional Budget Office, "Policies for Increasing Economic Growth and Employment in the Short Term," Statement of Douglas W. Elmendorf, Director, prepared for the Joint Economic Committee, February 23, 2010.
[32] See, for example, Table 5 (pp. 31-32) and Table 9 (pp. 42-43), Cummins, Hassett, and Hubbard (1994).

limit new investment. Zwick and Mahon (2017) find a greater investment response from expensing for financially constrained firms than for other businesses.

Impact of Expensing on Output and Jobs

Examining the effects on manufacturing plants of expensing between 2001 and 2011, Curtis et al. (2022) find that expensing increased the plants' investment and employment. By 2011, they find that manufacturing plants that benefited most from expensing increased their employment by 9.5 percent more than other plants.[33] The increases in employment were more concentrated among production workers than nonproduction workers. Relative employment of production workers increased by 11.5 percent, a 40-percent greater increase than the 8.1 percent increase in relative employment of non-production workers.

Given the greater increase in employment of workers operating production machinery, Curtis et al. (2022) conclude that capital and labor are complements in production in modern manufacturing rather than substitutes.

Curtis et al. (2022) also find that expensing increased the share of female workers by 3.2 percent, the share of Hispanic or Latino workers by 8.5 percent, and the share of Black workers by 1.6 percent. They find that expensing had larger employment effects among workers that are paid less on average and conclude that expensing "disproportionately helped disadvantaged workers at a time when their employment prospects in the manufacturing sector were dwindling."[34]

House and Shapiro (2006) estimate the employment, output, and investment impacts of the 30-percent and 50-percent expensing provided during 2001-2004. Under baseline assumptions they find that aggregate business investment was 1.8 percent above trend following enactment in 2003.

For a range of specifications and assumptions, House and Shapiro (2006) find that 50-percent expensing increased GDP by between 0.1 percent and 0.2 percent and was responsible for the creation of 100,000 to 200,000 jobs in 2003.[35]

The staff of the Joint Committee on Taxation (JCT) has also provided analysis of the macroeconomic effects on investment, GDP, and government tax revenue of legislative proposals to extend expensing.[36]

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[33] Curtis et al. (2022) treat plants ranked in the top one-third of benefit from expensing relative to MACRS depreciation per dollar of investment as being in the category of benefiting most from expensing.
[34] Curtis et al. (2022), pp. 23-24.
[35] As noted above, US Treasury (2010) incorporate the investment estimates of House and Shapiro (2006) in its projections of the investment response to President Obama's proposal for temporary 100-percent expensing.
[36] The JCT is a nonpartisan committee of the US Congress. The staff of the JCT assists the tax-writing committees and Members of Congress with the development and analysis of legislative proposals and is responsible for preparing official revenue estimates of all tax legislation considered by Congress. House rules from 2003 through 2017 and the fiscal year 2016 and 2018 budget resolutions agreed to by the House and Senate required cost estimates for major legislation to incorporate macroeconomic effects (House Rule XIII; S.Con.Res. 11 (114th Congress), Section 3112; and H.Con.Res. 71 (115th Congress), Section 4107 and Section 5107).

In 2015, JCT provided macroeconomic analysis of Senate Finance Committee-reported legislation to extend 50-percent expensing for two years along with an extension of other individual and business provisions in the Tax Relief Extension Act of 2015.[37] Although JCT's macroeconomic analysis was for the legislation in its entirety, the JCT noted that the temporary extension of 50-percent expensing was expected to have the most significant impact on business investment.

JCT estimated that the two-year extension of all provisions was expected to result in an initial increase in the amount of business capital of about 0.3 percent in the first five years of the budget period, which in turn would result in an increase in production, output, and receipts of about 0.1 percent during that period.[38]

JCT estimated that the resulting increase in business capital and production would increase tax revenues by $17.2 billion over the 10-year budget period. Slightly higher interest rates from an increase in federal borrowing were projected to result in increased payments of interest on the federal debt of $6.8 billion over the budget period. The net deficit reduction therefore from these macroeconomic effects of the two-year extension of all provisions was estimated to be $10.4 billion over 2016-2025. By comparison, the revenue cost of extending 50-percent expensing for two years was estimated by JCT at $3.6 billion over the budget period, before consideration of the net deficit-reducing macroeconomic effects.

In 2014, JCT provided macroeconomic analysis of House-passed legislation to make permanent 50-percent expensing.[39] JCT analyzed the bill using two alternative models (a macroeconomic equilibrium growth model and an overlapping generations model) and alternative assumptions about the Federal Reserve's monetary policy response and other parameters. The results were similar across all specifications and models.

JCT's 2014 analysis finds that permanent 50-percent expensing would increase the amount of business capital by between 0.4 percent and 0.5 percent for the first five years of the budget period, increasing to between 0.8 percent and 1.4 percent over the last five years of the 10-year budget period, relative to the then-present law baseline.[40] JCT found that GDP would increase by 0.1 percent for the first five years of the budget period, increasing to 0.2 percent over the last five years of the 10-year budget period.

Analysis of the Tax Cuts and Jobs Act

The Tax Cuts and Jobs Act of 2017 (TCJA) provides another opportunity to examine the effects of tax policy on business investment. TCJA increased temporary expensing from 50 percent to 100 percent and extended the period in which investment would qualify for expensing. In addition, among other provisions, TCJA reduced the corporate tax rate from 35 percent to

[37] Joint Committee on Taxation, *A Report to the Congressional Budget Office of the Macroeconomic Effects of the "Tax Relief Extension Act of 2015," as ordered to be Reported by the Senate Committee on Finance* (JCX-107-15), August 4, 2015.
[38] *Ibid.*, p. 2.
[39] US House of Representatives, Committee on Ways and Means, *Bonus Depreciation Modified and Made Permanent* (H. Rpt. 113-509), July 3, 2014.
[40] Ibid. JCT also reports that the bill would result in a decline in the amount of residential capital of approximately 0.1 percent, as some investment is shifted from residential capital (which does not qualify for expensing) to business capital (which does).

21 percent, implemented new limitations on interest expense, limited the use of net operating losses, repealed the deduction for income from manufacturing, and made various changes to the taxation of foreign earnings. Some of these business provisions would be expected to have positive effects on business investment, while others might deter investment. TCJA also provided reductions in individual income taxes, including for unincorporated business income.

The Council of Economic Advisers (2019) presented data showing that the growth in aggregate business investment in 2018 surpassed prior year trends. It also found that the types of property with the greatest increase in investment had the largest reductions in the user cost of capital, consistent with the enactment of 100-percent expensing and lower corporate tax rate being responsible for the growth in investment.

Analysis by Kopp et al. (2019) also found that growth of aggregate business investment in 2018 was significantly greater than had been anticipated prior to TCJA, and was greater than in other advanced economies. However, they believe that much of that growth can be attributed to businesses responding to an increase in aggregate demand (in part, arising from the individual income tax reductions in TCJA), rather than from reductions in the user cost of capital.

Since Kopp et al. only seek to explain the change in aggregate business investment rather than changes in investment across industries or types of assets that may have been differentially affected by expensing, they note that other factors, such as rising tariffs and trade uncertainty, could have contemporaneously offset or masked a positive contribution to business investment from TCJA's reduction in the user cost of capital. They don't explicitly reject tax incentives as having increased business investment; rather they believe the expected increase in business investment from the increase in aggregate demand is sufficient to account for most of the increase in aggregate business investment.

Gale and Haldeman (2021) state that "business fixed investment did in fact grow at a faster rate post-TCJA than pre-TCJA" but they too suggest that tax incentives for business investment were not responsible for this growth.[41]

The Joint Committee on Taxation (2017) provided a macroeconomic analysis of TCJA contemporaneous with its enactment. JCT estimated that the legislation would increase the amount of business capital by 0.9 percent and GDP by 0.7 percent over the 10-year budget period. The analysis notes that "The extension of bonus depreciation in the bill is an important contributor to increased investment incentives created by the bill." The analysis of the macroeconomic impacts also notes that "phasing out of bonus depreciation and the special deduction for pass-through income are expected to slow the rate of new investment."

The Congressional Budget Office (2018) (CBO) estimated that TCJA would result in a greater amount of business investment in every year of the 10-year budget period.[42] CBO estimated the greatest increase in investment for equipment, which benefited from the enactment of 100-percent expensing. CBO estimated that the effects on business investment from a lower user cost

[41] Gale and Haldeman (2021), p. 900. Among other factors, they cite greater investment in oil- and mining-related investments from higher oil prices as accounting for almost all the growth in business investment in 2018. Kopp et al. (2019), however, conclude that "the oil sector's role in driving overall business investment growth in 2018 was relatively small." (p. 6)
[42] Congressional Budget Office (2018), p. 117.

of capital are greater than the effects from higher aggregate demand, in contrast to Kopp et al. (2019).

The breadth of the tax changes made by TCJA make it more difficult to isolate the independent effect of 100-percent expensing on business investment. In addition, the significant impact of the coronavirus pandemic on the economy in 2020 and 2021 may limit the ability to examine the effect of TCJA on aggregate business investment in those years.

Further study of the actual changes in investment in different types of assets that takes account of how they are differentially affected by the enactment of 100-percent expensing under TCJA – as considered in prior studies examining expensing over the 2001 through 2011 periods – will shed more insight on the responsiveness of investment to expensing and other tax incentives. That said, there is no theoretical reason why business investment would be responsive to 30-percent or 50-percent expensing during the earlier periods studied, but not 100-percent expensing under TCJA.[43]

4. Conclusion

Expensing accelerates the depreciation deductions for new business investment to the first year an investment is placed in service, but does not change the overall amount of depreciation deductions that are claimed with respect to the investment over its life. By reducing the cost of capital and increasing cash flow of businesses, expensing has been found to increase business investment. Prior proposals to extend and increase expensing have also been estimated by the US Treasury Department in a 2010 report, the JCT, and CBO to increase business investment.[44]

Recent empirical analyses find significant increases in business investment from expensing. Findings from this research include:

- House and Shapiro (2006 and 2008), using aggregate investment data, estimate that 50-percent expensing increased total business investment by 1.8 percent in 2003. They also estimate that the increase in investment increased employment by 100,000 to 200,000 jobs in 2003.
- Zwick and Mahon (2017), using tax return data, find partial expensing increased investment in eligible property by 10.4 percent between 2001 and 2004 and by 16.9 percent between 2008 and 2010.
- Curtis et al. (2022), using manufacturing plant-level data through 2011, find that manufacturing plants expected to benefit most from partial expensing relative to MACRS depreciation increased their investment by 15.8 percent and increased their employment by 9.5 percent relative to other plants.

Based on the existing research, expensing is likely to result in increased business investment, increased productivity, and greater employment.

[43] Because corporate and passthrough business tax rates were generally reduced under TCJA, the after-tax benefit to a business from the increase in expensing from 50 percent to 100 percent is smaller than if tax rates had been unchanged. The reduction in business tax rates affects the magnitude of the benefit from expensing, but expensing still reduces the user cost of capital and thereby provides an incentive for greater business investment.

[44] US Department of Treasury (2010); Joint Committee on Taxation (2015) and US House of Representatives, Committee on Ways and Means (2014); and Congressional Budget Office (2018).

Appendix A: Legislative History of Expensing

Table A-1. – Effective Dates and Rates of Expensing, 2001-2026

Legislation	Start Date	End Date*	Expensing Percentage
Job Creation and Worker Assistance Act of 2002	9/11/2001	9/10/2004	30%
Jobs and Growth Tax Relief Reconciliation Act of 2003**	5/6/2003	12/31/2004	50%
Economic Stimulus Act of 2008	1/1/2008	12/31/2008	50%
American Recovery and Reinvestment Act of 2009	1/1/2009	12/31/2009	50%
Small Business Jobs Act of 2010	1/1/2010	12/31/2010	50%
Tax Relief, Unemployment Compensation Reauthorization, and Jobs Creation Act of 2010**	9/9/2010	12/31/2011	100%
	1/1/2012	12/31/2012	50%
American Taxpayer Relief Act of 2012	1/1/2013	12/31/2013	50%
Tax Increase Prevention Act of 2014	1/1/2014	12/31/2014	50%
Protecting Americans from Tax Hikes Act of 2015	1/1/2015	12/31/2019	50%
Tax Cuts and Jobs Act of 2017**	9/28/2017	12/31/2022	100%
	1/1/2023	12/31/2023	80%
	1/1/2024	12/31/2024	60%
	1/1/2025	12/31/2025	40%
	1/1/2026	12/31/2026	20%

* The end date is extended for certain property with longer production periods and transportation property.
** Supersedes prior legislation.

Appendix B: Depreciation Deductions with and without Expensing

Under the Modified Accelerated Cost Recovery System (MACRS), the depreciation deductions for a given asset are determined from (i) an applicable recovery period (which determines the number of years deductions are claimed), (ii) an applicable depreciation method (which determines the proportion of the asset's remaining cost deducted each year), and (iii) an applicable convention (which determines how the deduction in the first year the property is placed in service is adjusted to account for the asset being in service for only a portion of the year).

The applicable recovery period under MACRS ranges from three to 50 years, depending on the asset. The applicable depreciation method ranges from straight-line depreciation (under which deductions are taken in equal amounts over the recovery period) to accelerated methods, including the 200-percent declining balance method, which in the first year provides a deduction that is twice the amount that would be calculated using the straight-line method. The applicable convention for equipment is normally a half-year convention, which reduces the deduction in the first year by half.

As an example, depreciation deductions under MACRS for 5-year property to which the 200-percent declining balance method and half-year convention apply are shown in **Table B-1** as a percent of the asset's cost:

Table B-1. – MACRS Depreciation Percentages for 5-year Property

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
20%	32%	19.2%	11.52%	11.52%	5.76%	100.0%

In this example, the full cost of the 5-year property is recovered over six tax years, with the half-year convention responsible for the recovery period being stretched out one additional tax year. The deduction in Year 1 is 20 percent, calculated as one-half (from the half-year convention) times 200 percent (from use of the 200-percent declining balance method) divided by 5 (the 5-year property's recovery period). The 200-percent declining balance method is applied in Year 2 and Year 3 to the remaining basis at the beginning of each year, resulting in a deduction of 40 percent of the remaining basis each year. In Year 4, the recovery method switches to straight-line over the 2-1/2 year remaining recovery period (because straight-line provides a greater deduction), resulting in equal deductions in Year 4 and Year 5, and half that amount in Year 6, when the final half-year deduction is claimed.

Under full expensing, the entire cost of the asset is recovered through a depreciation deduction in Year 1, with no additional depreciation provided in later years. **Table B-2** illustrates these depreciation deductions as a percent of the asset's cost:

Table B-2. – Full Expensing Depreciation Percentages for 5-year Property

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
100%	0%	0%	0%	0%	0%	100.0%

In years in which 30-percent and 50-percent expensing were permitted, the annual depreciation deduction was determined by treating a percentage of the investment as expensed (30 percent or 50 percent, respectively) and depreciating the remaining portion under MACRS depreciation.

For example, under 50-percent expensing, the depreciation deduction for 5-year property in Year 1 was equal to 60 percent of the asset's cost, calculated as the sum of 50 percent (the expensed percentage) plus 10 percent (the 50 percent not expensed times the 20-percent first-year deduction under MACRS). **Table B-3** shows the depreciation percentages for each year for 5-year property under 50-percent expensing.

Table B-3. – 50-percent Expensing Depreciation Percentages for 5-year Property

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
60%	16%	9.6%	5.76%	5.76%	2.88%	100.0%

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