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Temporary Investment Incentives

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Temporary investment incentives can provide investment demand stimulus to support economic recovery from the COVID-19 pandemic. This note describes temporary investment tax incentives and reviews their effectiveness. Its purpose is not to advocate the use of tax incentives, but to highlight important considerations, should governments contemplate using them. To maximize their effectiveness, these investment incentives be highly circumscribed in duration and target investment spending as directly as possible. Cross-border coordination is desirable to capture the positive spillovers of the stimulus to other countries. Well-designed, temporary, provisions of accelerated depreciation provide the most cost-effective forms of investment stimulus in recessions.

I. TEMPORARY INVESTMENT TAX INCENTIVES CAN AID RECOVERY FROM RECESSION

Reports of businesses slashing capital spending budgets amid the COVID-19 pandemic abound. For example, McDonald's plans to cut $1 billion in capital expenditures globally in 2020 and MGM Resorts expects to defer at least 33 percent of planned 2020 U.S. domestic capital expenditures. The new International Data Corporation (IDC) COVID-19 Tech Index of leading indicators for IT spending points toward declines in overall tech spending in 2020. Economic weakness appears likely to persist in the immediate aftermath of the shutdown of non-essential sectors of the economy.

Temporary investment tax incentives reduce the user cost of capital (Box 1) and expire after a short period, typically one to three years. The types of temporary incentives discussed in this note differ from tax holidays, commonly seen in the investment codes of developing countries. A tax holiday is a reduction in the tax rate (possibly to zero) granted to a firm for a defined period, following its decision to invest. Temporary investment incentives qua stimulus begin and expire for all qualifying firms on the same dates.

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The expiration of the incentive at a pre-announced date induces firms to accelerate their spending plans (e.g., purchases of machinery and equipment) to take advantage of the window of opportunity for tax savings.[2] If the temporary business tax cut is perceived by firms as likely to be renewed, the policy loses much of its stimulus punch. Temporary tax incentives are designed as counter-cyclical fiscal instruments and are not intended to improve long-term growth.[3]

The effectiveness of temporary incentives in any country will depend on the structure of its existing tax system and its level of development. For example, in countries with widespread sectoral exemptions or holidays from corporate income tax, temporary tax relief does not benefit the already tax-privileged firms. Furthermore, investment in developing countries may depend more on investor risks and compliance costs, than on tax incentives.[4] Temporary tax incentives as instruments for stimulating investment demand are more appropriate for high- and middle-income countries.

BOX 1. The User Cost of Capital

According to the neoclassical theory of investment behavior, firms invest in physical assets until the gross marginal return from using an additional amount of capital in production equals its marginal cost, where the latter comprises the cost of financing, economic depreciation due to wear and obsolescence, and the payment of all business-related taxes. In the absence of taxation and pre-existing market distortions, the private investment outcome is considered socially efficient. Taxing profits can distort the choices of firms, for instance, when the cost of debt-financing is deductible, while the cost of equity-financing is not. The tax system in that case is said to be "non-neutral," because it may alter the investment and financing choices of businesses away from the optimum.

The tax-inclusive marginal cost of capital is commonly referred to as the "user cost of capital." It can be calculated from economic data and the corporate income tax provisions in the tax code. Changes to the tax system that reduce the user cost of capital, render investments that were previously unprofitable, now worthwhile. The user cost of capital, and the related concept of effective marginal tax rate, can serve, therefore, as summary measures of the fiscal climate for investment. A tax system can be designed to capture above-normal profits, without deterring marginal investments. In that case, the user cost of capital is unaffected by the tax system, the marginal effective tax rate is zero, and economic neutrality is preserved.

II. INVESTMENT INCENTIVES: REDUCING TAXABLE INCOME VERSUS REDUCING TAX RATES

Bonus depreciation—or, in the extreme case, expensing (meaning 100 percent bonus depreciation)—reduces taxable income by allowing more of capital expenditure to be deducted against tax in the current year than the normal depreciation schedule.[5] Expensing, accompanied by the non-deductibility of interest and a constant tax rate, achieves neutrality of the tax system with respect to taxation, meaning that any investment that is

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[2] It is also possible to incentivize current investment spending by pre-announcing a *future tax increase*. However, this tends to raise the future cost of capital and hence can be expected to have a weaker stimulus effect than a temporary tax reduction for an equal-size tax rate change.

[3] Structural enhancements to economic efficiency can be achieved by permanent reform in the design of the corporate income tax. One option, for instance, is full expensing under a cash-flow tax and no deduction of interest (see e.g., IMF 2016). Temporary tax incentives can also be used as a tool to support digitalization, particularly for small- and medium-sized enterprises, to enhance their productivity in the longer run.

[4] See Van Parys and James (2010).

[5] Bonus depreciation and expensing are both forms of the general concept of accelerated depreciation. Accelerated depreciation enhances the present value of depreciation deductions relative to the statutory depreciation schedule, hence improving the after-tax return on investment. To avoid cumbersome terminology, the discussion in the note focuses on "expensing," but bonus depreciation is similar, except that the proportion of investment that can be immediately deducted may be less than 100 percent. The term "bonus depreciation" can be misunderstood: even under "bonus" depreciation, the total depreciation over the asset life is 100 percent. The expression "first-year allowance" is also commonly used to refer to bonus depreciation.

worthwhile in the absence of tax would continue to be so after tax. Intuitively, under such a scheme the government effectively becomes a silent partner in all investments, bearing the same proportion of costs as it receives of all returns. In combination with other provisions, such as interest deductibility, expensing even subsidizes investment. However, for companies in a loss position, the benefit of expensing is postponed (assuming loss carry-forward provisions) to a future year in which they return to profitability, and is diminished in present value if, as is usually the case, interest in not paid on losses carried forward. The effectiveness of expensing can be augmented if it is combined with a generous loss-carry back provision, allowing loss-makers to retroactively apply the deduction to past profitable years, generating a tax refund.

While expensing only changes the time profile of the deduction of investment costs, investment tax credits (ITC) provide businesses tax savings by directly reducing their tax liability by a given fraction of their investment spending.[6] If the ITC is refundable, then a taxpayer receives a cash payment when there is no tax liability to offset. ITCs are regarded as the easiest of the incentives to restrict to incremental investments. However, since the level of investment that would have taken place without the tax benefit is unknown, an arbitrary threshold must be legislated to define eligible capital spending.[7]

Tax rate reductions directly reduce a profitable company's tax liability, but also indirectly increase its taxable income, by eroding the value of depreciation deductions. However, for a profitable firm, using equity-financing of investment, the first effect dominates, so that tax rate cuts incentivize investment. Tax rate cuts provide no benefit, however, to companies in a loss position, which many will find themselves in during a recession.

Temporary tax rate cuts or temporary expensing provisions can be important investment incentives for firms, with an additional beneficial impact for those that are cash constrained.[8] The stimulus is strongest if the tax incentives apply not only to corporations, but to unincorporated proprietorships and partnerships. However, the extension to unincorporated businesses is easier with expensing than with tax rate cuts, because the calculation of taxable business income is the same as for corporations. A notable difference between tax rate cuts and expensing provisions is that tax rate cuts raise the after-tax profits from a company's already existing capital stock, generated by past investments. In contrast, expensing applies only to new investments, which is the desired target. Temporary tax rate cuts can also produce perverse incentives, that can reduce a firm's incentive to invest as the policy approaches its termination date. This occurs because depreciation deductions are applied during the phase of reduced tax rates, leaving the firm with a lower balance of undepreciated assets to apply to taxable income after the tax rates are back to normal.[9] Moreover, temporary tax rate cuts are ineffective for investments that take some time to become profitable (when tax rates are back up). Overall, the investment "bang-for-buck" from tax rate cuts is inferior to that from expensing for the same tax revenue cost.[10]

III. INCENTIVE EFFECTS ARE GREATER FOR LONGER-LIVED ASSETS

For assets with long productive lives (i.e., assets that depreciate slowly), the value of the capital is little affected by marginal shifts in the timing of the investments. Hence, firms can be induced to accelerate their investment

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[6] Whereas an ITC is a tax credit, a first-year investment allowance, is a tax deduction. The two forms of incentives can be made equivalent in terms of tax relief. Sometimes allowances (or ITCs) are granted on top of the statutory depreciation schedule, thereby increasing the size of the tax benefit.

[7] The treatment of leasing agreements also complicates the implementation of incremental investment incentives, because the lessor owns the equipment while the lessee is the user of it.

[8] See Gbohoui (2019).

[9] This consequence of temporary tax rate cuts is diminished if businesses are permitted to carry forward their depreciation allowances until after the rate cut phase, as some countries do with respect to tax holidays.

[10] See, e.g., Edge and Rudd (2011).

plans for long-lived assets to take advantage of the tax break. Consequently, such investments exhibit highly elastic short-term responses to temporary tax incentives. However, while expensing provisions significantly alter the depreciation schedules of long-lived assets, the benefit of expensing is relatively modest for equipment that is short-lived.[11] Reductions of investment spending after the expiration of a temporary tax incentive are likely to be muted for long-lived asset classes, because the reduction in future investment is spread over a long period of time. Examples of equipment with relatively low economic depreciation rates include radio towers, farm buildings, electricity distribution systems, and telephone communication systems.

In some cases, however, the planning and implementation costs associated with long-lived investments can make it difficult for businesses to accelerate their plans for capital investments. For this reason, most stimulus proposals exclude structures. Temporary investment incentives are usually granted to investment placed in service after the effective date, even if ordered long ago, thus raising the size of the tax revenue cost. At the other end of the temporary period, the subsidy is given to all investment ordered before the cut-off date, even if placed in service long after, as otherwise the policy is biased against investments with long lead times. To prevent abuse of the tax measures, temporary policies usually require the investment to be placed in service within three to five years after the cut-off date of the temporary incentive. Acquired intangible assets might be excluded, to prevent acquisitions for profit-shifting motives.

IV. EVIDENCE SUGGESTS THAT TEMPORARY INVESTMENT INCENTIVES GENERATE STRONG INVESTMENT RESPONSES IN THE SHORT TERM

The concept of elasticity is used to report the investment response to a reduction in the user cost of capital, arising from investment incentives. For example, an elasticity of 2 would mean that a 1 percent reduction in the user cost of capital increases investment by 2 percent. To obtain the investment level change due to temporary tax incentives, the elasticity is multiplied by the implied percentage reduction in the user cost of capital. To illustrate, suppose that the user cost of capital per dollar of investment in an asset with a 10-year life, falls from 15.1 percent to 14 percent during the incentive period, as a result of adopting temporary full expensing. The percentage fall in the cost of capital is then approximately 7 percent (100 × 1.1 ÷ 15.1). With an elasticity of 2, investment in that asset class would be predicted to rise by 14 percent in the short term.

The United States introduced temporary bonus depreciation during 2002–04 to address the early 2000s recession.[12] That experience has been extensively analyzed to quantify the effects of temporary investment incentives during and after the policy interval. A short-term investment elasticity of 9 appears as a reasonable point estimate based on the research studies (Box 2). Small- and medium-sized firms show much stronger responses than do public companies.[13] The elasticity may be larger in small open economies, compared to large economies, such as the United States, because domestic interest rates and equipment prices are less likely to rise with investment spending in the case of the first group of countries. When interest rates rise as a result of stimulus spending, some investments are crowded-out by the higher cost of capital.

There is evidence that investment responses weaken during periods of high uncertainty, usually associated with recessions. Companies that consistently invest every year, typically capital-intensive firms, are found to respond

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[11] Evidence for the United States indicates that the investment responses of goods with 10- to 15-year lifespans are more than twice the responses for capital goods with three-year lifespans. See House and Shapiro (2008).

[12] The 2002 Job Creation and Worker Assistance Act (JCWAA) and the 2003 Jobs and Growth Tax Relief Reconciliation Act (JGTRRA) introduced temporary bonus depreciation of 30 percent and 50 percent, respectively, for investments made through to the end of 2004 (with some extensions to 2005), for assets with a recovery period of no more than 20 years. Bonus depreciation was reinstated in 2008 and extended to full expensing for tax years ending between September 2010 and December 2011.The 2018 US tax law allows businesses to fully deduct all capital investment costs up to $1 million during the years 2018–23.

[13] Zwick and Mahon (2017).

to incentives during periods of economic volatility, but companies that had not planned any investment in the absence of the policy tend to be unresponsive to the implementation of incentives during periods of economic uncertainty.[14] This cautious behavior is in contrast to periods of low uncertainty, when both types of firms are observed to respond to new tax incentives.

BOX 2. Estimates of the [Tax-] Elasticity of Investment

A study of US federal tax policy episodes of temporary bonus depreciation from 2001 to 2004 and 2008 to 2010 finds an elasticity of 7.2.[15] The response of small firms is found to be especially large. Another study of the same tax policies reports the elasticity of investment in the United States in the range of 6 and 14.[16] A similar elasticity, 9.7, is obtained from the investment responses of manufacturing firms to US state-level policies of temporary bonus depreciation.[17] These are very large estimated short-term investment responses to temporary bonus depreciation and expensing policies. There is also evidence that the positive effect on investment persists for a few years after the incentive period expires, possibly due to the costs of adjusting capital installations.

According to a study on the investment effects of permanent and temporary tax liability cuts, an (unanticipated) 1 percent cut, increases investment by about 10 percent at its peak, 10 quarters after the implementation date, before decelerating rapidly.[18] The study combines US episodes of tax rate cuts and tax base cuts, both of which reduce the user cost of capital. The authors remark that the temporary 2.86 percent tax liability cut associated with the 2003 JGTRRA "provided a major boost to the economy in the mid-2000s."

Estimates from UK data, based on a comparison of investment responses of qualifying and nonqualifying small- and medium-sized enterprises to bonus depreciation provisions, imply an elasticity of investment of 10.7 at an assumed discount rate of 7 percent, or an elasticity of about 5 at discount rates that may be more realistic for small companies.[19] While the UK policies were permanent, rather than temporary, they are indicative that businesses respond to investment incentives, including partial or full expensing provisions. A similar study on the effect of introducing a permanent policy of expensing in Poland yields an elasticity of 4.[20] The permanent nature of the tax incentives may explain why this estimated elasticity is lower than in the studies of the impacts of temporary bonus depreciation.

V. HOW TO CALCULATE THE PERCENTAGE CHANGES IN THE USER COST

We consider the effects, separately, of (1) introducing temporary bonus depreciation or expensing, (2) introducing a temporary investment tax credit, and (3) temporarily reducing the tax rate on business income. Each of these measures generates a certain percentage change in the user cost of capital. The annex provides the equations used for these calculations. The baseline assumption is a corporate tax rate of 25 percent, straight-line tax depreciation, no ITC, and a nominal interest rate of 5 percent with 1 percent price inflation. The temporary tax incentives are assumed to be announced ahead of the implementation date to give businesses enough time to adjust their spending plans. The impacts of the incentives on the user cost of capital assume that the marginal capital expenditure is equity-financed. If investment is debt-financed, the tax benefit of a rate cut is reduced because the value of the interest deductions is diminished.

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[14] See Guceri and Albinowski (2019).

[15] Zwick and Mahon (2017).

[16] House and Shapiro (2008).

[17] See Ohrn (2019).

[18] See Mertens and Ravn (2012). Their study blends tax liability changes that were meant to be permanent and those meant to be temporary, but their results remain broadly similar when they exclude the eight episodes of temporary cuts from their analysis.

[19] See Maffini, Xing, and Devereux (2019) and Maffini, Xing, and Devereux (2016).

[20] Guceri and Albinowski (2019).

Table 1 shows the percentage reduction in the user cost of capital arising from, respectively, temporary bonus depreciation (for different proportions), a temporary business income tax rate cut of 5 percentage points, and an ITC, each for different lengths of asset lives. For instance, for an asset with a life of 10 years, bonus depreciation reduces the cost of capital by between 1.8 and 7.1 percent, for a bonus depreciation ranging from 25 percent and full expensing; and a one-year reduction in the corporate tax rate by 5 percentage points reduces the cost of capital by between 5.6 and 6.5 percent in the year of the tax cut. As the table shows, assets with longer lives benefit relatively more from a temporary tax rate cut. This arises because the value of depreciation deductions become lower during the phase of the reduced tax rate, and longer-lived assets spend a relatively short part of their lives during that phase. The percentage reduction in the user cost of capital from a temporary ITC is simply equal to 100 × ITC rate for all asset lives. For example, a 10 percent ITC rate generates a 10 percent reduction in the user cost of capital. The tax revenue implications are not equivalent across the policies and would need to be assessed.

TABLE 1. Percentage Reduction in Cost of Capital from Temporary Tax Incentives

	Asset Life			
Bonus Depreciation	**5 Years**	**10 Years**	**15 Years**	**20 Years**
Proportion = 0.25	1.1	1.8	2.3	2.8
Proportion = 0.50	2.1	3.5	4.7	5.6
Proportion = 0.75	3.2	5.3	7.0	8.4
Proportion = 1.00	4.3	7.1	9.3	11.2
Tax Rate Reduction				
5 percentage points	5.6	6.2	6.4	6.5
Investment Tax Credit				
5 percentage points	5.0	5.0	5.0	5.0

VI. AGGREGATE EFFECTS

Economists are often interested in the GDP effect of investment stimulus. The following steps can be used to determine the aggregate effect.

(Step 1) The predicted *percentage change of investment*, resulting directly from temporary incentives, can be evaluated by multiplying the *investment elasticity* (discussed above) by the percentage reduction in the user cost of capital, for the asset categories and businesses to which the policy applies.

(Step 2) The *percentage change in GDP* is obtained by multiplying the predicted percentage change in investment from step 1 by the share of *domestically produced* investment in GDP. This step recognizes that imports of equipment are leakages from domestic GDP. Whereas in the United State about one-third of machinery and equipment investment is imported, in small open economies, such as Canada, a much greater share of it is imported than is domestically produced. In many developing countries, machinery, and equipment is almost entirely imported. However, there may still be some hiring from the investments themselves. Note that the share of total investment (domestically produced and imported) in GDP is typically between 20 and 25 percent.

(Step 3) To obtain the *overall GDP effect* of the stimulus, the percentage change in domestically produced investment demand is multiplied by an assumed *multiplier*. However, the existence of such, second-round, spending effects on GDP is controversial and depend on the state of the economy. Whether tax cuts can boost aggregate spending beyond the size of the tax revenue cost depends on factors such as the impact of the stimulus on interest rates, the stage of the business cycle, and consumer's expectations about future taxes.[21]

There is evidence that the output and employment levels produced by the businesses directly responding to the investment incentives take several years to fully materialize, even though the investment response itself is rapid. This delay creates some risk that the tax incentives mistime the intended contribution to aggregate demand relative to the duration of the recession.[22] The risk is reduced if the window for the temporary tax incentives is kept narrow. Experience with temporary bonus depreciation in the early 2000s recession in the United States also shows focusing on a small subset of investment spending translates to only a modest impact on GDP and employment, despite the strong response of investment in equipment with relatively long asset lives.[23] The stimulus impact of the incentives would be greater if the policy were to apply to a broader group of investment goods.

VII. INTERNATIONAL CONSIDERATIONS

Since part of the demand stimulus from temporary investment incentives leaks to foreign suppliers of the capital goods, countries might individually do too little to boost investment as they fail to incorporate the positive spillover to other countries. International coordination can internalize these spillover effects and make demand stimulus more effective.[24] The nature of temporary tax incentives is that they are expected to have little impact on longer-term capital stocks, which helps to mitigate the concern of countries engaging in tax competition with temporary incentives. Coordination among governments is desirable to ensure the timely expirations of the incentives. During the COVID-19 pandemic, cooperation can avoid a beggar-thy-neighbor approach to incentivizing the acquisition of personal protective equipment and promote positive transboundary health spillovers.

VIII. LEGAL IMPLEMENTATION

To communicate tax policies effectively to investors, and to ensure good governance through fiscal transparency, public accountability, and institutional legitimacy, the temporary tax incentives should be subject to the legislative process and consolidated under the tax law.[25] The eligibility criteria for the incentives must be clearly defined, along with the cut-off date and the rules regarding the period permitted for placing the capital in service.

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[21] See Cwik and Wieland (2011) and Dabla-Norris and Lima (2018).

[22] Ohrn (2019).

[23] House and Shapiro (2008).

[24] Cwik and Wieland (2011).

[25] See IMF (2020).

ANNEX

ANNEX TABLE 1. Symbols and Formulas Used to Calculate Impacts of Investment Incentives

p	Price of the capital asset	
r	Real interest rate	
δ	Economic depreciation rate	
u	Marginal tax rate on business income	
i	Nominal interest rate	
λ	Proportion of capital expenditure treated as a current expense	
D_j	Depreciation rate in j^{th} year after the year of the expenditure	
C_i	User cost of capital with statutory depreciation under policy i	$C_i = p(r + \delta) \times \frac{(1-A_i)}{(1-u)}.$
z	Present value of depreciation deductions with statutory depreciation schedule, per dollar of investment[26]	$z = \sum_{j=1}^{L} \frac{D_j}{(1+i)^j}$
A	Value of depreciation deduction with statutory schedule	$A = uz$
A_B	Value of depreciation deduction with bonus depreciation	$A_B = u \times (\lambda + (1-\lambda)z)$
A_{ITC}	Value of depreciation deduction with investment tax credit	$A_{ITC} = ITC + (1-ITC) \times uz$

The formulas above are used to derive the percentage fall in the user cost of capital, after introducing temporary bonus depreciation at the rate $0 < \lambda \leq 1$ from an initial rate of 0 or a temporary investment tax credit.[27] The effect of a temporary tax cut is more complicated. Not only is the tax rate changing, but the value of the depreciation deduction becomes time-varying.[28] In the case of a temporary tax rate change equal to Δu, lasting for R years, and assuming straight-line depreciation over L years, the user cost of capital for an equity-financed investment is given by

$$C_T = \frac{p(r + \delta) \times (1 - A_T) + (1 + r)\Delta A_T}{1 - u - \Delta u}$$

where $A_T = \frac{u}{iL}\left(1 - \frac{1}{(1+i)^L}\right) + \frac{\Delta u}{iL}\left(1 - \frac{1}{(1+i)^R}\right)$ and $\Delta A = \frac{\Delta u}{(1+i)L}\left(1 - \frac{1}{(1+i)^R}\right)$.

For a tax rate cut, $\Delta u < 0$. The formulas below show the percentage fall in the user cost of capital resulting from temporary bonus depreciation or a temporary tax rate cut of 1 percentage point lasting for one year. The

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[26] Under straight-line depreciation, $Dj=1/L$ in every year, where L is the asset life for tax depreciation purposes. Under a declining balance depreciation, $Dj=(1-)j-1$. These formulas abstract from the half-year rule. More complicated depreciation systems also exist. z is calculated for the normal depreciation schedule.

[27] House and Shapiro (2008).

[28] See Mintz (1990).

scenarios assume the policy is announced in the year before it takes effect. The results of applying the formula for the tax rate cut can be scaled up, approximately proportionately, for larger tax rate reductions.

% Reduction in *C* from introducing bonus depreciation = $100 \times \frac{u(1-z)\lambda}{1-uz}$

% Reduction in *C* per percentage point of tax rate cut = $100 \times \left(\frac{1}{1-u} - \left(\frac{1}{L}\right) \left(\frac{r+\delta-i(1+r)/(1+i)}{(1-uz)(1+i)(r+\delta)} \right) \right)$

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