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Can Accelerated Depreciation Methods Compensate For Inflation In Business Investment Decisions?

By M. Frank Barton, Jr., and
Vernon Dewayne Palmer

Inflation and taxes in combination are probably the two strongest disincentives to capital formation and business investment spending.

*"Inflation, in conjunction with the accounting convention of recording transactions at their historical values, reduces the returns generated by investment projects. In addition, the combined effects of inflation and personal income tax structure tend to drive up the cost of obtaining the funds necessary for a given capital investment program."*¹

In order to present a comparison of returns on investments during periods of inflation we must distinguish between dollar amount returns and purchasing power returns, or *nominal* and *real* rates of return. Normal return refers simply to the number of after-tax dollars cash flow without regard to purchasing power of the different period dollars. In the purchasing power concept, the aftertax dollar flow is converted to represent the *real* ability to purchase goods or services for each period.

Investment Returns with Zero Inflation

Consider a business which purchased an asset for \$350,000 and is expected to yield an annual before-tax net cash receipts of \$100,000 over its expected life of 7 years with no salvage value. The assumed income tax rate is 50%. Straight-line depreciation is used. In a period of zero inflation the purchasing power of the after-tax cash flow would remain constant over the 7-year life of the investment. Table 1 indicates the after-tax cash flow and purchasing power after-tax cash flow for a period of zero inflation. Note that the after-tax cash flow and the purchasing power after-tax cash flow are the same.

Note the present value of after-tax cash flow using various rates of return on investment. This investment would only be selected if the ROI desired were no more than slightly over 10%.

Investment Returns with 5 Percent Inflation Rate

Assume the same investment with a 5% inflation rate. Net cash receipts rise from \$105,000 after the first year

of inflation to \$140,709 after the seventh, however, the depreciation charged against net cash receipts remained the same. The spread between the two increases each year as well as the amount paid out in income taxes. Table 2 indicates the after-tax cash flow and the purchasing power of the after-tax cash flow under a 5% inflation rate. Income taxes increase each year and the purchasing power of the after-tax cash flow becomes smaller each year.

In the first year the purchasing power of the after-tax cash flow was about \$1,200 less; however by the 7th year the after-tax cash flow was about \$7,200 less during a period of 5 percent inflation than in a period of zero inflation.

As the inflation rate increases, the attractiveness of business investments rapidly decreases unless there are some offsetting conditions that could be applied. The choice of an accelerated method of depreciation might be considered. The two most popular types of accelerated depreciation methods are the declining balance and the sum of the years digits. Certain tangible property qualifies for tax purposes for an accelerated basis of depreciation. Also, certain property qualifies for an additional depreciation allowance of 20 percent in the first year.

Consider an investment of \$350,000 in qualifying tangible property, expected life of 7 years, no salvage value using the sum of the years digits method of depreciation. The assumed tax rate is 50 percent. By using an accelerated depreciation method the purchasing power of the after-tax cash flow would be much greater in the early years than in later years. Table 3 indicates the after-tax cash flow and the purchasing power after tax cash flow for each year of the 7-year life of the asset. Possibly this could serve to offset the loss of purchase power by inflation. A comparison of the data on Table 1, 2 and 3 might be of some benefit at this time. The ideal, of course, in figuring returns on investment would be a period of zero inflation. The only consideration is the return on the business investment. Table 4 indicates the returns on an investment using the sum of the years digits depreciation method

TABLE 1
Return on Hypothetical Investment of \$350,000
with Zero Inflation
Straight-Line Depreciation Method

End of Year	Net Cash Flow	Cash Receipts Not Taxed Due to Depreciation Charges	Taxes Paid	After-Tax Cash Flow	Purchasing Power of After-Tax Cash Flow
1	\$100,000	\$50,000	\$25,000	\$ 75,000	\$ 75,000
2	100,000	50,000	25,000	75,000	75,000
3	100,000	50,000	25,000	75,000	75,000
4	100,000	50,000	25,000	75,000	75,000
5	100,000	50,000	25,000	75,000	75,000
6	100,000	50,000	25,000	75,000	75,000
7				<u>\$525,000</u>	<u>\$525,000</u>

Present value of after-tax cash flow with a desired rate of return of:

10%	\$365,130
12%	342,285
14%	321,622
16%	302,895
18%	285,862
20%	270,345

TABLE 2
Return on Hypothetical Investment of \$350,000
with 5% Inflation
Straight-Line Depreciation Method

End of Year	Net Cash Flow	Cash Receipts Not Taxed Due to Depreciation Charges	Taxes Paid	After-Tax Cash Flow	Purchasing Power of After-Tax Cash Flow
1	\$105,000	\$50,000	\$27,500	\$77,500	\$ 73,811
2	110,250	50,000	30,125	80,125	72,673
3	115,763	50,000	32,882	82,881	71,593
4	121,551	50,000	35,776	85,775	70,567
5	127,628	50,000	38,814	88,814	69,586
6	134,009	50,000	42,005	92,004	68,653
7	140,709	50,000	45,355	95,354	67,768
					<u>\$494,651</u>

TABLE 3
Return on Hypothetical Investment of \$350,000
Sum of the Years Digits Depreciation

End of Year	Net Cash Flow	Cash Receipts Not Taxed Due to Depreciation Charges	Taxes Paid	After-Tax Cash Flow	Purchasing Power of After-Tax Cash Flow
5% Inflation Rate					
1	\$105,000	\$87,500	\$ 8,750	\$ 96,250	\$ 91,668
2	110,250	75,000	17,625	92,625	84,011
3	115,763	62,500	26,632	89,131	76,951
4	121,551	50,000	35,776	85,775	70,565
5	127,628	37,500	45,064	82,624	64,736
6	134,009	25,000	54,505	79,504	59,326
7	140,709	12,500	64,104	76,605	54,443
				<u>\$602,514</u>	<u>\$501,700</u>
10% Inflation Rate					
1	\$110,000	\$87,500	\$11,250	\$ 98,750	\$ 89,774
2	121,000	75,000	23,000	98,000	80,987
3	133,100	62,500	35,300	97,800	73,477
4	146,410	50,000	48,205	98,205	67,074
5	161,051	37,500	61,776	99,275	61,640
6	177,148	25,000	76,074	101,074	57,056
7	194,856	12,500	91,178	103,678	53,208
				<u>\$696,782</u>	<u>\$483,216</u>

TABLE 4
Return on Hypothetical Investment of \$350,000¹

Inflation Rate	Depreciation Method	Net Cash Flow	After Tax Cash Flow	Purchasing Power of After Tax Cash Flow	10%	12%	14%	16%	18%	20%
					0%	St. Ln.	\$700,000	\$525,000	\$525,000	\$365,130
1%	S of YD	728,567	539,285	519,881	373,091	351,752	332,367	314,685	298,529	283,733
2%	S of YD	758,296	554,150	515,006	369,702	348,577	329,387	311,885	295,891	281,245
3%	S of YD	789,230	569,617	510,358	366,463	345,540	326,236	309,202	293,364	278,853
4%	S of YD	821,430	585,716	503,248	361,353	340,934	322,221	305,155	289,560	275,278
5%	S of YD	854,919	602,514	501,700	360,395	339,851	321,188	304,169	288,614	274,368
6%	S of YD	869,772	619,863	497,670	357,567	347,198	318,696	301,821	286,401	272,276
7%	S of YD	926,001	638,002	493,812	354,849	334,648	316,294	299,559	284,264	270,256
8%	S of YD	963,667	656,835	490,123	352,241	332,196	313,991	297,384	282,210	268,311

¹Seven year life and no salvage value.

²The net cash receipts on a beginning of the year basis of \$100,000 rise each year according to the inflation rate selected resulting in the amount shown in this column. Transactions are assumed to occur on a cash basis.

³Assumed tax rate is 50 percent.

⁴Each year's after-tax cash flow has been adjusted for selected inflation rate.

with zero through 8 percent inflation rates. The benchmark for comparison purposes is the zero inflation rate using the straight line depreciation method. The purchasing power of the after-tax cash flow becomes increasingly smaller as the inflation increases. At this point, there has been no allowance for return on investment, only the purchasing power of the future dollar under different rates of inflation has been measured.

At a desired rate of return of 10 percent, a large portion of the effect of inflation has been offset by the use of an accelerated depreciation method. As the desired rate of return is increased, we find that at 16 percent, the present value of net cash flow with a 5 percent inflation rate has exceeded that of the zero inflation rate using a straight line depreciation method.

For business investments that qualify for the additional 20 percent first year depreciation allowance or an investment credit, the present value of the net cash flow would match that of an investment during a period of zero inflation using a straight-line depreciation method at lower rates of return on an investment, and in some cases at the very beginning.

Investment Situations

Suppose the life of an investment is n_0 years with no salvage value, an inflation rate of f_0 is forecast for each of the n_0 years, and the cash inflow before taxes from the investment is constant in terms of deflated dollars over the n_0 years. The rate of return r_0 that corresponds to n_0 and f_0 in a table means that the investment must earn an internal rate of return of at least r_0 in the conceptually simple case of no inflation and straight line depreciation in order to break even in terms of deflated dol-

lars when some method of accelerated depreciation, and a constant rate of inflation f_0 is considered, where the same tax rate t is assumed to be appropriate for both the inflation and no inflation cases.

Consider the following example. An investment opportunity exists that requires an immediate investment outlay of \$70,000. The project has an expected life of 7 years with zero residual value. The inflation rate is projected to be 4.1 percent for each of the next 7 years, but the inflated earnings are not expected to increase the tax rate above the present 50 percent. The investment will yield \$42,600 before taxes in deflated dollars annually for the life of the investment. If the sum of the years' digits depreciation method is to be used, should the investment be made?

The project must have an internal rate of return of at least 12 percent in the case of zero inflation and straight line depreciation in order for the investment to be considered. After \$10,000 is deducted for depreciation, the investment yields \$16,300 in after-tax deflated dollars each year. The internal rate of return is thus 14 percent, which is more than 12 percent, and the investment should be retained for further consideration. If the inflation rate were projected to be 6.2 percent, however, the investment should be rejected, since an internal rate of at least 18 percent would then be required in the case of straight line depreciation and no inflation.

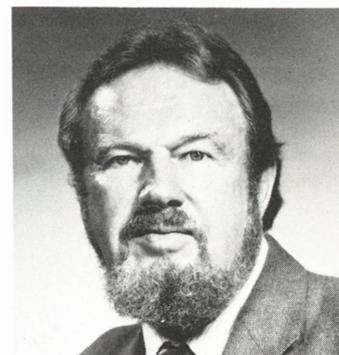
Conclusions

Congress in its wisdom, or by chance, has provided a means of compensating for inflation in investment decisions where accelerated depreciation methods can be used. When management knows the cost of capital, the desired rate of return on investments, the projected infla-

tion rate, and has a reasonable knowledge of the effect of accelerated depreciation methods on the timing of tax payments, investment decisions can be insulated against the adverse effects of inflation in many cases. Ω

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¹John H. Tatom and James E. Turley, "Inflation and Taxes: Disincentives for Capital Formation," Federal Reserve Bank of St. Louis, January, 1978, p. 2.



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