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This paper sets forth a capital budgeting technique that is both theoretically correct and sensitive to the special financing needs of the small business. This technique involves evaluating cash flows and determining if they are sufficient to meet the loan payment schedule. A sufficient amount of cash flow must remain after debt obligations are met to compensate the equity investment. Net operating cash flows are discounted at the cost of equity while the tax shield from interest and depreciation is discounted at the cost of debt.

I. INTRODUCTION

The advantages accruing to small businesses that adopt sophisticated discounted cash flow capital budgeting techniques, such as the net present value model, have been topics of great interest to both finance and small business researchers [23, 22, 10, 19, 21, 12, 7, 27, 28]. Brigham [3] proposes three criteria for evaluating capital budgeting models. The capital budgeting technique should include:

1. the explicit consideration of all net cash flows;
2. the time value of money; and
3. an ability to discriminate between mutually exclusive projects and select the specific project that maximizes the value of the firm.

There is an intuitive and positive interrelationship between the ability of a firm to assess the economic desirability of investment opportunities and the firm's performance, as measured by market returns, return on assets, or changes in net worth. Researchers have attempted to assess this

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Table 1
A Summary of the Findings of Selected Studies Pertaining to the Relationship between the Adoption of Sophisticated Capital Budgeting Techniques and Organization Performance

Author	*Sample*	*Performance Measure*	*Findings*
Klammer (1973)	Convenience example of 369 manufacturing firms listed in *COMPUSTAT.* Response rate of 50%.	Average operating rates of return.	Discounted cash flow techniques-explained approximately 16% of the variance in operating rates of return (R2 of 16.3), T and F values not reported.
Kim (1982)	1979 *Fortune 500.* Response rate of 26.4%.	Return on assets, risk adjusted ROA, ROA of firm compared to industry, and risk adjusted ROA of firm compared to its industry.	The degree of sophistication of a firm's capital budgeting system budgeting system was found to be positively related to all of the measures of performance.
Haka, Gordon, and Pinches (1985)	A sample of 30 firms that had adopted sophisticated capital budgeting techniques were paired with 30 firms matched by asset size, betas, and *SICs.*	Average relative market return.	The authors found no long-term significant effects due to adoption of sophisticated capital techniques.
Pike (1989)	Sample of the U.K.'s 208 largest firms.	Perceived investment decision-making effectiveness by firm's own managers.	Perceived level of investment decision-making effectiveness was found to be positively related to the utilization of sophisticated capital budgeting techniques.
Moore and Reichert (1989)	1985 *Fortune 500.* A response rate of 63%.	Relative ROI of the firm with respect to its industry.	A positive relationship was found between relative ROI and the adoption of a discounted cash flow model.

relationship utilizing a wide variety of methodologies from simple linear regression [13] to multiple discriminate analysis [17]. Table 1 summarizes the mixed results of research projects addressing the interrelationship between capital budgeting adoption and performance.

As a strategic response to increased levels of environmental hostility such as investor pressures, higher capital costs, and increased creditor demands, the adoption of discounted cash flow capital budgeting techniques by small businesses over the past two decades has been quite dramatic. In the early 1970's Scott, Gray, and Bird [23] found that of the small firms they sampled only 10 percent utilized any type of discounted cash flow capital budgeting technique. Approximately 20 years later White, Miles, Robideaux, and Arnold [28] concluded that 76% of the fastest-growing small U.S.-based firms did utilize some type of discounted cash flow capital budgeting technique in their capital investment decision-making.

I. PURPOSE

A barrier for many small businesses to the adoption of discounted cash flow capital budgeting techniques has been the often severe liquidity constraints caused by installment debt [27]. The purpose of this study is to examine the typical discounted cash flow models and to suggest a liquidity-sensitive capital budgeting technique that is theoretically correct and appropriate for small businesses.

For a small business with a single product and source of revenue the use of debt financing also suggests an additional criterion for investment evaluation, insuring that cash flows are sufficient to satisfy the required loan payment [27]. Churchill and Lewis [6] describe this type of firm as being in the survival stage of development. The chief concerns of the firm are:

1. to generate enough cash flow to stay in business;
2. to finance growth; and
3. to earn an acceptable risk-adjusted return on their investment.

If the firm is to remain in business, a project's cash flows must not only be sufficient to repay the debt, but also occur when repayments are due. A debt-financed project that has a positive *NPV* but whose cash flows do not coincide with the debt payment schedule should be rejected by the rational entrepreneur because a project that results in a firm defaulting on its obligations and declaring bankruptcy is not a value-maximizing investment.

A characteristic trait of small businesses is that they tend to rely almost exclusively upon installment debt and owners' equity, often due to a lack of access to public capital markets [30]. Vesper [24] reports that entrepreneurs typically provide approximately 50% of the venture's capitalization. Cost is a major barrier for small businesses to capital markets. Flotation costs for bond issues less than $1 million average 14%, while the underwriting costs of common stock issues of a similar size can exceed 22% of the value of the issue. The flotation fee for a $50 million issue of common stock averages about 4% [8, 26]. Thus, if a firm has a required return on equity of 16%, a new equity issue of $50 million will cost 16.67% (16% ÷ (1-0.04));

the same firm will pay significantly more, 20.5% (16% ÷ (1-0.22)), for an issue of only $1 million. Because of these costs, small businesses with smaller capital requirements typically rely upon owners' equity and commercial banks as their main sources of capital instead of primary capital markets. The loans are generally short-term, seldom exceeding the life of the project because the project's equipment and/or inventory often serve as collateral. This dependence on secured installment debt makes liquidity one of the most salient issues in project evaluation by small business decision-makers.

II. FINANCING EFFECTS ON CAPITAL BUDGETING

The traditional approach to capital budgeting is to evaluate the project's after-tax cash flows without specific attention to the method of financing [3, 15]. However, capital budgeting techniques do not ignore the role of debt in their formulation. The weighted average cost of capital (*WACC*) incorporates the after-tax cost of debt and equity into the discount rate. A common representation of cash flows after tax (*CFAT*) is:

$$CFAT_i = (R_i - C_i - Dep_i)(1 - t) + Dep_i, \tag{1}$$

where R_i = operating revenues
C_i = operating costs
Dep_i = current depreciation
t_i = marginal tax rate.

This equation may also be expressed as:

$$CFAT_i = (R_i - C)(1 - t) + (Dep_i)t \tag{2}$$

This illustrates the effect of the tax shield from the depreciation. Thus, net present value is simply the difference between the investment outlay and the sum of the *CFATs* discounted at the weighted average cost of capital. *NPV* can be algebraically represented as:

$$NPV = \sum_{i=1}^{n} \{[(R_i - C_i)(1 - t) + (Dep_i)t]/(1+k_w)^i\} - I \tag{3}$$

where $k_w = w_D k_D(1 - t) + w_P k_P + w_E k_E$
w_D = total debt-to-total asset ratio

k_D = required return on debt
w_P = preferred stock-to total asset ratio
k_P = required return on preferred stock
w_E = common equity-to-total asset ratio
k_E = required return on common equity
I = initial investment or project cost.

While the after-tax cash flows to be evaluated are unaffected by the financing mix of debt and equity, the *WACC* is critically dependent on the levels of debt and equity employed. This implicitly acknowledges the financing policy of the firm, rather than the financing arrangements for any specific project.

Myers [18] proposed a modification to the standard *NPV* model by acknowledging the tax shield resulting from the tax deductibility of interest payments. He claimed the operating cash flow derivation (equation (3)) overestimates the taxes paid by failing to reduce taxable income by the tax deductible interest expense. His adjusted present value (APV) is the sum of the standard *NPV* calculation as well as the present value of the tax shield from the interest on the debt. A formulation of APV is:

$$APV = \sum_{i=1}^{n} \{[(R_i - C_i)(1 - t) + Dep_i(t)]/(1+k_{UL})^i\} + \sum_{i=1}^{n} [(tk_D D_i)/(1+k_D)^i]\} - I \tag{4}$$

where D_i = level of debt in period i
k_{UL} = cost of equity of an unlevered firm.

Note that the operating cash flows are discounted by the required return on equity if the firm employed no debt. This is the Modigliani-Miller [16] argument, Proposition I (with taxes), that states that the value of the firm depends on the present value of the cash flows discounted at the unlevered cost of capital, which is the required return on equity. Since the tax shield from the interest is explicitly included, this value is discounted by the pretax cost of debt; the risk to this cash flow corresponds to the risk of defaulting on the debt. Thus, the values from operating cash flows and financing cash flows are kept separate.

Arditti and Levy [1] contended that since interest on debt is tax deductible, then adjusting the operating cash flow (revenues less operating costs) by (1-t) overstates the after-tax cost of interest. They modified the standard *NPV* formulation by explicitly adding the tax shield resulting from the interest to the operating cash flow and discounting the resulting sum by a single discount rate. Using the notation from above, a common formulation of their expression is:

$$NPV(AL) = \sum_{i=1}^{n} \{[(R_i - C_i)(1 - t) + (k_D D_i + Dep_i)t)]/(1+k_{AL})^i\} - I \quad (5)$$

where $k_{AL} = w_D k_D + w_E k_E$.

By explicitly adjusting for the tax shield in the cash flows, it would be redundant to use an after-tax cost of debt as a component of the discount rate.

Another sophisticated capital budgeting technique, the equity residual method (*NPV*(ER)), considers both the tax shield of the interest payment as well as the periodic principal repaid in determining the cash flows to be evaluated [5]. This technique is frequently used in real estate investment analysis, where the tax implications of debt financing are quite significant [29]. With *NPV*(ER) the interest tax shield is added to the operating cash flows, while the principal payment is subtracted from those cash flows. An expression of the equity residual method is:

$$NPV(ER) = \sum_{i=1}^{n} \{[(R_i - C_i - k_D D_i)(1 - t) + (Dep_i)t) - (D_i - D_{i+1})]/(1+k_E)^i\} - I \quad (6)$$

(In this case, the investment, *I*, is considered to be the equity investment alone.) The *NPV(ER)* discounts the cash flows less the debt payment at the cost of equity. This is intuitively appealing because those are the cash flows on which the equity shareholders have a claim.

As Chambers, et. al. [5] noted, the *APV*, *NPV(AL)* and the *NPV(ER)* are comparable and produce similar results. In most cases, Myers' *APV* produces the smallest result because the operating cash flows are discounted at the higher cost of equity. At the other extreme, *NPV* using the after-tax *WACC* produces the highest result since its discount rate is an after-tax average of the cost of debt and equity. The equity residual method also acknowledges that only those after-debt payment cash flows that remain can be reinvested to enhance the value of a project. The other three techniques implicitly assume that the debt obligation is interest only and that no principal will be repaid until the bonds mature at the conclusion of the project. Thus, the principal is available for reinvestment.

Capital Budgeting Techniques for Small Businesses

Three capital budgeting techniques—discounted payback, *LCNPV* [27] and a model by Burns and Walker [4] relating value to noncash expenses—have been applied within the small business environment. Bhandari [2] suggests that discounted payback has the simplicity required by small businesses while acknowledging their emphasis on liquidity. From a theoretical perspective discounted payback is an improvement over the standard payback formulation since it acknowledges the time value of money.

White and Miles [27] introduced the *LCNPV* as an alternative method of considering the limited cash flow sources of small businesses. If a firm has a single product resulting in a solitary cash flow source (as is typical of many small businesses and new ventures) and uses a term loan to finance the project, then the general *NPV* formulation may lead to bankruptcy. A project could conceivably have a positive *NPV* while generating net operating cash flows insufficient to make the principal payment required by a term loan. *LCNPV* adds solvency as an additional criterion to the evaluation of capital budgeting techniques for small businesses. *LCNPV* is algebraically calculated:

$$LCNPV = \sum_{i=1}^{n} [(D/TA)CF_i - Pmt_i]/(1+k)^i \qquad (7)$$

where D/TA = debt to asset ratio
CF_i = net cash flows (including tax shields) in period i
Pmt_i = principal payment in period i
k = cost of debt

With *LCNPV* a project that is financed by 40% debt must have 40% of the cash flows available to service the debt. The remaining cash flows are available to compensate the equity investment. A project is accepted if:

$$LCNPV > 0 \qquad (8)$$

$$(D/TA)CF_i - Pmt_i > 0 \text{ for each period} \qquad (9)$$

Thus, *LCNPV* requires that a project increase the value of the firm without exposing the firm to bankruptcy.

Burns and Walker [4] suggest that a simultaneity exists between the value of a firm (or project) and the noncash expenses. The Burns and Walker (BW) model decomposes the value of a firm into the present value of the net cash flows plus the present value of the tax shields from the noncash expenses, such as the depreciation of goodwill. The BW model recognizes that the noncash expenses are a function of value. Employing their notation, the BW model is expressed as:

$$V = \sum_{i=1}^{n} [CF^*_i/(1+k)^i] + \sum_{i=1}^{n} [t(d_iV/(1+k)^i] \qquad (10)$$

where V = present value of the asset or project
CF^*_i = net cash flows in period i except those cash flows from noncash expense tax shields
k = required return
n = life of the asset or project
d_i = debt/asset ratio in period i
d_iV = total noncash expenses in period i that provide tax shields

Solving for V produces the expression:

$$V = \sum_{i=1}^{n} [CF^*_i/(1+k)^i] /[1 - t(\sum_{i=1}^{n} (d_i/(1+k)^i)] \qquad (11)$$

Thus, a project's value is the present value of the net cash flows (the numerator), omitting the cash flows that result from the tax shields from noncash expenses, discounted at a rate (k) adjusted by the magnitude of the tax shield.

Each of the small business techniques mentioned above has serious problems that make them inappropriate for their designed audience. Discounted payback contains all but one of the fatal flaws of payback. First, discounted payback considers only those cash flows up to the payback period. Subsequent cash flows are ignored. In addition, there is no objective method of determining what the acceptable payback period should be.

LCNPV requires that the debt-to-asset proportion of net cash flows from each period be sufficient to cover the corresponding principal payment. This implies that equity requires a periodic compensation similar to that of the term debt. However, equity typically makes no such compensation requirement. In addition, as presented the discount rate is the cost of debt. Since the *LCNPV* is conceptually similar to the equity residual model, the residual cash flows should be discounted at the cost of equity.

The BW model was primarily designed to establish the value of a small business, not consider individual projects. It does not consider the timing of the project's financing costs as *LCNPV* does. The model also uses the same interest rate to discount the cash flows from operations as well as the cash flows from the noncash expense tax shields, although the discount rate for the latter is adjusted. Since the cash flows have been decomposed, different required rates of returns should be used for the discounting procedure, with the difference reflecting the risk associated with the cash flows. Finally, BW is applicable only when there are nonphysical assets to be depreciated. If all of the depreciable assets are physical assets, then there is no simultaneity between value and cash flow [4]. The BW model, therefore, would be inappropriate for most analyses involving small businesses or new venture investments.

Small Business Environment That Makes *NPV* Inappropriate and a Suggested Alternative

The disregard for the timing of financing costs is appropriate in instances where the firm has ready access to capital markets and multiple sources of income, or when the financing supports the firm in general and is not attributable to a specific project [25]. Most small firms, however, enjoy none of these circumstances. Because of their small size, their access to capital markets is extremely limited. The typical flotation costs makes the use of bond or equity issues prohibitively expensive. Hence, conventional term loans from banks provide the majority of the debt financing [8]. Most small firms have a single, or at best only a few products, that will generate income. Finally, most outside financing is project specific. This is especially true for debt financing, with the assets associated with the project serving as collateral for the debt incurred to fund the project.

Given small firms' reliance on bank term loans as a source of debt finance [12, 24], it is not surprising that small firms tend to use payback as a capital budgeting technique. Payback emphasizes the liquidity of a project as opposed to the overall value enhancement of the firm that may result from the project. However, for reasons that have been enumerated earlier, payback (and its various derivatives) as a strategic tool has serious deficiencies.

In addition, while payback and its derivatives emphasize liquidity, the most critical factor in small businesses is solvency. It does not matter that a project would repay the initial investment within three years if the cash flows in the first year are insufficient to make the first installment loan payment. A capital budgeting plan that incorporates the financing situation unique to small firms yet has the theoretical basis similar to *APV* and *NPV(ER)* is the small firm present value (*SFPV*). *SFPV* is a two-stage, capital budgeting technique. The first step recognizes that to remain solvent, operating revenues plus the tax shields from interest and depreciation must be greater than or equal to operating costs plus any debt payment required. Thus, for each period:

$$CFAR_i = (R_i - C_i - Dep_i - k_D D_i)(1 - t) + Dep_i + Res_i \geq (D_i - D_{i+1}) \quad (12)$$

where $CFAR_i$ = cash flows available for reinvestment from period i
R_i = pretax operating revenues in period i
C_i = pretax operating costs in period i
Dep_i = depreciation in period i
k_D = pretax required return on debt
D_i = debt in period i
t = marginal tax rate
Res_i = cash reserves from an earlier period brought forward to maintain solvency in the current period

While equation (12) seems complex, it is merely an expression of solvency. For a firm to remain solvent, net income (the first term) plus depreciation plus some amount saved must exceed the required principal payment, which is the change in the value of the debt. The value of cash reserves brought forward will be kept at a minimum level because the return on liquid assets is typically less than the return to equity or even the return to debt.

Using excess *CFAR*s from the current period to make a debt payment in the next period may seem like negative financial leverage, especially when the cost of debt (k_D) exceeds the return earned on those funds carried forward (k_{RF}); however, it is consistent with value maximizing behavior for the small business. Payments made on a debt in excess of the required payment are generally applied to the principal and do not reduce the required payment in the next period. As such, there is no effect on solvency. It is possible that reducing the principal of the debt would make it possible to renegotiate the terms of the debt and the accompanying payment. However, the transactions costs of such renegotiation, especially in terms of entrepreneur's time required, would greatly outweigh any incremental benefit from the lower payment. It is possible to negotiate the original term loan with uneven payments that correspond to the uneven cash flows; however, it is questionable whether this is an advisable option to pursue. Holding excess cash balances instead of applying these funds against the loan produces two distinct advantages. First, it generates a higher degree of financial flexibility in the event of unexpected expenses as a result of the increased liquidity. It is not inconceivable for the firm to minimize cash balances by paying more than the loan required and then find itself in a situation where an additional loan is required for an unexpected expense. Second, by holding higher average daily cash balances, the lender perceives that the firm is more stable financially, a very real benefit the next time a loan is needed. The preferred method of insuring solvency in the next period, therefore, is to put the funds aside in a liquid, interest-bearing account and then withdraw them when the next payment is due.

Equation (12) can be rearranged to group the cash flows by risk class. Thus, equation (12) becomes:

$$CFAR_i = (R_i - C_i)(1 - -t) - k_D D_i + (Dep_i + k_D D_i)(t) + Res_i - (D_i - D_{i+1}) \geq 0. \quad (13)$$

To determine the value of a project, *SFPV* decomposes the *CFAR*s into their relevant risk classes discounts these cash flows at the appropriate interest rate. The risky cash flows on which equity shareholders have a claim are discounted at the cost of equity. The cash flows that are dependent on the tax shields from depreciation and interest have value only if there is sufficient operating income to offset. The risk that there will not be sufficient income to take advantage of the interest and depreciation tax shield is the risk that cash flows will be less than the interest payment. Thus, the tax shield cash flows are discounted at the pretax cost of debt—the risk-return required by the lender. Rearranging equation (13) to reflect the cash flow grouping by risk, SFPV can be expressed as:

$$SFPV = \{ \sum_{i=1}^{n} [(R_i - C_i)(1 - t) - k_D D_i + Res_i - (D_i - D_{i+1})]/(1+k_E)^i \sum_{i=1}^{n} [(Dep_i + k_D D_i)t]/(1+k_D)^i\} - (I - D_0) \quad (14)$$

where I = total investment required by the project
$I\text{-}D_0$ = portion of the project financed by equity

Although equation (14) appears awkward, it specifies the cash flows available to equity investors. The cash flows are discounted at different rates to reflect the relative risks of the operating cash flows and those cash flows resulting from tax shields. The first term reflects the funds available to equity investors after taxes and debt payments have been made. The uncertainty of these future revenues and costs makes the cost of equity the appropriate discount rate. The second term captures the tax shields of depreciation and interest payments. Since the values of these tax shields are known, the appropriate discount rate reflects the risk that the income may be insufficient to cover the required interest payment. This level of risk is conceptualized by the cost of debt. The final term is the amount of the project that is financed with equity. The debt portion has already been satisfied by the earlier payments of interest and principal.

A project should be accepted only if two conditions are met: (1) all of the *CFAR*s are greater than or equal to zero; and (2) the *SFPV* is positive. Thus, *SFPV* evaluates whether or not there are sufficient cash flows to compensate the equity investment once the debt portion of the project has been repaid. It is possible to conceive of a project that would generate cash flows only sufficient for the loan payment on the debt and, therefore, not expose the firm to a bankruptcy risk. However, the lack of compensation for the equity investors suggests that the investment should not occur.

There are several differences between the *SFPV* and the standard *NPV* or *APV*. A key difference is that *SFPV*'s cash flows occur after the debt payment has been made. *NPV* and *APV* implicitly assume that all cash flows are available for reinvestment until the termination of the project. This suggests that any debt that is used is in the form of a zero coupon bond, with the entire repayment occurring at the conclusion of the project. To the extent that debt payments are required over the life of a project, those cash flows are no longer available for reinvestment. It is questionable whether such an assumption regarding the type of debt issued is correct for a firm of any size; however, the assumption is typically incorrect for a small firm.

Another difference is that cash flows are discounted according to individual categories based on their risk. Cash flows from operations reflect the risk from operations and are therefore uncertain. Thus, these cash flows are discounted by the rate of return required by the firm's owners—the cost of equity. The tax shield from interest and depreciation will have value as long as earnings before interest and taxes are at least as great as the interest owed, which reflects the risk of debt. The tax shield, therefore, is discounted by the cost of debt.

A Comparison of *NPV*(*WACC*), *APV*, *NPV*(AL), *NPV*(ER) and *SFPV*

Three examples should serve to point out how *SFPV* is developed from previous capital budgeting techniques. In the first example a four-year project has the following characteristics:

$INITIAL\ COST = \$1000$ $\quad$ $ANNUAL\ REVENUES = \$1400$

$OPERATING\ COSTS = \$488.55$ $\quad$ $k_D = 9\%\ \ k_E = 15\%.$

Table 2
A Comparison of the Five Capital Budgeting Methods
(Positive Cash Flows after Debt Payment Each Year)

Cost = $1000
Revenues = $1400 per year for four years
Operating costs = $488.55 per year for four years
Tax rate = 45%
k_D = 9% k_E = 15% TD/TA = 40%

Method	*Result*	*Discount Rate*
NPV(*WACC*)	$905.09	*WACC* = 10.98%
NPV(AL)	$874.39	k_{AL} = 12.6%
NPV(ER)	$689.43	k_E = 15%
APV	$846.59	k_{UL} = 13.39% k_D = 9%
SFPV	$878.72	k_{RF} = 5% k_D = 9% k_E = 15%

The project is financed using a $400, four-year term loan, (reflecting the firm's debt ratio of 40%), implying an annual payment of $123.47. The tax rate is 45% and straight-line depreciation is used. Following Modigliani and Miller, Proposition II (with taxes) [16], the unlevered cost of capital is 13.39%.

Table 2 shows the various cash flows and values derived from the various capital budgeting techniques. As expected, the maximum value is derived using the *NPV(WACC)* formulation. The minimum value is from the equity residual model, which discount cash flows after the debt payment is made at the cost of equity. *APV* is less than the *NPV(WACC)* because it discounts the same cash flows as the *NPV(WACC)* at a higher discount rate, k_{UL}, and then adds the present value of the tax shield from interest. This additional value of the tax shield does not overcome the reduced present value from the discounted operating cash flows. *SFPV* is higher than the equity residual value because the tax shield from interest and depreciation is discounted at the cost of debt. It is also higher than the *APV*, as the tax shield discounted at the cost of debt is greater given the inclusion of depreciation.

Another example is given in Table 3. where costs remain the same as in Table 2 but revenues are $1400, $500, $1400 and $1400 in years one through four respectively. This causes net income to be negative in year two. *NPV(WACC)*, *APV*, *NPV(ER)*, and *NPV(AL)* all produce positive values, suggesting that the projects be accepted; however, all of the *CFAR*s in the *SFPV* formulation are not positive. In this case, it is possible to invest some

Table 3
A Comparison of the Five Capital Budgeting Methods (Negative Cash Flow after Debt Payment Covered from Previous Cash Flows)

Cost = $1000
Revenues = $1400, $500, $1400, $1400
Operating costs = $488.55 per year for four years
Tax rate = 45%
k_D = 9%
k_E = 15%
TD/TA = 40%

Method	*Result*	*Discount Rate*
NPV(*WACC*)	$503.19	WACC = 10.98%
NPV(AL)	$483.97	k_{AL} = 12.6%
NPV(ER)	$315.14	k_E = 15%
APV	$461.59	k_{UL} = 13.39% k_D = 9%
SFPV	$394.91	k_{RF} = 5% k_D = 9% k_E = 15%

Table 4
A Comparison of the Five Capital Budgeting Methods, (Negative Cash Flow after Debt Payment Not Covered from Earlier Cash Flows)

Cost = $1000
Revenues = $500, $1400, $1400, $1400
Operating costs = $488.55 per year for four years
Tax rate = 45%
k_D = 9%
k_E = 15%
TD/TA = 40%

Method	*Result*	*Discount Rate*
NPV(WACC)	$459.06	WACC = 10.98%
NPV(AL)	$434.78	k_{AL} = 12.6%
NPV(ER)	$258.99	k_E = 15%
APV	$410.03	k_{UL} = 13.39% k_D = 9%
SFPV	**REJECT**	k_{RF} = 5% k_D = 9% k_E = 15%
	$CFAR_1 < 0$	

of the cash flow from year one in a liquid account to use to cover the shortfall in the second year. Note that only the present value of the shortfall need be set aside. Thus, saving $106.69 at 5%, (the assumed rate on risk-free liquid assets) will pay the $112.02 deficiency in the second year.

A second difference to note in the *SFPV* model is that the tax shield has value if and only if earnings before taxes exist that can be shielded. While corporations have the option of carrying losses back three years or forward for 15 years, sole proprietorships and partnerships—the most common organizational form for small businesses—do not.

In Table 4 the cash flow shortfall comes at the beginning of the project. Again, the *NPV(WACC)*, *APV*, *NPV(ER)*, and *NPV(AL)* all produce positive values, suggesting that the projects be accepted; however, the initial CFAR is negative, with no prior reserves to cover this shortage. Thus, the project should be rejected by a small business with a single source of revenues.

III. CONCLUSIONS

This paper has developed a new capital budgeting technique with specific attention to the unique position of short-term installment debt as a source of capital for the small business. The technique was shown to evolve from several existing capital budgeting methods. The *SFPV* explicitly introduces the solvency requirement into the capital budgeting decision. Once the costs and debt payments have been subtracted from operating revenues, the remaining cash flows accrue to the equity investors. This amount, therefore, is discounted by the cost of equity. In addition, the *SFPV* expands on the *APV* by Myers [18] by including the tax shield from depreciation with the tax shield from interest as a cash flow to be discounted by the cost of debt.

The goal of the *SFPV* technique is to provide a capital budgeting model for small businesses that is theoretically sound and fiscally prudent. *SFPV* can be used with a group of projects simultaneously for businesses that have several revenue sources. In this case, reserves to cover the shortfall from one project can be transferred to another project within the same period. The *CFAR*s calculated could reflect the entire cash flows to the firm. In any event, *SFPV* is more appropriate as a capital budgeting technique for small businesses than the models previously assessed. In addition, *SFPV* satisfies the three-fold criteria of Brigham [3] while acknowledging the special role debt finance plays for small businesses by incorporating a sensitivity to the debt payment schedule.

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