Put Budgeting Back into Capital Budgeting

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PUT BUDGETING BACK INTO CAPITAL BUDGETING

Working Paper 82-302*

by

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*This paper represents a draft of work in progress by the author and is being sent to you for information and review. Responsibility for the contents rests solely with the author. This working paper may not be reproduced or distributed without the written consent of the author. Please address all correspondence to Michael F. van Breda.
Tony Farnsworth, Chief Executive Officer of Datra Motors, an automobile distributor and a subsidiary of a large diversified holding company, was considering a proposal to expand his operations. This would involve the acquisition of more floor space to display the additional vehicles, would tie up working capital in inventory, and present long-range implications since the new facilities could last 20 years.

Mr. Farnsworth put the problem to a young associate, a newly appointed young MBA student. She took the figures away and a few days later returned with the net present value of the decision to expand the distributor. This answer left Farnsworth mildly frustrated.

First, he had this niggling feeling that an awful lot of information seemed to have been discarded between the time he had given the facts of the case as he saw them to his assistant and the time she had come back with her single number. Second, he felt frankly uncomfortable with the calculations done by his assistant. He had never been very good at mathematics and the paper that she presented to him looked an awful lot like mathematics. Long experience with the financial statements of his division had made him very familiar with budgets but this thing called capital budgeting seemed a world removed from the pro forma statements with which he was more familiar.

In particular, he had no feel for what the net present value meant. Certainly, he knew the rule -- accept the project if the net present value is greater than zero. But how did this relate to the profitability of his operations? If capital budgeting was indeed budgeting would he be able to find the net present value anywhere in his ordinary budgets? How in other words did the two relate? How in short could he get the budget back into the capital budgeting process?
There is an answer to these questions. Drawing on ideas suggested by Van Breda,¹ the answer involves an accounting approach to capital budgeting that downplays the mathematics of it all and that sets the whole of investment analysis in the context of the ongoing budget process. In particular, this new approach provides a precise explanation of the meaning of the net present value calculation in an accounting setting. The added advantage of this approach is that it enables the manager to control the investment process -- in other words it makes possible the control as well as the planning of investments. And not unimportantly, the method, using budgets as it does, highlights the liquidity aspects of the project as well as its ultimate profitability.

It must be emphasized that the method does not introduce any new theory. Everything that is discussed here can be drawn out of existing formulations. All that is suggested here is that by reformatting the problem of capital investment analysis slightly one can make the problem easier to understand, easier to interpret, easier to integrate with one's ongoing budget process, and easier to use for later control purposes.

In particular, the article makes an argument for a return to favor of residual income. This concept was introduced into the literature by General Electric as an improvement over the use of return on investment measures. For a variety of reasons, but probably largely because few understood its relationship with other areas such as capital budgeting and budgeting in general, the use of the residual income measure has declined. This article argues that management could find it an extremely simple and useful measure to calculate

in the capital budgeting process and to watch as a control measure as the project matures.

INVESTMENT ANALYSIS

Right at the outset, we need to remind ourselves of the sometimes overlooked fact that the proper business of business is indeed business, or the creation of wealth. Academics are fond of claiming that business men and women should maximize wealth. Such a strong statement is entirely unnecessary for our purposes. All we need to assume is that one of the chief concerns of business must be the creation of wealth and that in general the business community and indeed society as a whole is interested in more rather than less wealth.

Choosing the appropriate vehicles for the creation of that wealth is the role of investment analysis. Typically, we proceed by arraying a menu of options on top of a base case that is usually described by the status quo although this last is by no means necessary. The essence of the method is to work incrementally, that is, to see how much additional wealth each project will produce and, after comparing them one against the other, to select one or more.

Whichever project one chooses will generate a certain amount of additional wealth for one at some point in the future. The point in the future at which one evaluates this incremental wealth is usually the end of the life of the project -- hence the term terminal wealth or terminal value. Sometimes, when the project lasts for many years, or when one has an array of projects all with different lives, one evaluates one's incremental wealth at the end of one's planning horizon. In the case we examine here we shall assume a 5 year
planning horizon. In other words, we will estimate the incremental wealth the proposed expansion will generate at the end of five years.

One's wealth at any point in time consists of cash and other monetary assets plus one's physical assets less, of course, one's liabilities. The monetary items such as cash, accounts receivables, accounts payables, are usually relatively easy to value and so to place in one's estimate of wealth. Physical assets such as inventory, plant and equipment are a little more difficult to handle. One approach is to estimate what could be earned if one sells off one's assets at the end of 5 years. This is the method we will use in the case of Datra.

Once one's wealth has been estimated at some point in the future a very simple rule emerges for evaluating investments. If one's wealth increases as a result of undertaking a particular project, one should adopt that project. That is all there is to it. One does not need discount tables, one does not need present value factors, or any of the other paraphernalia that make up the chapters that have been written on present value analysis. All that one needs is this one simple rule based on common sense: if one's wealth increases then one should proceed.

Only one caveat needs to be added to this simple rule. Funds do not come without a cost. It is common practice to charge income with interest on debt and, if unpaid, to show an interest payable obligation on the balance sheet. It is a lot less common to show a "dividend payable" account for equity funds that have been borrowed just as surely as debt has been borrowed. Yet we must, if we are to make sense of our investment rule which, in a slightly refined form, states that, if our wealth is increased after we have paid off all our obligations, including interest to creditors and dividends to shareholders, then we should proceed. It is of small comfort to have a project that
produces insufficient wealth to pay shareholders a sufficient dividend for the use of the funds they have entrusted to our care.

Datra Motors, Inc.

To see just how trivially easy this approach really is, consider the proposed expansion of Datra Motors. Exhibit I contains an analysis of the receipts and expenditures that will be incurred in that expansion. Exhibit II contains the pro forma balance sheet and Exhibit III the pro forma income statements. The planning horizon of the firm is five years hence the appearance of five years of statements.

Inevitably, the detailed description that follows of the derivation of the various numbers sounds involved. Actually, all we are doing is simple budgeting. One begins with a forecast of revenues and expenses over a selected planning horizon and after estimating balance sheet items, such as the level of inventory required, one arrives at the associated cash flow. Negative cash flows have to be financed -- in this case by a corporate head office -- at a cost shown here as the cost of capital.

The three exhibits are therefore perfectly conventional. The only line which is perhaps mildly different is line 8 in the balance sheet labeled accumulated residual income. The reason for this term is discussed later. For the moment, one can equate it to retained earnings and the associated residual income number to net income after interest and tax.

In the next few paragraphs we examine the origin of all of the numbers. Those interested only in the results can skip this section. We begin with the cash flows in Exhibit I. Lines 1 through 6 are fairly self-explanatory. Each represents the estimated incremental effect of the proposal on the cash flow associated with each line item. Line 1 reappears in the income statement as
revenue, while lines 3, 4, and 5 appear in the income statement on line 4 as expenses.

Line 7 of that first exhibit shows that the new premises will cost $208,000. These premises are expected to last 20 years so that one can expect to have $10,400 of depreciation expense each year which is shown in the pro forma income statements on line 5. At the end of 1982, the division will have premises that have a net book value $10,400 below their original cost or $198,000 as shown on the third line of Exhibit II.

The second line of that exhibit shows the level of inventory that was deemed necessary to maintain the new level of sales. In 1982, this was $41,000. Since line 2 of Exhibit I indicated that in 1982 Datra Motors expected to purchase inventory costing $451,000, it is apparent that the cost of inventory sold in 1982 will be $410,000. This estimate appears on line 2 of Exhibit III.

With this, the operating budget is complete. We turn now to a consideration of the funds needed for the proposed expansion and their cost. Monies to purchase the new premises will have to be obtained from the corporation. From day one of the expansion, therefore, the division will have a note payable outstanding to its head office of $208,000. This money does not come without a cost. We will assume here that corporate head office charges its divisions 12% for the use of these funds. A later paragraph explains in a little more detail how Datra arrived at an interest rate of 12%. For the moment we shall take it as a given.

The details of the interest charge are set out at the bottom of Exhibit I. Reading down the first column, beginning at line 10, we see that the division had no funds associated with this project outstanding at the start of this expansion. Line 11 shows the $208,000 that it borrowed to fund the new
premises. Line 12 is the net operating cash flow before tax and is a repeat of line 6 above. Line 13 is the tax as calculated in Exhibit III and shown there on line 7. Line 14 is the closing cash balance for the period but being negative for the most part it really represents the funds that have been borrowed by the division. This line, therefore, makes its reappearance in the balance sheet as the note payable.

Lines 15 through 17 show the calculation of the interest charges. The funds outstanding at the start of 1982 are $208,000 and interest on this at 12% amount to some $25,000. At the start of 1983 there is a cash balance of $221,000 on loan from the corporation but there is also the interest payable of $25,000 yielding a total liability of $246,000. This line appears in the balance sheet on line 7 and forms the base for calculating the interest expense for 1983. The interest expense itself appears on line 9 of Exhibit III as well as line 16 of Exhibit I.

**Balance Sheet Approach**

We are now in a position to estimate the additional wealth the expansion would produce. We begin with the balance sheets that we have already drawn up. The one of real concern to us is the last one, i.e., the one at the end of 1986. It shows inventory on hand at a book value of $62,000 and premises at a net book value of $158,000. Neither of these figures purports to measure economic value though. To arrive at an estimate of Datra's wealth at the end of 1986, therefore, one has to figure their real value. We do this by the simple device of a hypothetical sale at that point.

It is estimated that the premises could be sold for $238,000 at the end of 5 years. Since the net book value at that point will be $158,000, a profit on the sale of $82,000 can be expected. Allowing for rounding error, if a tax rate of 40% was in effect, they might forecast a net profit after tax of
$48,000 from the disposal of the premises. This amount must be added to the accumulated residual income to arrive at an economic measure of Datra's net worth at the end of 1986.

A similar assumption must be made to handle the existence of physical working capital at the end of the 5 years. The level of inventory climbs each year until at the end of the 5 years the firm has $62,000 on hand. This amount cannot be ignored when one calculates one's wealth. Assume that the inventory could be disposed of at this point for $62,000. Since this is its book value there is no profit on the transaction.

The last line of Exhibit II shows that the final balance sheet with economic values inserted in place of accounting book values for the physical assets reveals an accumulated residual income figure of negative $3,000. This figure is the wealth generated by the division after it has met all its obligations including the interest it owes to its owners — in this case the corporation. What immediately appears is that the expansion does not in fact generate additional wealth. The amount is small but negative nonetheless, meaning that, if the division goes ahead with its expansion plans, the company will be worse off to the extent of $3,000 compared with what it could have done.

A very simple and, one hopes, very understandable rule emerges from this case. To analyze a project, one simply calculates a pro forma balance sheet as at the end of the project's life, or at some other planning horizon that might be more convenient. Any point in time can be chosen just as long as at that point one makes a full estimate of one's additional wealth which means including the market value of one's physical assets, for instance. The only slightly unusual feature in this is that one must include an estimate of the
cost of all the funds used along the way. With such a balance sheet in hand, the rule is simply: if the net worth is positive, proceed.

The rule is so simple and straightforward that it is perhaps necessary to stress that it does everything that net present value analysis or discounted cash flow analysis does or any other similar technique. It will in other words give identical decisions in identical situations. We have done present value analysis in effect, as we shall demonstrate later, but done it in a way that one hopes is quite painless — and understandable.

Expanding on this last, there seem to be several advantages to this approach. First, it puts the emphasis right where one wants it in these analyses, namely on the budgeting part of capital budgeting. The vast majority of companies, many more than do net present value analysis, do some form of budgeting. All this method suggests is extending that budget out from one year to 5 years or to some other convenient planning horizon. In other words, the method is a simple extension of an approach with which most companies are very familiar.

The only additional twist for most people is that a charge is made for equity funds. But this is not a complicated notion. Nor is it an unusual notion. Professor Anthony\(^2\) has been making a strong plea in recent years for such a charge to find its way into the annual reports of companies. This article parallels that plea by suggesting that one should at the very least place such a charge in one's budgets.

It is completely true that all that this new approach achieves is really a reformatting of what is already done in present value analysis. On the other hand, it is claimed that the proposed format forces the analyst to

concentrate on the budgeting implications of the analysis and not on the mathematics of the analysis. This is especially true today where even tables are beginning to fall into disuse as analysts plug a few figures into a calculator or enter them into a computer and accept in return a single figure, namely the net present value. Many are genuinely quite astonished when pushing out pro forma balance sheets and estimating cash requirements by just how much capital will be tied up in a new project and for how long.

A third advantage of this approach is that it parallels the accounting process so closely. The question that the subject area of finance sets out to address is essentially what is the price of a financial instrument that promises to pay so much over so many years in the future. The concern of the accountant is far more with the measurement of wealth for reporting and control purposes. This method ties in with that concern directly and as a result is ideally suited as a basis for control as we shall argue in more detail later. For the moment it is sufficient to note that the method simply involves drawing up pro forma accounting statements. Given the familiarity of most managers with accounting statements the method has great intuitive appeal.

In short, the method is every bit as rigorous as any other method in current use. It has the major advantage that it puts the budgeting back into capital budgeting. It avoids the use of tables, discounting and mathematics. It highlights the cash needs of the proposal and its financial cost to creditors and shareholders alike. Above all it is simple and understandable. If one's net worth increases as a result of the proposal, go; otherwise, stick with the status quo.

**Income Statement Approach**

All our discussion thus far has revolved around the balance sheet because it contains the most direct measure of a company's worth. But a change in ne
worth is no more than a measure of net income (after adjusting for any dividends, of course). What this means is that we can repeat our analysis making use of income statements instead of balance sheets. The immediate advantage of this is that these pro forma income statements lend themselves ideally to budgetary control.

The analysis appearing in Exhibit III shows income statements for the periods 1982 through 1986. The top half of this exhibit is perfectly straightforward since it simply repeats the data of the cash flow statement after making appropriate conversions to get from cash purchases to cost of sales. Line 10 introduces in this setting the slightly unfamiliar twist that we discussed in the context of the balance sheet since we find here the interest charge on the cash borrowed from the Corporation. From Exhibit I we see that this charge was $30,000 for 1983 for instance. The income earned by the division after charging it for the capital it used in 1983 is a negative $12,000. In fact, it is only when the profit on the assumed sale of the premises is added in that the division makes positive income after the additional charge.

Put another way, in each of the first 4 years of the proposed expansion of Datra Motors, the income generated by that expansion will not be enough to offset the interest charge of 12% on the capital needed to fund that expansion. In the last year enough income will be generated by the sale of the premises to offset the charge. Over the life of the planning horizon that last boost will not be enough to wipe out the previous negative residual income numbers. The last column in Exhibit III reveals that Datra Motors will decrease its wealth by $3,000.

This brings us to our third rule of investment: If the income generated over the life of the project is positive, proceed. The income referred to
here is after a charge for all the funds used. An alternative way of stating this rule would therefore be to say that so long as the ordinary net income generated over the life of the project (or some other planning period) exceed the cost of the funds necessary to fund that project, then one should proceed.

It is probably important to remind ourselves at this point that while managers can change their income figures from year to year by switching accounting methods, that the income figure over the life of a project is completely independent of the methods chosen by management. It is more than likely that many companies will find that in a given year their net income is not sufficient to offset the cost of the funds used. This is to be expected. At stake here is not what happens in an individual year but over the entire planning period. In this way we overcome the criticism of those who say accounting net income is too dependent on an accountant's methodology to be of any use.

**Residual Income**

The income number introduced above is known as the residual income number. It was first introduced by General Electric in the Fifties as a means of evaluating the performance of their divisions -- in other words as a control measure. For a variety of reasons that have relatively little to do with this article the measure has fallen into disuse. The argument here is that it should be resurrected -- as a planning measure first and then only as a control measure. This seems to be in full accord with Professor Solomons, who in his classic monograph on Divisional Performance described the notion of residual income as: "the excess of net earnings over the cost of capital."

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He argued that residual income was a better measure of managerial success than a rate of return such as the return on investment. The essential criterion that he used for this judgement was that residual income provided a better guide to divisions, permitting corporate head office to delegate more decision to divisional managers without fear that decisions contrary to the interests of the corporations would be taken. In particular, residual income circumvents the situation where a division turns down a project earning 20% say because it would lower their current return of 25% say despite the fact that the hurdle rate for new projects is set at only 15%.

Professor Solomons then asked the question of how one makes residual income into a goal for a manager. At least with the return measure one can set a target of say 18% for the upcoming year for one's management. He discarded the notion of setting a target percentage of residual income to investment since that was subject to many of the same problems as the rate of return. Instead, he opted for a target residual income that should be set in dollars. The manager's success would then be judged in relation to this dollar target. He concluded that "by setting the manager's target in terms of residual income, his freedom to manage is enterprise is preserved. He is not, however, left free to achieve his own target by sacrificing the interests of the company as a whole."

The problem that Professor Solomons did not address was just how one arrives at this target residual income. The answer is contained in this paper. As each project is analysed and accepted so the analysis becomes the budget for control purposes forming an explicit target. The article therefore not only supports Professor Solomons earlier arguments but extends them by providing the planning preface to the control chapter. Stated otherwise, this paper demonstrates that the target residual income that Professor Solomons suggests
that managers need falls directly out of the approach to investment analysis embraced by this paper.

From an administrative point of view this approach has certain advantages too. So many times the analysis of capital investments is done by one group in an organization and budgeting by another. Once the initial decision is taken to undertake a project or an expansion or some other capital investment the assumptions that underlay that decision tend to be filed and forgotten. By pulling the investment analysis tightly together with budgeting one ensures that those managers who proposed a particular investment will continue to live with their ideas and assumptions through the medium of the ongoing operating budget. The basis for the decision is not forgotten in other words and can serve as a foundation for further learning about the environment and the firm as expectations are realized or not as the case may be.

The approach espoused here has a further advantage because it does not simply provide a target for one year ahead. Instead, by definition, it provides targets for many a year out. As such it reminds those who evaluate the performance of divisional managers that to achieve higher income in the future it is often necessary to sacrifice present income now. Our example, for instance, showed 4 years of negative residual income numbers which might well be necessary to put one in a position to reap larger benefits. The approach forces one to at least look at the longer term. In doing so it answers in part one of Professor Solomons' concerns that residual income, like net income, is a poor guide in the short run and on a year-to-year basis. Our deliberate focus is on project residual income.

Restating the methodology then from the point of view of the income statement, one begins by drawing up a series of pro forma income statements for the period of the project or some other convenient planning horizon. At
the end of the planning horizon it is necessary to make some assumption about what one intends to do with the assets that one has accumulated en route. A typical assumption is that one would sell them — hypothetically of course. It is then necessary to check the project's need for funds. Some of those can come from outside and others might be drawn from internal sources. All these funds must be costed out, i.e., a charge must be made for all funds that one proposes to use. That done, one has an estimate of the annual residual income figure that can be used as a target for control purposes if the proposal is accepted. The rule for accepting the project is as simple and straightforward. If the residual income accumulated over the period under examination is positive one goes ahead with the project (all other things being equal of course); otherwise, one abandons the whole idea.

INTEREST CHARGES

The Cost of Capital

Thus far the article has rather sloughed over just how one arrives at the rate that head office should use to calculate the interest that they should charge the divisions for their various projects. It is an old problem and one that is no different from determining a suitable discount rate for net present value analysis. In a nutshell we will propose using the opportunity cost of capital, i.e., if head office did not lend this money to its Datra division what would it do with it. The answer to that question determines the correct cost of capital to use.

The Corporate Head Office of any organization can be thought of as the banker to its divisions. The essential role of that banker is to allocate funds between divisions so as to maximize the total long-run wealth of the entire corporation. Consider two divisions then — say Datra Motors and Action
Corp. Datra can make $18,000 for the corporation but it uses $208,000 capital to do this which we presume could be used by Action Corp. to earn $24,960. In other words, Action Corp. is able to earn $24,960 over $208,000 for the company or 12% interest. If Datra is to take the funds away from Action it must be able to earn a higher return than Action. All that we are saying here is that in this case the corporation has an alternative use for its money. The revenue that that alternative use could provide should be charged to Datra as a way of checking that this venture is really more profitable than the alternative.

Of course one could compare the $18,000 generated by Datra with the $24,960 generated by Action directly and conclude that Action was a more profitable place to put one's money. There are, however, benefits to be achieved by doing the analysis this way, i.e., by charging the profits of the next best alternative to this project. One obvious benefit is that one does not have to consult two pieces of paper. Line 10 of Exhibit III contains all that we need to know about the profitability of the alternatives. Doing the analysis this way enables us to concentrate our attention on the project at hand rather than sifting through a number of projects and comparing them one by one.

The points raised here are sufficiently important to be restated. The corporation as a whole could have earned 12% on its funds by putting it with the other division, Action Corp. -- or so we have assumed. If this money is put into Datra instead the company as a whole is losing 12% each year. Instead it is getting income from Datra. At the end of 5 years the company will be worse off by $3,000 than it could have been if it had gone with Action Corp. The residual income number is therefore a hypothetical number, but it is a very valuable hypothetical number because it reveals how much one
actually makes above and beyond what one could have made if one had stuck with the other next best alternative.

In all this we have assumed that there is another division and that one knows how much one could earn from that on these funds. It is more than conceivable that there is no other division, or if there is it could not make use of these funds. If that is the case, one must return to a more basic question and ask what one's shareholders could do with this money. The rate at which they would and could invest this money if it was returned to them provides the ultimate bottom line. It is an old and well-known saw of business that if the enterprise cannot make more than their shareholders on the invested capital then management has a moral obligation to return the capital to its owners.

**Capital Invested**

The concept that we have been developing here is that a charge should be made on the capital invested in the business, be it a division or a complete firm. A major question that needs addressing is how this capital should be defined. For example, in many large diversified corporations, a central collection bureau exists and accounts receivable are handled there centrally. As a result, the divisional financial statements tend to exclude receivables from the list of assets. Cash is often treated as a central treasury function and is also typically omitted from the divisional balance sheet.

In Solomons' discussion of residual income, he suggests that a charge should only be made for those elements of capital that are controllable by the divisional managers. This would vary from firm to firm but would be less than the total capital in general. In the same section he raises the issue of whether liabilities should be set off against assets in establishing the appropriate capital base.
Much of this debate derives from the fact that residual income was defined in the first place as a control measure. The natural follow-up question then was what capital does the manager indeed control and should he not be charged for that capital only. There is considerable merit in this view.

Our approach however began from a planning angle and asks the question first whether the investment is advisable or not. It should be clear that when asking this question one must take all the capital into the analysis. One cannot at this point make the distinction between controllable and non-controllable capital. By the same token those funds that the firm or division derives from the issuance of debt or the use of credit should come into consideration and the interest expense should be shown as a cost of doing business. This merely expands on the basic approach, namely that we are concerned with whether the cash spin-off of the proposed investment covers the cost of the funds used for this investment. In brief, we must include all the funds and not just the controllable portion.

Once the analysis is done, however, there would seem to be no good reason why the financial statements used for control purposes might not make a distinction between capital controlled by the relevant managers and that controlled by more senior management. One could still have as a final bottom line the total picture that would correspond with the planning document, but one would also have an income figure higher up on the document that would be the performance measure of the divisional manager and that would exclude the effect of capital used but not controlled by the manager.

To summarize then, the charge that the corporation should make to the division, or the company charge itself, is the opportunity cost of capital. The question that should be asked and answered is, how much money do we have tied up in this investment and what could we do with that money if it were freed
up. The question may sometimes be difficult to answer in practice because we do not have easy access to the disposal value of some of our assets. On the other hand, it is not a difficult question to ask in the sense that it is conceptually obscure.

PRESENT VALUE ANALYSIS

In this final section of the paper we provide a brief explanation of how the proposed method relates to the more normal textbook suggestions that management should use present value analysis or discounted cash flow analysis. The answer, as we shall demonstrate numerically, is that residual income is a simple transformation of net present value. More specifically the residual income accumulated over the life of a project is equal to the net terminal value of that project, i.e., the value of the project at the end of its life. The net terminal value, in turn, is simply the net present value times an interest factor for the life of the project. Since the latter is a constant, the rule of investing when the residual income number is positive or of choosing the investment with the highest residual income number is identical to the rules involving net present value.

Exhibit IV should make this clear -- numerically at least. On the right-hand side of this exhibit we have the cash flow on a net basis over the 5 years of the proposed planning horizon. The very first cash flow is a large negative for the obvious reason that it involves the purchase of the necessary assets. The cash flow in the fifth year is a large positive number because it involves the presumed sale of the assets. In the center are the appropriate factors for discounting at a rate of 12% and on the left are found the present values that add up to an amount of a negative $1,323. With a negative net
present value our rule is, as always, not to proceed, which is in line with our residual income rule derived in the body of the paper.

This negative $1,323, however, represents the amount the project is worth at the start. Alternatively stated, it is the amount we would have to pay to another to take it away. But if this amount were invested at 12% for 5 years, we should have the amount the project would have been worth at that point in time. Equivalently, it represents our wealth in 5 years time. But this is none other than the accumulated residual income figure that we have been talking about all this time. A dollar invested today is worth $1.76 in five year time as may easily be calculated or looked up in a set of tables. It follows immediately that the $1,323 that we have now would accumulate to $1,323 times $1.76 after 5 years or to an amount of $2,332 which to the next thousand is precisely the residual income number that we showed earlier.

CONCLUSION

It is generally agreed that ideally one would want one's decision model and one's subsequent control model to be consistent with one another. In practice, of course, one sees decision models based on discounted cash flow methods (among other things), and the control models based on accrual accounting. The two simply do not mesh. Some have suggested that management should go over completely to a cash based approach, i.e., do both the planning and the control in terms of cash so that the two are consistent.

This article is as concerned as anyone about the lack of consistency between the two phases of the managerial process. The proposed solution here though is to go accrual accounting for both. By charging for the use of fun in the planning and the control model one achieves exactly the same purpose one does as in present value analysis. In addition, though, the planning
model, based as it is on income, provides an automatic budget against which one can control the division or firm.

In particular, the method forces one to examine all of one's assumptions such as what one could do with the funds if they were invested elsewhere. It highlights the ongoing investment that is inevitable with most expansions or projects. The method avoids all use of tables and complex calculators. All it asks for is a simple budget and an annual charge for the funds used to support the budget. It could be a simple and effective way to put the budget back into capital budgeting.
Exhibit I

DATRA MOTORS

Pro Forma Cash Flow Statements
(all values in thousands)

<table>
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<td>24</td>
<td>26</td>
</tr>
<tr>
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<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>5. Administrative Expense</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>6. Net Operating Cash Flow Before Tax</td>
<td>$(2)</td>
<td>$36</td>
<td>$37</td>
<td>$38</td>
<td>$41</td>
</tr>
<tr>
<td>7. Cost of Premises</td>
<td>208</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Resale Value of Premises</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>238</td>
</tr>
<tr>
<td>9. Resale Value of Working Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>72</td>
</tr>
<tr>
<td>10. Opening Cash Balance</td>
<td>0</td>
<td>(221)</td>
<td>(197)</td>
<td>(173)</td>
<td>(149)</td>
</tr>
<tr>
<td>11. Capital Outlay at Start of Year</td>
<td>(208)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
</tr>
<tr>
<td>12. Net Operating Cash Flow Before Tax</td>
<td>(2)</td>
<td>36</td>
<td>37</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>14. Closing Cash Balance</td>
<td>(221)</td>
<td>(197)</td>
<td>(173)</td>
<td>(149)</td>
<td>(123)</td>
</tr>
<tr>
<td>15. Total Funds Borrowed</td>
<td>208</td>
<td>246</td>
<td>252</td>
<td>258</td>
<td>265</td>
</tr>
<tr>
<td>16. Interest Expense</td>
<td>25</td>
<td>30</td>
<td>30</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>17. Interest Payable</td>
<td>25</td>
<td>55</td>
<td>85</td>
<td>116</td>
<td>148</td>
</tr>
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</table>
Exhibit II

DATRA MOTORS

Pro Forma Balance Sheets
(all values in thousands)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. Cash</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>2. Inventory</td>
<td>41</td>
<td>45</td>
<td>50</td>
<td>56</td>
<td>62</td>
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<tr>
<td>3. Net Fixed Assets</td>
<td>198</td>
<td>188</td>
<td>178</td>
<td>168</td>
<td>158</td>
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<tr>
<td>4. Total Assets</td>
<td>$239</td>
<td>$233</td>
<td>$228</td>
<td>$224</td>
<td>$220</td>
</tr>
<tr>
<td>5. Note Payable</td>
<td>$221</td>
<td>$197</td>
<td>$173</td>
<td>$149</td>
<td>$123</td>
</tr>
<tr>
<td>6. Interest Payable</td>
<td>25</td>
<td>55</td>
<td>85</td>
<td>116</td>
<td>148</td>
</tr>
<tr>
<td>7. Total Liabilities</td>
<td>246</td>
<td>252</td>
<td>258</td>
<td>265</td>
<td>271</td>
</tr>
<tr>
<td>8. Accumulated Residual Income</td>
<td>(7)</td>
<td>(19)</td>
<td>(30)</td>
<td>(41)</td>
<td>(51)</td>
</tr>
<tr>
<td>9. Total</td>
<td>$239</td>
<td>$233</td>
<td>$228</td>
<td>$224</td>
<td>$220</td>
</tr>
<tr>
<td>10. Accumulated Residual Income including profit on disposal of assets</td>
<td>(7)</td>
<td>(19)</td>
<td>(30)</td>
<td>(41)</td>
<td>(3)</td>
</tr>
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### Exhibit III

**DATRA MOTORS**

**Pro Forma Income Statements**

(all values in thousands)

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</thead>
<tbody>
<tr>
<td>1. Revenue</td>
<td>$482</td>
<td>$528</td>
<td>$579</td>
<td>$635</td>
<td>$696</td>
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<tr>
<td>2. Cost of Sales</td>
<td>410</td>
<td>451</td>
<td>496</td>
<td>546</td>
<td>600</td>
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<td>3. Gross Margin</td>
<td>$72</td>
<td>$77</td>
<td>$83</td>
<td>$89</td>
<td>$96</td>
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<td>4. Expenses</td>
<td>33</td>
<td>37</td>
<td>41</td>
<td>45</td>
<td>49</td>
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<tr>
<td>5. Depreciation</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
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<td>6. Income Before Tax</td>
<td>$29</td>
<td>$30</td>
<td>$32</td>
<td>$34</td>
<td>$37</td>
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<td>7. Tax</td>
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<td>13</td>
<td>14</td>
<td>15</td>
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<td>8. Net Income</td>
<td>$18</td>
<td>$18</td>
<td>$19</td>
<td>$20</td>
<td>$22</td>
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<td>11. Profit on Disposal of Premises Net of Tax</td>
<td>0</td>
<td>0</td>
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Exhibit IV

PRESENT VALUE ANALYSIS

<table>
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<tr>
<th>At 12%</th>
<th>Cash Flow</th>
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<tr>
<td>PV</td>
<td>Factor</td>
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<td>$(208,000)</td>
<td>1.0000</td>
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<tr>
<td>(11,608)</td>
<td>.8929</td>
</tr>
<tr>
<td>19,133</td>
<td>.7972</td>
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<tr>
<td>17,083</td>
<td>.7117</td>
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<tr>
<td>15,253</td>
<td>.6355</td>
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<tr>
<td>166,816</td>
<td>.5674</td>
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<td>$ (1,323)</td>
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<table>
<thead>
<tr>
<th>Years</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(208)*</td>
<td>(13)</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>294*</td>
</tr>
</tbody>
</table>

*Key: $294 = $206 + 62 + 26
$206 = $238 - 0.4 x (238 - 158)
The following papers are currently available in the Edwin L. Cox School of Business Working Paper Series.

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80-102  "Constructing a Theory of Accounting---An Axiomatic Approach," by Marvin L. Carlson and James W. Lamb

80-103  "Mentors & Managers," by Michael E. McGill

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