THE CAPITAL BUDGETING DECISIONS OF SMALL BUSINESSES

Abstract

This paper analyzes the capital budgeting practices of small firms using survey data compiled by the National Federation of Independent Business. Unlike large firms, which tend to rely on the discounted cash flow calculations favored by finance texts, many small firms evaluate projects using the payback period or ‘gut feel’. The use of these relatively unsophisticated project evaluation tools appears to be due in part to the limited educational background of some small business owners, and small staff sizes. However, we also identify specific business reasons—including liquidity concerns and cash flow estimation challenges—why small firms do not exclusively use discounted cash flow analysis when evaluating projects. Thus, our results suggest reasons why optimal investment evaluation procedures for large and small firms might differ.
THE CAPITAL BUDGETING DECISIONS OF SMALL BUSINESSES

This paper analyzes the capital budgeting practices of small firms. Small businesses (defined by the U.S. Small Business Administration as firms with less than 500 employees) are estimated to produce about 50 percent of private GDP in the U.S., and employ 60 percent of the private sector labor force.\(^1\) Many of these businesses are service oriented, but over 50 percent are in agriculture, manufacturing, construction, transportation, wholesale, and retail—all industries requiring substantial capital investment.\(^2\)

Although capital investments in the small business sector are important to individual firms and the overall economy, capital budgeting surveys published in the finance literature over the past 40 years have focused on the investment decisions of large firms.\(^3\) The most prominent exception is a study by Graham and Harvey (2001), which compares the capital budgeting practices of small and large firms. However, many of the ‘small’ firms in their study are quite large, as Graham and Harvey use a revenue threshold of $1 billion to separate firms by size. Indeed, less than 10 percent of their sample report revenues below $25 million. In contrast, 83 percent of the firms in the Board of Governor’s 1993 Survey of Small Business Finance report sales under $1 million. Thus, Graham and Harvey’s results do not directly address the investment decisions of very small firms.

There are several reasons why small and large firms might use different criteria when evaluating projects. First, small-business owners may balance the goal of wealth maximization (the goal of a firm in capital budgeting theory) against other objectives—such as maintaining the

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\(^1\) See U.S. Small Business Administration Office of Advocacy (www.sba.gov/advoc). Although 500 employees is the threshold at the SBA, 80 percent of all firms have 20 employees or less.

\(^2\) Bureau of the Census, 1997 Economic Census.

\(^3\) Scott and Petty (1984) summarize the results of 21 early studies of large firm capital budgeting practices. The selection criteria in these studies include membership in the Fortune 500/1000, a minimum level of capital expenditures, size, or stock appreciation in excess of certain benchmarks. In more recent studies, Moore and Reichardt (1983) surveyed 298 Fortune 500 firms, Bierman (1993) looked at 74 Fortune 100 firms, and Graham and Harvey (2001) investigated the behavior of 392 firms chosen from the membership of the Financial Executives Institute and the Fortune 500.
independence of the business (Ang, 1992, Keasey and Watson, 1993)—when making investment decisions. Second, small firms lack the personnel resources of larger firms, and therefore may not have the time or expertise to analyze proposed projects in the same depth as larger firms (Ang, 1992). Finally, some small firms face capital constraints (Peterson and Rajan, 1994, and Danielson and Scott, 2004), making project liquidity a more important concern for small firms than it is for larger entities. Because of these differences, survey results describing the capital budgeting decisions of large firms should not be generalized to the small firm sector.

To document the capital budgeting practices of small businesses (defined in this paper as those with fewer than 250 employees), we use survey data collected for the National Federation of Independent Business (NFIB) Research Foundation by The Gallup Organization. In addition to typical questions about investment evaluation tools, the survey asks about the types of investments the firm makes (e.g., replacement versus expansion), its use of other planning tools (e.g., cash flow projections, capital budgets, and tax planning activities), and the owner’s willingness to finance projects with debt. The survey also includes demographic variables, allowing us to examine the relations between capital budgeting practice and firm characteristics such as size, sales growth, industry, owner age, owner education level, and business age.

The results confirm that small and large firms evaluate projects differently. Unlike large firms, which tend to rely on the discounted cash flow calculations favored by finance texts (Graham and Harvey, 2001), we find that the capital budgeting metrics identified most frequently by small firms as their primary project evaluation tool are ‘gut feel’ and the payback period. Less than 15 percent of the firms listed discounted cash flow analysis as their primary decision metric, and over 30 percent of the firms do not estimate cash flows when making investment decisions.

Certainly a lack of sophistication contributes to these results, as over 50 percent of the small-business owners surveyed do not have a college (graduate or undergraduate) degree. In addition, the smallest of the surveyed firms (i.e., firms with 3 employees or less) are significantly less likely to make cash flow projections, perhaps because time constraints limit the depth of the
investment analysis these firms can perform.

However, the results also highlight specific business reasons why discounted cash flow analysis might not be the single best project evaluation tool for every small firm. For example, 45 percent of the sample would delay a promising investment until it could be financed with internally generated funds, suggesting the firms face real (or self-imposed) capital constraints.\(^4\) We also find that the most important class of investments is ‘replacement’ for almost 50 percent of the firms. Discounted cash flow calculations may not be required to justify these investments if the owner is committed to maintaining the firm as a going concern, and if the firm has limited options about how and when to replace equipment. Finally, investments in new product lines are the most important class of investments for almost one quarter of the sample firms. Because the ultimate success of this type of investment is often uncertain, it can be difficult to obtain reliable future cash flow estimates, reducing the value of discounted cash flow analysis. Thus, our results suggest that optimal methods of capital budgeting analysis can differ between large and small firms.

The remainder of the paper is organized as follows. Section I summarizes the capital budgeting literature as it applies to small firms. Section II describes the survey data used in this study. Section III discusses the survey results and Section IV concludes.

I. Capital Budgeting Theory and Small Firms

Brealey and Myers (2003) present a simple rule managers can use to make capital budgeting decisions: Invest in all positive net present value projects, and reject those with a negative net present value. By following this rule, capital budgeting theory says firms will make the set of investment decisions that will maximize shareholder wealth. And, because net present value is a complete measure

\(^4\) Survey participants were asked: “Suppose you had the opportunity to make an investment in your business that would allow earnings to rise 25 percent within the next two years. The project had minimal risk, but you did NOT have the cash right then to make the investment. Would you most likely . . . ?” The choices given to participants included wait until you accumulate enough cash, borrow the money and make the investment, seek an outside investor, and other. Forty-five percent of the respondents selected wait until you accumulate enough cash.
of a project’s contribution to shareholder wealth, there is no need for the firm to consider alternative capital budgeting tools, such as payback period or accounting rate of return.

However, small firms often operate in environments that do not satisfy the assumptions underlying the basic capital budgeting model. And, small firms may not be able to make reliable estimates of future cash flows, as required in discounted cash flow analysis. In the remainder of this section, we discuss these potential problems in more detail, and explain why discounted cash flow analysis (e.g., net present value or internal rate of return) is not necessarily the single, best, capital budgeting decision tool for every small firm.

A. Capital Budgeting Assumptions and the Small Firm

Capital budgeting theory, as described in most finance texts, assume that the primary goal of the firm’s shareholders is to maximize firm value. In addition, the firm is assumed to have access to perfect financial markets, allowing it to finance all value-enhancing projects. When these assumptions are met, firms can separate investment and financing decisions and should invest in all positive net present value projects (Brealey and Myers, 2003).

However, there are at least three reasons why the applicability of this literature to small firms can be questioned. First, shareholder wealth maximization may not be the objective of every small firm. As Keasey and Watson (1993, p. 228) point out, an entrepreneur may establish a firm as an alternative to unemployment, as a way to avoid employment boredom (i.e., as a lifestyle choice), or as a vehicle to develop, manufacture, and market inventions. In each of these cases, the primary goal of the entrepreneur may be to maintain the viability of the firm, rather than to maximize its value.5

Second, the management teams of some small firms are not complete, and often lack expertise in the areas of finance and accounting (Ang, 1992). Because of this deficiency, Keasey

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5 In a survey of Swiss firms, Jorg, Loderer, and Roth (2004) find that maintaining the independence of the firm was cited more frequently than shareholder value maximization as a goal of managers. They also find that firms pursuing goals other than shareholder value maximization were less likely to rely on discounted cash flow analysis when making investment decisions. This result suggests that the perceived value of discounted cash flow analysis is lower if a firm’s primary goal is not value maximization.
and Watson (1993) observe that some small business owners may lack the expertise required to evaluate projects using discounted cash flows. Providing some support for this conjecture, Graham and Harvey (2001) find that the small firms in their survey are more likely than large firms to use less sophisticated methods of analysis, such as the payback period. However, as already mentioned, the small firms in the Graham and Harvey study have up to $1 billion in annual revenues. Thus, it is likely that many of these firms have more complete management teams than the small firms envisioned by Ang or Keasey and Watson. In contrast, we evaluate the capital budgeting policies of very small firms—our sample includes only firms with less than 250 employees, and over 80 percent of the firms have less than 10 employees—where the problem of incomplete management teams is likely to be most severe.

Finally, capital market imperfections constrain the financing options of small firms. For example, some cannot obtain bank loans, because of their information-opaqueness and lack of strong banking relationships (e.g., Peterson and Rajan, 1994 and 1995, and Cole, 1998). Similarly, Ang (1992) observes that access to public capital markets can be expensive for certain small firms, and impossible for others. These capital constraints can make it essential for small firms to maintain sufficient cash balances, so that they can invest in potentially profitable investments as they become available (Almeida, Campello, and Weisbach, 2004). Thus, capital constraints provide small privately-held firms with a legitimate economic reason to be concerned about how quickly a project will generate cash flows (i.e., the payback period).

**B. Cash Flow Estimation Issues**

In his critique of capital budgeting theory, Booth (1996) describes estimation issues managers must confront when attempting to implement discounted cash flow analysis. He concludes that the value of discounted cash flow analysis decreases as uncertainty about the level of future cash flows increases. According to this view, discounted cash flow analysis can be applied most directly to projects with cash flow profiles similar to the firm’s current operations (e.g., projects extending those operations). Discounted cash flow analysis will be less valuable when evaluating
ventures that are not directly related to the firm’s current activities.

Although Booth developed these ideas for large multinational corporations, they can also be applied to small firms. If a small firm is considering an investment in a new product line, future cash flows cannot be estimated directly from the past performance of the firm’s existing operations. In addition, because of the firm’s scale, market research studies to quantify future product demand might not be cost effective. Therefore, small firms cannot rely exclusively on discounted cash flow analysis when evaluating investments in new product lines.

There are also reasons why a small firm may not use discounted cash flow analysis when evaluating replacement decisions. In many cases, replacing equipment is not a discretionary investment for a small firm (e.g., the firm must replace the equipment to stay in business). And, in some replacement decisions, a small firm may have limited replacement options, and differences between the future maintenance costs of the various options can be difficult to pinpoint in advance. As a result, discounted cash flow analysis might not be required to justify replacement decisions, or estimation issues might make discounted cash flow analysis difficult to apply.6

This suggests that discounted cash flow analysis is most useful when evaluating discretionary projects offering cash flow profiles similar to a firm’s existing operations (such as projects extending product lines). In contrast, if a firm is evaluating replacement projects or investments in new product lines, it is less likely to rely exclusively on discounted cash flow analysis.

Because of the characteristics of small firms outlined above, it would not be surprising if these firms evaluate projects using different techniques than large firms. However, as Keasey and Watson (1993) note, evidence about these differences is largely anecdotal. In the remainder of the paper, we use survey data to document the capital budgeting practices of small firms, and to provide evidence about whether project evaluation methods are related to the type of investment

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6 Booth (1996) also concludes that discounted cash flow analysis might not be used for replacement decisions, but for a different reason. In particular, he argues that the payback period combined with judgment can often lead a firm to the correct decision for replacement projects, making discounted cash flow analysis unnecessary.
under consideration.

II. Description of Data

The use of survey data to document capital budgeting practices has a long history in the finance literature. However, as Graham and Harvey (2001, p. 189) note, survey results should be interpreted with caution because surveys measure manager beliefs, not necessarily their actions; survey participants may not be representative of the defined population of firms; and survey questions may be misunderstood by some participants. Nonetheless, surveys are valuable because they provide information that cannot be readily gleaned from financial statements. In particular, survey results can shed light on how firms make investment and financing decisions, and why they use these approaches.

The data for this study were collected for the NFIB Research Foundation by the Gallup Organization. The interviews for this survey were conducted in April and May 2003 from a sample of small firms, defined as a business employing at least one individual in addition to the owner(s), but no more than 249. The sampling frame for the survey was drawn at the NFIB’s direction from the files of the Dun & Bradstreet Corporation. Because the distribution of small businesses is highly skewed when ranked by the number of employees, interview quotas were used to increase the number of larger firms in the sample. Once the data were compiled, the responses were weighted to reflect population proportions based on U.S. Census data, yielding a sample of 792 observations.

The demographic characteristics of the sample—industry, sales growth, business age, employment, owner education, and owner age—are summarized in Exhibit 1. For each attribute, we group responses into three to five categories. Our goal was to ensure that each group contains enough responses so we can draw inferences about how firm behavior differs across categories.

Insert Exhibit 1 here

\[^\text{7} \text{ Ibid, fn. 3.}\]
Exhibit 1 shows 72 percent of the sample firms are in construction, manufacturing, retail, or wholesale, all industries requiring substantial capital investments. Service industries, where capital expenditures may have less importance, account for 20 percent of the sample.

The sample is distributed evenly across four real sales growth categories. The high growth category is defined as a cumulative (not annualized) increase of 20 percent or more over the past two years, and includes 24 percent of the sample firms. At the other extreme, 24 percent of the firms report two-year sales declines of 10 percent or more. This distribution implies that approximately 75 percent of the sample firms have experienced an average annualized growth rate of 10 percent or less over the last two years. Thus, many of the capital budgeting decisions of small firms may be focused more on maintaining current levels of service and quality, rather than on expansion.

Similarly, the sample is distributed fairly evenly across four business age categories, ranging from six years in business or less (23 percent of the sample), to 21 years in business or more (27 percent of the sample). The number of years in business could influence the type of investments a firm will make or the firm’s planning process. For example, firms in business longer may have more equipment in need of replacement. Or, if a business has a limited operating history, the firm may not be able to obtain bank loans unless it can demonstrate that it has appropriate planning processes in place.

The median (mean) number of total employees is 4 (9). Sixteen percent of the firms have only one employee, and only 18 percent have 10 or more total employees. Thus, it is likely that many sample firms do not have complete management teams, as Ang (1992) argues. In addition, firms with few employees may not have adequate personnel resources to fully analyze capital budgeting alternatives.

The data in Exhibit 1 also suggests that the educational background of owners could influence how the firm makes capital budgeting decisions. Over 50 percent of the sample firms do not have (at least) a four year college degree, and only 13 percent have an advanced or profes-
ional degree. Therefore, many of the small-business owners may have an incomplete (or incorrect) understanding of how capital budgeting alternatives should be evaluated.

Finally, 63 percent of the business owners are at least 45 years old, and 32 percent are 55 or older. There is at least some prior evidence (e.g., Graham and Harvey, 2001) that capital budgeting sophistication is lower in subsets of older executives.

III. Survey Results

We use the NFIB survey to address three questions concerning the capital budgeting activities of small firms. We first consider the question of whether the investment and financing activities of small firms conform to the assumptions underlying capital budgeting theory. Then, we look at the overall planning activities of small firms—use of business plans, consideration of tax implications, etc.—and identify firm characteristics that tend to be present when more sophisticated practices are in place. Finally, we provide evidence about the specific project evaluation techniques small firms use (e.g., payback period, discounted cash flow methods, etc.). We report on the results of these procedures in Sections A through D. In Sections A, B, and C, we identify significant differences between the average responses in various subsets of firms and the overall sample averages using a binomial Z-score. In Section D, we use multinomial logit to evaluate how the choice of investment evaluation tools is related to a set of firm characteristics.

A. Investment Activity

Exhibit 2 describes the investment activities of sample firms. The exhibit identifies the firms’ most important type of investment over the past 12 months, and reports the percentage of firms that will delay a potentially profitable investment until the firm has enough internally generated cash to fund the project (see footnote 4).

Insert Exhibit 2 here

Exhibit 2 shows that the most important type of investment is ‘replacement’ for 46 percent of the sample firms. Firms in service industries were more likely than the average sample
firm to select this response, while those in construction and manufacturing were less likely. Firms with the highest growth rates and those in business less than 6 years were less likely than the average sample firm to report replacement activity as the primary investment type. Finally, the importance of replacement activity increases with the age of the business owner, and is significantly less than the overall sample mean when the business owner is younger than 44.8

Projects to extend existing product lines were listed as the primary investment activity by 21 percent of the sample firms. The percentage of firms selecting this response was higher than the overall sample average for construction and manufacturing firms. The remaining sub-sample averages were not significantly different than the overall sample averages (at the 5 percent significance level).

Investments in new product lines were reported as the most important investment type for 23 percent of the sample firms. Firms in the service industry were less likely than the average sample firm to select this response. Firms with the highest growth rates were more likely (than the overall sample average) to be expanding into new product lines, while those with the lowest growth rate were less likely. The oldest firms were also less likely than the average firm to be attempting to expand into new product lines.

Exhibit 2 also suggests that many small firms face real (or self-imposed) capital constraints. Forty-five percent of the sample firms report that they would delay a promising investment until it could be financed with internally generated funds (wait for cash). Firms most likely to wait for cash include the youngest firms (less than 6 years old), the smallest firms (one employee), and those where the owner does not have a college (or advanced) degree. As these

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8 The significance of the sub-sample entries depends on the difference between the sub-sample mean and the overall sample mean in a given column, and on the number of observations in the sub-sample (most of these numbers appear in Exhibit 1). Thus, it is possible for two sub-samples to have similar response percentages, with one being significant and the other not. For example, 54 percent of the service firms identify replacement as the primary investment type, while 55 percent of the firms in the ‘other’ industry category selected this investment type. However, this response percentage is significantly different from the overall sample average for service firms, but not for the ‘other’ firms. As shown in Exhibit 1, the service industries contain over twice as many firms as the ‘other’ category.
firms are likely to face capital market constraints, this result supports the prediction in Almeida, Campello, and Weisbach (2004) that capital constraints will increase a firm’s propensity to save cash. Firms with older owners are also slightly more likely to wait for cash than are firms with younger owners.

These results suggest three reasons why small firms might not follow the prescriptions of capital budgeting theory when evaluating projects. First, it is noteworthy that replacement activity is the most important type of investment for almost half of the sample firms. If replacing old equipment is necessary for the firm to remain in business, the owner’s capital budgeting decision is essentially a choice between replacing the machine and staying in business, or closing the business and finding employment elsewhere. In this case, maintaining the viability of the firm as a going concern, rather than maximizing its value, might be the owner’s primary objective.

Second, the results suggest that many small firms place internal limits on the amount they will borrow. Thus, many small firms cannot (or choose not to) separate investment and financing decisions, which is in conflict with capital budgeting theory.

Finally, the results suggest that the personal financial planning considerations of business owners may affect the investment and financing decisions of small firms, with older owners being more conservative in their strategies than younger owners (i.e., older owners focus more on replacement activity and are more likely to report that they will wait for cash). These results conflict with the assumptions underlying capital budgeting theory, where the transferability of ownership interests (at low cost) allows managers to separate the planning horizon of a business from the planning horizon of its owners.

**B. Planning Activity**

Exhibit 3 analyzes three dimensions of each firm’s planning environment. In particular, the exhibit identifies how frequently firms estimate cash flows when making capital budgeting decisions, whether they have written business plans, and if they consider tax implications when making capital budgeting decisions.
Exhibit 3 reports that only 31 percent of the firms have a written business plan in place. Over 30 percent of the sample firms do not estimate future cash flows when making investment decisions, and 26 percent of the firms do not consider the tax implications of investment decisions. Thus, many small firms do not have a formal planning system in place to guide their capital budgeting decisions.

Exhibit 3 reveals that firms with the highest growth rates (over 20 percent growth) are more likely to use each of these planning tools. The response rates are significantly higher than the overall sample mean for written business plans and the consideration of tax effects. Similarly, firms that extend existing product lines or invest in new lines of business engage in more planning activities than the average sample firm. As firms expand, they use up more of their borrowing capacity, reducing their future financial flexibility (assuming that they face capital constraints). For these firms, it may be essential to plan ahead, so the firm is not forced to bypass promising opportunities in the future.

Newer firms (less than 6 years old) and younger owners (less than 45 years old) are more likely than other firms to use written business plans. This is an expected result if banks require evidence of planning sophistication before extending credit to firms with limited operating histories.

The smallest firms (3 or less employees) are less likely to make cash flow projections, while firms with 10 or more employees are more likely to make these estimates. This finding supports conjectures made by Ang (1992) and Keasey and Watson (1993) that personnel constraints (incomplete management teams) may limit the ability of small firms to engage in planning activities.

The planning activities of small firms are also strongly related to the educational background of the business owner. If the business owner does not have a college degree, the firm is less likely than the average firm to make cash flow projections or to use written business plans.
However, if the business owner has an advanced/professional degree, the firm is more likely to engage in such activities.

C. Project Evaluation Methods

Exhibit 4 summarizes responses to the survey question asking firms to identify the primary tool used to assess a project’s financial viability. The evaluation methods included in the survey were payback period, the accounting rate of return, discounted cash flow analysis, gut feel, or combination.

Exhibit 4 reveals that the most common tool is the least sophisticated: ‘gut feel.’ This method of analysis was selected by 26 percent of the sample firms.\(^9\) The use of gut feel is strongly related to the business owner’s educational background. Owners without a college degree use this method most frequently, while owners with advanced degrees are less likely to use this method. The use of gut feel is also inversely related to a firm’s use of planning tools. In particular, firms with written business plans and those that make cash flow projections are significantly less likely to rely on gut feel when making investment decisions. Thus, the use of gut feel as an investment evaluation tool is concentrated in the least sophisticated of the small firms: those where the business owner does not have a formal education, and firms without an overall planning system in place.

However, Exhibit 4 also shows that gut feel is widely used by firms that primarily make replacement investments. A firm may have limited options when replacing equipment, and estimating future cash flows (i.e., incremental maintenance costs or efficiency gains) for each available option might be difficult. In addition, if the investment is necessary for the firm’s survival (and the owner is committed to maintaining the business as a going concern), the maximization of firm value may not be the business owner’s primary objective when making this type of invest-

\(^9\) Similarly, Vos and Vos (2000) find that ‘intuition’ is the most frequently used project evaluation technique in a survey of 238 small New Zealand businesses.
ment. Instead, the owner may simply look for the alternative promising the required level of performance at the most reasonable cost. Thus, it is not surprising to find that small business owners use relatively unsophisticated methods of analysis when evaluating replacement options.

Gut feel is also used extensively by firms in the service industry. Although some service firms make substantial capital expenditures, the investments of many service firms might be limited to business vehicles (e.g., delivery trucks) or office equipment. Because a firm’s primary considerations when evaluating this type of purchase decision might be cost, reliability, and product features, structuring a discounted cash flow analysis of these investments can be difficult.

The second most common response was the payback period, selected by 19 percent of the sample. Although the use of the payback period is not strongly related to most firm characteristics, three items are worth mentioning. First, the payback period is used slightly more often by firms who will wait for cash, as expected. Second, firms using the payback period are significantly more likely than other firms to estimate future cash flows (because cash flow estimates are required for this calculation). Finally, the use of the payback period appears to increase with the formal education of the business owner. These results suggest that the payback period conveys important economic information in at least some circumstances. For example, the payback period can be a rational project evaluation tool for small firms facing capital constraints (i.e., firms that do not operate in the perfect financial markets envisioned by capital budgeting theory). In this case, projects that return cash quickly could benefit a firm by easing future cash flow constraints.

The accounting rate of return was next, identified by 14 percent of the firms as their primary evaluation method. The use of accounting rate of return increases with the firms’ growth rates, and is significantly greater than the sample mean for those firms entering new lines of business. Each of these characteristics can indicate high borrowing needs. Therefore, the accounting rate of return is especially important if a firm must provide banks with periodic financial statements, or is required to comply with loan covenants based on financial statement ratios.

The most theoretically correct method—discounted cash flow analysis—is the primary
investment evaluation method of only 12 percent of the firms. Not surprisingly, owners with advanced/professional degrees are most likely to use this method, with 17 percent of these firms identifying it as their primary evaluation tool. Firms with written business plans and those that consider the tax implications of investments are also significantly more likely to use discounted cash flow techniques. Thus, firms using this project evaluation method are among the most sophisticated of the small firms. Supporting the arguments outlined in Section I.B, firms extending existing product lines are significantly more likely to use discounted cash flow analysis than are other firms. Another noteworthy finding is that 18 percent of the firms in business less than six years use this method, the most of any age group. Although younger firms are less likely to have complete management teams in place, it is also possible that banks encourage younger firms to demonstrate that adequate planning (and project evaluation) procedures are in place before extending credit.

Of the specific evaluation techniques firms could choose from, ‘combination’ was selected least often, by 11 percent of the firms. The use of this method does not appear to be strongly related to any of the firm characteristics listed in Exhibit 4.

The results in Exhibit 4 stand in stark contrast to those in Graham and Harvey (2001). In their study, approximately 75 percent of the firms evaluate projects using estimates of project net present value or internal rate of return. In addition, the vast majority of the firms in their study appear to consider multiple measures of project value when making investment decisions. However, even the smaller firms in their study are much larger than the firms in the NFIB survey, and are thus more likely to have complete management teams in place. For this reason, it is not surprising that the firms in their study use more sophisticated methods of project analysis than the firms in the NFIB sample.

D. Multivariate Analysis

To provide a multivariate perspective on how small firms make investment decisions, we use multinomial logit to jointly identify factors influencing the choice of a project evaluation tool.
This technique is appropriate when an unordered response, such as the set of project evaluation tools, has more than two outcomes. Exhibit 5 reports the results of this exercise, with gut feel as the omitted category. Thus, the coefficients listed in Exhibit 5 should be interpreted as the increase (for a positive coefficient) or the decrease (for a negative coefficient) in the log odds between the evaluation tool shown and gut feel.

The results in Exhibit 5 show that firms using any of the formal investment evaluation tools (payback period, accounting rate of return, discounted cash flows, or combination) are more likely to make cash flow projections than firms using gut feel. In addition, firms using the accounting rate of return, discounted cash flows, or combination are more likely to consider tax implications when evaluating projects. These results corroborate those in Exhibit 4—firms using gut feel to evaluate projects have much weaker overall planning environments than other firms.

Exhibit 5 also identifies factors that differentiate between firms attaching primary importance to the various investment evaluation tools. Most notably, Exhibit 5 suggests that capital constraints and the type of investment (e.g., replacement, expand product line, new line) can influence how firms evaluate projects.

The wait for cash coefficient is positive and significant for both payback period and discounted cash flow analysis. These results suggest that firms committed to funding projects internally (i.e., they will wait for cash) are not necessarily irrational or unsophisticated. Instead, the decision to wait for cash might be an acknowledgement that the firm does not operate in perfect financial markets, and faces capital constraints. Because the firm knows that it may not be able to fund all valuable projects, it will evaluate projects using the payback period (to help it allocate investment funds over a multi-year horizon) or discounted cash flow analysis (to help it identify the best projects).

The accounting rate of return is favored by firms pursuing either growth strategy: expand product line or new product line. The coefficients for both of these variables are positive and sig-
significant for accounting rate of return. As a firm grows, it may need to raise new capital, either by obtaining a bank loan or by attracting new equity investors. In either case, the firm’s historical and projected financial statements will be used to communicate information about the firm to investors. The accounting rate of return can be valuable to firms pursuing growth strategies because it provides information about how a project will affect a firm’s financial statements (and its ability to meet accounting-based loan covenants).

The importance of discounted cash flow analysis depends on the type of growth the firm is pursuing. The coefficient for expanding an existing product line is positive and significant for discounted cash flows, but the coefficient for new product line is not. Firms will use discounted cash flows to evaluate projects extending existing product lines because future cash flow estimates can be based on past performance in this case. But, if it is entering a new product line, where obtaining future cash flow estimates can be difficult, the firm is less likely to use a discounted cash flow method of analysis. As in Exhibit 4, these results confirm the arguments outlined in Booth (1996), and in Section I.B, above.

IV. Conclusions

Using survey data, we document the capital budgeting practices of small firms, defined as those with less than 250 employees. We find that these firms analyze potential investments using much less sophisticated methods of analysis than those recommended by capital budgeting theory and those employed by larger firms (Graham and Harvey, 2001). In particular, discounted cash flow analysis is employed less frequently than gut feel, payback period, and accounting rate of return.

Because many small-business owners have limited formal education, a lack of financial sophistication is certainly an important reason why the capital budgeting practices of small firms differ so dramatically from the recommendations of finance texts. And, small staff sizes also constrain the amount of capital budgeting analyses the firms can perform. However, we also pro-
pose substantive reasons why small firms do not rely on discounted cash flow analysis when evaluating projects.

First, many small firms face capital constraints, and thus do not operate in the perfect capital markets required by capital budgeting theory. Most of the firms in our sample are very small (i.e., have less than 10 employees), have limited operating histories (almost half have been in business for less than 10 years), and have owners without a college education. These characteristics may limit the amount of bank credit the firms can obtain. If so, the firms may be required to finance some future investments using internally generated funds, and it is not surprising that measures of project liquidity (such as the payback period) are considered when making investment decisions.

Second, many of the investments made by small firms cannot easily be evaluated using the discounted cash flow techniques recommended by capital budgeting theory. Many investments by small firms are not discretionary (i.e., the firm must make a specific investment or go out of business) and future incremental cash flows (other than direct purchase costs) can be difficult to isolate. For example, if a firm must replace a delivery truck, it may be difficult for the firm to estimate differences in the future annual operating costs of two replacement vehicles under consideration. Or, when a firm is introducing a new product line, estimates of future cash flows can be imprecise (and market research studies required to obtain better future cash flow estimates may not be cost effective), reducing the value of discounted cash flow analysis. Thus, it is not surprising that gut feel is frequently used by small firms to analyze certain investments.

These results suggest that capital budgeting theory, as presented in most corporate finance texts, may not be the appropriate method of analysis for every small firm investment decision. If a firm faces capital constraints, the payback period and the accounting rate of return can provide managers with useful (albeit incomplete) information about the value of a project. And, for projects where future cash flows cannot be easily estimated, discounted cash flow analysis may not provide a reliable estimate of a project’s contribution to firm value, making it necessary
for the firm to rely on other project evaluation methods. The small business literature (i.e., Ang 1992 and Keasey and Watson 1993) describes some of the specific capital budgeting challenges small firms face, but a fully integrated capital budgeting theory—identifying the conditions under which discounted cash flow analysis is appropriate—has yet to be developed. The question of how to better tailor the prescriptions of capital budgeting theory for small firms remains an important topic for future research.
References


