Harvard Business Review

Finance And Investing

# How Fast Can Your Company Afford to Grow?

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From the Magazine (May 2001)

Everyone knows that starting a business requires cash, and growing a business requires even more—for working capital, facilities and equipment, and operating expenses. But few people understand that a profitable company that tries to grow too fast can run out of cash—even if its products are great successes. A key challenge for managers of any growing concern, then, is to strike the proper balance between consuming cash and generating it. Fail to strike that balance, and even a thriving company can soon find itself out of business—a victim of its own success.

Fortunately, there's a straightforward way to calculate the growth rate a company's current operations can sustain and, conversely, the point at which it would need to adjust operations or find new funding to support its growth. In this article, we will lay out a framework for managing growth that takes into account three critical factors:

- A company's operating cash cycle—the amount of time the company's money is tied up in inventory and other current assets before the company is paid for the goods and services it produces.

- The amount of cash needed to finance each dollar of sales, including working capital and operating expenses.

- The amount of cash generated by each dollar of sales.

Together, these three factors determine what we call the *self-financeable growth* (SFG) *rate*—that is, the rate at which a company can sustain its growth through the revenues it generates without going hat in hand to financiers.

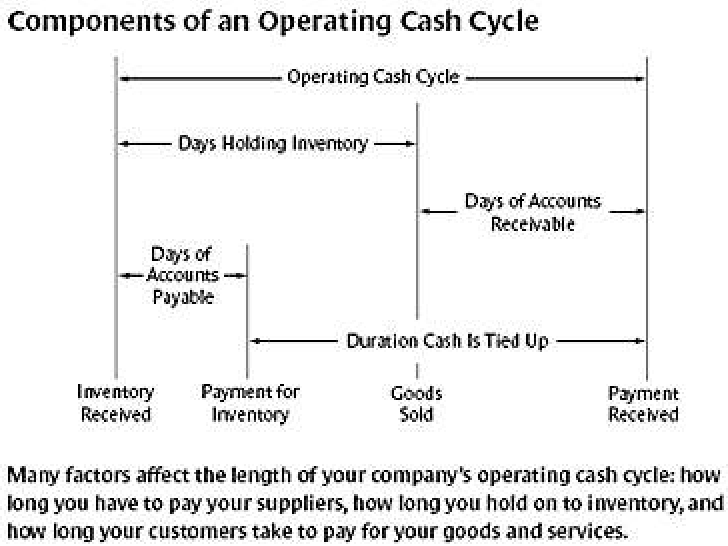
The usefulness of this framework goes beyond the calculation of a sustainable growth rate. It can also give managers practical insights into how efficiently their operations are running, how profit margins affect their ability to fuel faster growth, which of their product lines and customer segments hold the greatest growth potential, and what kinds of businesses might be attractive investment targets.

## Three Levers for Growth

To begin, we'll show how the SFG rate is calculated in a simplified example for a hypothetical company we'll call Chullins Distributors. Then we'll demonstrate how the three factors work as levers that can be manipulated to enhance Chullins's ability to grow from internally generated funds. To determine the SFG rate, we must first calculate each of the three factors that compose it.

### The Operating Cash Cycle.

Every business has an *operating cash cycle* (OCC), essentially the length of time a company's cash is tied up in working capital before that money is finally returned when customers pay for the products sold or services rendered. Companies that require little inventory and are paid by their customers immediately in cash, like many service firms, have a relatively short OCC. But companies that must tie up funds in components and inventory at one end and then wait to collect accounts receivable at the other have a fairly long OCC. All other things being equal, the shorter the cycle, the faster a company can redeploy its cash and grow from internal sources. (See the exhibit “Components of an Operating Cash Cycle.”)




Components of an Operating Cash Cycle Many factors affect the length of your company’s operating cash cycle: how long you have to pay your suppliers, how long you hold on to inventory, and how long your customers take to pay for your goods and services.

To calculate Chullins’s OCC, take a look at its most recent income statement and balance sheet, shown in the exhibit “Chullins Distributors’ Financial Statements.” At the right side of the balance sheet, we see that customers pay their invoices in 70 days and that inventory is held for an average of 80 days before it’s sold. So the cash that Chullins invests in working capital is tied up for a total of 150 days. That’s Chullins’s operating cash cycle.

**Chullins Distributors' Financial Statements**

| Income Statement (in 000's) | | |
|---|---|---|
| Sales | $2,000 | 100.0% |
| Cost of sales | 1,200 | 60.0 |
| Gross profit | 800 | 40.0 |
| Operating expenses | 700 | 35.0 |
| Net profit after tax | $100 | 5.0% |

| Balance Sheet (in 000's) | | | |
|---|---|---|---|
| Cash | $ 10 | | |
| Accounts receivable | 384 | | 70 days* |
| Inventory | 263 | | 80 days |
| Total current assets | | $657 | |
| Plant and equipment | $25 | | |
| **Total assets** | | $682 | |
| Accounts payable | $99 | | 30 days |
| Bank loan payable | 50 | | |
| Total current liabilities | | $149 | |
| Contributed capital | $350 | | |
| Retained earnings | 183 | | |
| Total owners' equity | | $533 | |
| **Total equities** | | $682 | |

*Calculate the number of days as follows. For accounts receivable, divide the dollar amount ($384) by the daily *sales* ($2,000 ÷ 365). For inventory and accounts payable, divide the dollar amounts ($263 and $99) by the daily *cost of sales* ($1,200 ÷ 365).

Chullins Distributors' Financial Statements

Fortunately, Chullins's cash isn't really tied up for the entire OCC. We need to take into account the delay between the time Chullins receives supplies and the time it pays for them. As the exhibit shows, the company is on 30-day credit terms with its suppliers, so cash is not actually expended for inventory the moment it arrives but, rather, 30 days afterward, when the supplier is paid. This shortens the time the cash is tied up for inventory and accounts receivable (ultimately, therefore, for cost of sales) to only 120 days, or 80% of the 150-day cycle.

Of course, in addition to working capital, we must also account for the cash needed for everyday operating expenses—payroll, marketing and selling costs, utilities, and the like. These expenses are paid from time to time throughout the cycle, and the cash for them may be tied up anywhere from 150 days (for bills paid on the first day of the cycle) to zero days (for invoices paid on the same day the company receives its cash from customers). We shall assume, though, that bills are paid more or less uniformly throughout the cycle and so are outstanding, on average, for half the period, or 75 days. A summary of the duration Chullins's cash is tied up for cost of sales and operating expenses appears in the exhibit "Chullins Distributors' Operating Cash Cycle"; to simplify this first example, we've included income taxes within operating expenses and ignored depreciation.

**Chullins Distributors' Operating Cash Cycle**

| | Base Case | |
|---|---|---|
| **Duration Cash Is Tied Up** (in days) | | |
| Accounts receivable | 70 | |
| Inventory | 80 | |
| OCC | **150** | |
| Accounts payable | 30 | |
| Cost of sales | 120 | |
| Operating expenses | 75 | |
| **Income Statement** | | |
| Sales | $1.000 | |
| Cost of sales | 0.600 | |
| Operating expenses | 0.350 | |
| Total costs | $0.950 | |
| Profit (cash) | $0.050 | |
| **Amount of Cash Tied Up per Sales Dollar** | | |
| Cost of sales | $0.600 × (120 ÷ 150) = | $0.480 |
| Operations | $0.350 × (75 ÷ 150) = | $0.175 |
| Cash required for each OCC | | $0.655 |
| **Cash Generated per Sales Dollar** | | $0.050 |
| **SFG Rate Calculations** | | |
| OCC SFG rate | $0.050 ÷ $0.655 = | 7.63% |
| OCCs per year | 365 ÷ 150 = | 2.433 |
| Annual SFG rate | 7.63% × 2.433 = | 18.58% |
| Compounded annual SFG rate | $(1 + 0.0763)^{2.433} - 1 =$ | 19.60% |

Chullins Distributors' Operating Cash Cycle

### The Amount of Cash Tied Up per Cycle.

Now that we know how long Chullins's cash will be tied up, we next calculate how much cash is involved. The income statement shows that to produce one dollar of sales, Chullins incurs 60 cents in cost of sales, money that Chullins must invest in working capital, which we've already determined is tied up for 80% of the 150-day cycle. The average amount of cash needed for cost of sales over the entire cycle is thus 80% of 60 cents, or 48 cents per dollar of sales.

The income statement also shows that Chullins must invest 35 cents per dollar of sales to pay its operating expenses throughout the cycle. Since we've calculated that this cash is tied up, on average, for half the cycle, or 75 days, the average amount of cash needed for operating expenses over the entire cycle is 17.5 cents per dollar of sales. So all in all, Chullins must invest a total of 65.5 cents per dollar of sales over each operating cash cycle.

**The Amount of Cash Coming In per Cycle.**

Happily, Chullins is a thriving, profitable business: after using 60 cents of each sales dollar for working capital to support cost of sales and another 35 cents for operating expenses, it reaps a full dollar at the end of the cycle. To finance another trip around the cycle at the same level of sales, it will need to reinvest 95 cents of that dollar, 60 cents for cost of sales and 35 cents for operating expenses. The extra 5 cents that each dollar of sales produces can be invested in additional working capital and operating expenses to generate more revenue in the next cycle. How much more revenue? A simple calculation will lead us to that number—the SFG rate—for each cycle.

## The Maximum SFG Rate

Suppose Chullins decides to invest the entire 5 cents in working capital and operating expenses to finance additional sales volume. Assuming the company has the productive capacity and marketing capability to generate additional sales, adding the 5 cents to the 65.5 cents already invested would increase its investment by 7.63% each cycle,[1] which directly translates into a 7.63% increase in sales volume in the next cycle.

If Chullins can grow 7.63% every 150 days, how much can it grow annually? Since there are 2.433 cycles of 150 days in a 365-day year, the company can afford to finance an annual growth rate of 2.433 times 7.63%, or 18.58%, on the money it generates from its own sales. Its SFG rate, in other words, is 18.58%.

Of course, in each subsequent cycle, Chullins is earning more and more, and this calculation has not taken into account the compounding effect. If it did, the SFG would come out to 19.60%.[2] As a practical matter, though, unless your operating cash cycle is very short—less than about 100 days—the simpler straight-multiplication calculation is sufficient. That's because our framework assumes a company's past performance is an accurate predictor of its future performance, which most managers know is a tenuous assumption at best. So using the more conservative SFG figure offers some measure of protection from unanticipated slips in performance.

What does that 18.58% figure tell us? If Chullins grows more slowly than 18.58% (assuming all variables remain constant), it will produce more cash than it needs to support its growth. But if it attempts to grow faster than 18.58% per year, it must either free up more cash from its operations or find additional funding. Otherwise, it could unexpectedly find itself strapped for cash.

## Pulling the Levers

Chullins may see a market opportunity to grow faster than 18.58% and, for any number of reasons, may want to fund it by internal, not external, financing. The company could afford to grow faster by manipulating any of the three levers that determine its SFG rate. Our framework shows how each of these decisions will change the maximum growth rate Chullins can afford to finance by itself.

### Lever 1: Speeding Cash Flow.

Suppose Chullins's accounts receivable manager can get customers to pay faster, shrinking collection time from 70 days to 66. Let's also suppose that management can improve the rate at which it turns its inventory, perhaps through better forecasting, thereby reducing the time its cash is tied up from 80 days to 74. These changes reduce the OCC from 150 to 140 days. The company is still paying the same 60 cents for every dollar of inventory, and it's still on 30-day terms.

Now that the 60 cents is tied up for only 110 out of 140 days, the cash needed for inventory over the entire cycle is reduced from 48 cents to 47.1 cents (see the figures for Lever 1, calculated in the same way as in the previous exhibit, in "Pulling the Three Levers to Manage Cash for Growth"). Operating expenses remain at 35 cents and are still tied up for half the OCC, so 17.5 cents is still needed each cycle for operating expenses. Thus, the company needs 64.6 cents cash to generate one dollar of sales in each cycle. It still generates 5 cents profit, so the extra 5 cents will generate 7.73% more sales (5 divided by 64.6 cents) for each cycle. There are now more cycles per year (2.607 rather than 2.433), so that slight increase in growth per cycle works out to an annual SFG rate of 20.17%. The framework clearly shows the effect of better asset management: by modestly decreasing the amount of time for inventory turnover (7.5%) and for collecting receivables (5.7%), Chullins increases the amount it can afford to grow by slightly more than 1.5 percentage points.

**Pulling the Three Levers to Manage Cash for Growth**

| | Lever 1: Speeding Cash Flow | Lever 2: Reducing Costs | Lever 3: Raising Prices | |
|---|---|---|---|---|
| **Duration Cash Is Tied Up (in days)** | | | | |
| Accounts receivable | 66 | 70 | 70 | |
| Inventory | 74 | 80 | 80 | |
| OCC | 140 | 150 | 150 | |
| Accounts payable | 30 | 30 | 30 | |
| Cost of sales | 110 | 120 | 120 | |
| Operating expenses | 70 | 75 | 75 | |
| **Income Statement** | | | Unadjusted | Adjusted |
| Sales | $1.000 | $1.000 | $1.015 | $1.0000 |
| Cost of sales | 0.600 | 0.590 | 0.600 | 0.5911 |
| Operating expenses | 0.350 | 0.345 | 0.350 | 0.3448 |
| Total costs | $0.950 | $0.935 | $0.950 | $0.9360 |
| Profit (cash) | $0.050 | $0.065 | $0.065 | $0.0640 |
| **Amount of Cash Tied Up per Sales Dollar** | | | | |
| Cost of sales | $0.471 | $0.4720 | $0.4729 | |
| Operations | $0.175 | $0.1725 | $0.1724 | |
| Cash required for each OCC | $0.646 | $0.6445 | $0.6453 | |
| **Cash Generated per Sales Dollar** | $0.050 | $0.065 | $0.064 | |
| **SFG Rate Calculations** | | | | |
| OCC SFG rate | 7.73% | 10.09% | 9.92% | |
| OCCs per year | 2.607 | 2.433 | 2.433 | |
| Annual SFG rate | 20.17% | 24.54% | 24.15% | |
| Compounded annual SFG rate | 21.44% | 26.34% | 25.89% | |

Pulling the Three Levers to Manage Cash for Growth

| | Pulling Multiple Levers |
|---|---|
| | 66 |
| | 74 |
| | 140 |
| | 30 |
| | 110 |
| | 70 |
| | |
| | $1.000 |
| | 0.590 |
| | 0.345 |
| | $0.935 |
| | $0.065 |
| | |
| | $0.4636 |
| | $0.1725 |
| | $0.6361 |
| | $0.065 |
| | |
| | 10.22% |
| | 2.607 |
| | 26.64% |
| | 28.87% |

Many entrepreneurs understand in a general way the importance of effectively managing cash flow. Using the tools presented in this article, they can calculate the real impact of any proposed changes in their working capital on the rate at which they can grow.

**Lever 2: Reducing Costs.**

Instead of speeding up cash flow, management could seek to decrease the amount of cash it needs to invest. Suppose Chullins's managers can negotiate better prices from key suppliers, thereby reducing the cost of sales from 60% to 59%. Suppose they can trim operating expenses by half a percentage point as well, dropping from 35% to 34.5% of sales. That would reduce the cash required to finance the next cycle from 65.5 cents to 64.45 cents, a savings of 1.05 cents per dollar of sales. If Chullins passed on these savings to its customers to hold its profit margin at 5%, the savings would have little impact on its ability to finance further growth, as its SFG rate would increase infinitesimally from 18.58% to 18.88%.

But if prices were held constant, the extra cash generated in each cycle would rise from 5 cents per dollar of sales to 6.5 cents. Now, needing only 64.45 cents to generate each dollar of sales in each cycle and generating 6.5 cents profit on each dollar, Chullins can generate 10.09% more sales in the next cycle, for an annualized SFG rate of 24.54%. (See the figures for Lever 2 in the exhibit.)

Look at the power of the profit margin. An increase of 1.5 percentage points in the net margin led to an increase of six percentage points from the original 18.58% in the rate at which Chullins can grow—that's an increase of 32% in its SFG rate. Companies with huge gross margins, such as many software companies (which can produce CDs for only a few dollars and sell them for hundreds), are able to grow so fast because they need to tie up relatively little cash for inventory and because their high profit margins generate lots of cash for growth.

**Lever 3: Raising Prices.**

Rather than reduce costs, Chullins could achieve essentially the same result by raising prices (assuming the market would bear it). Suppose management thinks it can raise prices 1.5% without dampening demand. That too raises profit margins from 5 cents to 6.5 cents. If all costs remain the same, the higher prices would, in effect, lower the cost of sales and operating expenses. The result is that Chullins would be able to sustain a growth rate of 24.15%, slightly lower than it could afford if it instead reduced costs while keeping its price steady, since in that case, slightly more cash is invested during the cycle. (See the figures for Lever 3 in the exhibit.)

**Pulling Multiple Levers.**

There is, of course, nothing to prevent management from using more than one lever at a time. If Chullins could manage to both speed its cash flow and reduce costs, it would be able to sustain an annual growth rate of 26.64%—43% more than its original growth rate—without going to external sources of capital. (See the figures in the exhibit for using multiple levers.)

## Adding Complexity to the Framework

So far, we've considered a simplified situation: the operating cash cycle encompasses all the cash flows involved in generating sales, and there are no non-cash expenses, so profit equals cash at the end of each cycle. We've included income taxes in operating expenses and ignored depreciation. In reality, however, the effects of taxes and depreciation are more complex than this, and we can account for them within the framework.

**Income Taxes.**

Two complications arise regarding income taxes for most companies: taxes are not paid uniformly over a company's OCC (in the United States, for example, taxes are paid quarterly), and their calculation includes noncash expenses such as depreciation.

Let's assume that 40% of pretax profits are paid quarterly in income taxes. As we did with operating expenses, we'll treat income taxes as if we paid them uniformly throughout the 90-day quarter such that cash for taxes will be tied up for 45 days and will accrue for 45 days. To make the example comparable, we must adjust the figures so that Chullins generates 5% profit from operations after taxes rather than before (which we do by raising pretax profits from sales to 8.3%). Cash for cost of sales and operating expenses remains the same, but we must now include cash for income taxes (3.3% for 105 of the cycle's 150 days, since we subtract the 45 days when taxes will not have been paid). Chullins's ability to grow according to this more precise treatment, 18.39%, is barely less than the 18.58% in our original example. That's because cash tied up for income taxes is very small relative to the amount needed for cost of sales and operating expenses.

**Depreciation and Asset Replacement.**

In most companies, depreciation expenses are offset wholly or mostly by real cash used to maintain their asset bases. Equipment must be replaced, facilities updated, and so on, just to maintain a company's current rate of sales. To include these costs, we will use the depreciation figure (1% of sales) that Chullins historically shows on its income statement, together with our assumptions about the company's asset replacement history.

If Chullins doesn't need to invest cash to upgrade assets (which may be true in the short term), its SFG rate rises to 19.94%. That's because the depreciation allowance saves on taxes, yielding more cash from operations (5.4% of sales rather than 5%). But if we assume that the company spends all of its depreciation allowance on asset replacement to maintain its current sales level, the SFG rate falls to 16.25%. This makes sense, because the cash being invested in asset replacement exceeds the cash generated from the tax break.

Making adjustments for taxes, depreciation, and asset replacement can be tedious, and as their impact on the SFG rate is generally extremely small, we suggest that for preliminary, back-of-the-envelope planning, managers should omit them. In a spreadsheet analysis, the calculations are relatively easier, and we include them in our remaining comparisons to be more precise.

## Investing over Many Cycles

So far, we've assumed that Chullins Distributors has enough capacity to accommodate an increase in sales without increasing fixed assets; we've also assumed that all marketing and R&D expenditures could remain at their historical levels as a percentage of sales.

At some point for almost all companies, however, these assumptions fail to hold. Plants are working around the clock, perhaps. Maybe Chullins's warehouse is bursting at the seams. Or the company needs to embark on a major promotion or costly R&D effort. In such cases, a portion of the cash generated in each operating cash cycle must be set aside to fund expenses that span a number of cycles.

### Investing in Additional Fixed Assets.

The period over which a company finances its fixed assets has a marked effect on its ability to grow, perhaps more than many managers would expect. Let's say that Chullins needs $400,000 to expand its facilities in a year in which its annual sales volume is $10 million. It must therefore set aside 4 cents of each annual sales dollar for expansion, i.e., 4 cents in cash for each sales dollar in Chullins's 150-day cycle. Deducting this amount and the 1 cent for asset replacement from its 5.4% profit leaves 0.4 cents to fund growth in subsequent cycles, and the SFG rate drops to a mere 1.48%. Chullins, therefore, may be unable to serve potential new customers just before expansion, although it could resume a faster rate of growth after the facilities are in place.

> **The period over which a company finances its fixed assets has a marked effect on its ability to grow, perhaps more than many managers would expect.**

But what if the company decides to take two years to set aside that $400,000? Then each annual sales dollar would provide cash for growth of 2.4 cents per dollar of sales, because only 2 cents per sales dollar must be set aside for expansion during each 150-day cycle. Chullins's patience would permit a faster SFG rate, 8.86%, during the funding period.

After making the investment in new capacity, Chullins could resume its previous full SFG rate, assuming that its levels of operating and working capital remain unchanged. If, however, the new investment reduces the cost of sales or operating expenses, as it might, Chullins's growth rate would increase. Of course, the company could, perhaps, lease its additional facilities, to avoid the initial cash outlay entirely. Doing so would avoid depressing its SFG rate for a year or two, as in the examples above, but would add costs over the life of the lease. Projecting the extra costs and comparing them to any additional cash the new facilities would generate would enable the company to calculate its SFG rate for this scenario.

### Investing in R&D and Marketing.

Suppose the company invests a hefty $400,000 in R&D or marketing, paid out evenly over the year. How that expense is accounted for has a major effect on Chullins's ability to finance future growth. If the investment is treated as a capital expenditure, it becomes the equivalent of purchasing a fixed asset, and the SFG drops to the same 1.48%. But how about expensing the investment in the current year for tax purposes? That will reduce Chullins's taxable income from 7.3% to 3.3%. The resulting tax savings means that cash from operations falls 2.4 percentage points rather than 4 points. For working capital, Chullins now needs 66.8 cents instead of 65.9 cents for each cycle to fund the higher level of operating expenses. Thus, allowing for tax savings, Chullins would now be generating cash at the rate of 2 cents per sales dollar, for an SFG rate of 7.29% during the period in which the additional 4% expense in R&D or marketing takes place.

### Different Product Lines Within a Business.

Different product lines, different customers, different business units, and so on often exhibit different cash and operating characteristics. Some customers, for example, may need extended terms, thereby requiring greater investments in working capital. Others may demand volume discounts. Let's give Chullins two product lines to illustrate how to use the framework to make decisions about their growth potential.

**Where Is the Most Growth Potential?**

For simplicity's sake, we've used a distribution company for our hypothetical example. But different kinds of ...

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Product A is its original line, which has a net profit margin of 4%. At 7%, Product B is a higher-margin line of customized items sold to a few large customers who require extended terms. When we calculate the SFG rate for each in the usual way, we find that even though Product A carries lower margins, the duration of its cash cycle is so much shorter (92 days versus 271 days) that its SFG rate comes to 27.08%, nearly twice Product B's 13.65%. If we assume that the prospects for growth are equal for the two product lines, Chullins will grow faster in the long run by pursuing the lower-margin Product A. Since its annual SFG rate is twice as high, a dollar of cash invested in efforts to grow Product A will bring slightly more net profit (4% profit on 27.08% additional sales will yield 1.08% more net profit) than that same dollar would reap if invested in Product B (7% net profit on 13.65% additional sales will yield 0.96% more net profit). As sales growth compounds, the advantage of Product A over Product B can only grow. Counterintuitively, perhaps, serving large new customers with their equally large demands—even at higher margins—is not always the most attractive route to growth.

## Bringing Together Operations and Asset Management

Operating management decisions (which usually focus on the income statement) and asset management decisions (which typically focus on the balance sheet) are often made by different groups of managers within an organization. Our framework provides a way to bring together these discrete kinds of decisions and managerial perspectives for a common discussion of the merits of various operating and financial strategies and their impacts on the ability of a company to finance its own growth.

This collaboration need not be restricted to companywide decisions. SFG rates can be calculated for companies of any size, for business units, or for market segments. They can be calculated from historical financial data or extrapolated from planned future performance assumptions to facilitate what-if planning. As such, the SFG framework can be the source of a new, more complete, and more powerful understanding of the consequences of managerial decisions.

1. Calculation discrepancies are due to Excel spreadsheet rounding anomalies; calculations in the spreadsheets use more precise figures.

2. To account for compounding, we must raise the multiple for each subsequent cycle (1.0763, in our case) to the *n*th power, where *n* is the number of cycles in a year (2.433 here), and then subtract 1 to get the SFG rate as a percentage. In this example, (1.0763 to the 2.433 power = 1.1960) – 1 = 19.60%.

A version of this article appeared in the May 2001 issue of *Harvard Business Review*.

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