



# A balanced approach

Stephen Wells explains how spreadsheets can be used to create a model for businesses to balance liquidity with profitability. Plus, how to stay sane when moving from 1-2-3 to Excel.

**T**o an accountant, Working Capital is simply defined as a business's current assets minus its current liabilities (current, usually meaning consumed or payable within a year). To a businessman, it is the fuel of the enterprise. Sufficient working capital ensures that a company can pay its creditors, hold adequate stocks and allow debtors reasonable time for payment. The amount required will depend not only on the size of the business, but also the type of industry it is in. But all businesses need to manage their working capital and balance liquidity (the speed of converting into cash) with profitability (the return on idle funds).

Generally speaking, longer-term financial instruments will usually pay a higher rate of return than shorter-term ones. But the responsible manager can't tie up funds for six months when they are needed in 30 days. A spreadsheet can be of help here to create a useful model.

I emphasise that the example shown here is *only* a model and not intended to be incorporated into a company's financial statements. It is concerned only with the cash portion of working capital. This is money which a company might typically roll over in Treasury Reserve accounts, pooled with others to qualify for deposit minimums.

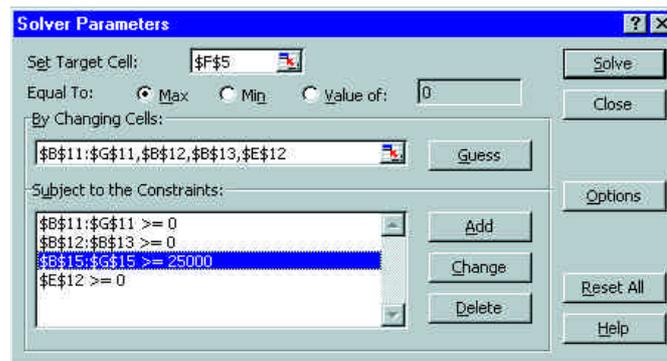
Fig 1 shows the layout. The total interest expected to be earned in the half-year is in cell F5. The current yields of the planned short-term financial instruments are in B3:B5. The starting cash is in B8. After the month-labelling row 7, the six columns B through G show the position at the start of each month; in this case, July through December. Column H shows the position at the end of the last month of the period.

The starting cash is entered in B8. The

**Fig 1 (Right)**

A worksheet for modelling potential short-term investments to maximise returns on the cash portion of Working Capital

	A	B	C	D	E	F	G	H
		Yield	Annual % Rate					
3	1-month Inst.	0.6%	7			Interest earned		
4	3-month Inst.	2.0%	8			£1,525		
5	6-month Inst.	4.5%	9					
7	Month:	July	August	September	October	November	December	Ending
8	Starting Cash:	£ 150,000	£ 90,000	£ 100,146	£ 120,292	£ 40,538	£ 25,683	£ 40,829
9	Matured Inst.		25,000	25,000	30,000	25,000	25,000	40,000
10	Interest:		146	146	246	146	146	696
11	1-month Inst.	25,000	25,000	25,000	25,000	25,000	25,000	
12	3-month Inst.	5,000			5,000			
13	6-month Inst.	10,000						
14	Cash needs:	20,000	-10,000	-20,000	80,000	15,000	-15,000	30,000
15	End Cash:	£ 90,000	£100,146	£ 120,292	£ 40,538	£ 25,683	£ 40,829	£ 51,525



**Fig 2 (Left)**

Establishing the parameters for Solver to follow: the target cell, the cells which can be changed, and the constraints

rest of row 8 shows the cash position at the end of the previous month and the start of the current one, so =B15 is entered in C8, =C15 in D8, and so on.

The initial anticipated investments in one-month, three-month and six-month instruments are entered in B11:B13. Row 14 shows the estimated cash needs of the business for each month. In many months (hopefully!) the business will generate more than its cash needs, and those amounts are entered as negative figures (as in Aug, Sep and Dec).

Row 15 shows the ending cash. C9 is entered in cell =B11 because the one-month deposit has now matured and is thus available if needed. However, it is

turned over or immediately reinvested and entered in C11. At the beginning of October, as recorded in E9, both a one-month and a three-month deposit mature; and at the end of December, H9, all three types of deposit mature.

Row 10 shows the interest earned. So =B11\* \$B\$3 is entered in C10, and =D11\* \$B\$3+B12\* \$B\$4 in E10, and =G11\* \$B\$3+E12\* \$B\$4+B13\* \$B\$5 in H10.

Cell F5 shows the total of this interest: =SUM(B10: H10)

At this point, you could fiddle around with the investments to see if you could

improve on the return. But both Excel and Lotus 1-2-3 offer a Solver tool which rapidly tries out hundreds of options for you.

In a dialog box (Fig 2) you set the Target Cell, in this case F5, and enter the cells which can be changed, here B11:G11,B13,B13,E12.

You can also establish some rules, which both Excel and 1-2-3 call Constraints. Here we've stated that all investments must be greater than, or equal to, zero. Also, it is management policy that the month-end cash balance after all transactions must always be at least £25,000.

If we now run this example using those constraints (Fig 4), Solver says we can earn £3,548 (more than a 130 percent increase) and still satisfy the same cash needs by increasing the six-month investment, not reinvesting the three-month investment in October and not making a one-month deposit in July and November. Who says computers aren't intelligent?

#### Staying sane

Even though statistically, Excel is currently the leading seller among spreadsheets, it can occasionally confuse people who have been used to Lotus 1-2-3. Take the simple matter of calculating compound growth. Let us say you bought a product for £416.90 in 1989 but the identical product is sold today for £583.66. You want to calculate the average percentage increase of the price each year. We'll enter the £416.90 in C1, £583.66 in C2 and 1997-1989 (or 8) in C3.

Lotus 1-2-3 offers the @RATE function with the arguments: Future Value, Present Value, Term. As far as an investment is concerned, logically £416.90 is the Present Value and £583.66 is the Future Value. So we enter @RATE(C2,C1,C3) in cell B1. The correct answer is displayed: an annual growth rate of 4.3 percent.

Excel also has a RATE function but its arguments are different. They are: NPER, representing the total number of payment periods for a loan or annuity; PMT is the payment made each period; PV for Present Value; FV for the Future Value; and Type, with a logical value depending on whether the payment is made at the beginning or end of each period.

If you enter the three elements which are known, Excel just returns a #NUM! error. You can enter the 1-2-3 formula, @RATE, and Excel will recognise it, but you'll still get a #NUM! error.

### EXCELlent little formulas

■ **Counting occurrences** If the range A1:A100 contains surnames, you can count the number of times that the surname in cell A10 appears in the total range A1:A100 with this formula:

`=COUNTIF(A1:A100, A10)`

■ **Counting coincidences** Using the same worksheet, now add the names of sports in the range B1:B100. You can count the number of rows in which the same particular surname occurs with the same sport by using

`SUM(IF(A1:A100="Smithson", IF(B1:B100="Cricket", 1, 0)))`

Enter as an array, using Ctrl+Shift+Enter.

■ **Conditional additions** As above, but add figures for costs in the range C1:C100. You can total the costs for the rows in which the same particular surname occurs with the same sport. Also enter as an array.

`=SUM(IF(A1:A100="Smithson", IF(B100:B100="Cricket", C100:C100)))`

■ **Joining text** If the surname in A1 is Jones and the sport in B1 is hockey, in another cell you can display Jones plays hockey with this formula:

`=A1&" plays "&B1`

■ **Joining dates** You can convert a date to text and join it with other text. If the date in cell D17 is 31/8/97 (that is, in the format dd/m/yy) you can display it in another cell as Fixture date: 31/8/97 using this formula:

`=&"Fixture date: "&TEXT(D17, "dd/m/yy")`

■ **Taking a discount** If there is an amount in cell C30 and you want to show this amount less 15 percent in another cell, you can use this formula:

`=C30*(1-15%)`

Make sure that this cell is formatted as a decimal or currency, though, not as a percentage.

Fortunately, Excel will calculate it the 1-2-3 way if you choose Tools, Options, Transition and, under Sheet Options, select the Transition formula entry check box. Click OK. Now it's just as though you were using 1-2-3 and you can enter the @RATE function with its three Lotus arguments.

Excel will change it to =RATE(C3,-C1,C2). You'll note that Excel is inserting a minus sign before the Present Value, which is enough to confuse anyone.

If your organisation has moved from 1-2-3 to Excel and you can't find a particular Lotus function that you are used to, it's worth trying this feature. But don't forget to clear the Transition formula entry check box when you're done.

#### Happy events

In days of yore, you would run a macro manually by pressing a hotkey, like Ctrl+Z, or selecting it from a menu list of macros, or by clicking a custom-made button. But VBA in Microsoft Excel 5.0 offered the opportunity to have events trigger a macro.

There were (and still are) properties like OnEntry. As soon as a user enters data on a worksheet, then a macro can run. Another property is OnUndo which triggers a macro if the Undo command is selected. I

particularly like OnTime which can automatically run a message that it's time to go to lunch at 12.50.

In all there were 14 of these events in Excel 5. Another was added in Excel 95, the OnSave event. It doesn't work if a workbook is saved by a program but is triggered when the user selects the Save or SaveAs commands from the File menu. OnSave might run a macro which simply states that the file has been saved.

Now Excel 97 has added 62 new events, many of which are very sophisticated. Among those available for use with charts, for instance, is MouseDown which occurs when the user presses the mouse button, and MouseUp when he or she releases it. The syntax includes a number of parts so that you can specify whether we're talking about the left button, right button, or middle button if you've got one. You can also specify if the macro runs with a simple press or when SHIFT, CTRL, SHIFT + CTRL, ALT, ALT + SHIFT, ALT + CTRL, or ALT + SHIFT + CTRL are pressed. Whether anyone would remember which of those variations is needed to run the macro is another matter. Maybe it will remain your little secret that you have to press the right button with ALT+CTRL?

Some of the new events are more refined versions of earlier ones. For example, there was a DoubleClick property which runs macro when the user points to an object and then clicks a mouse button twice. Now there is also the BeforeDoubleClick event which occurs when an embedded chart or worksheet is double-clicked, before the default double-click action. It could be used for overriding the default double-click behaviour in a specific instance, like someone wanting to change an element of a chart.

#### Data entry control

Excel 97 also offers an easy way to ensure that anyone entering data onto a worksheet follows your rules. Perhaps it would be more diplomatic to say you can be helpful in communicating what is expected. They still have the option of clicking in a list and choosing Data, Form, and an entry form will automatically be created.

Alternatively, you can set up the sheet as in Fig 3 so that a message such as Enter date Use format 00/00/97 automatically appears when a data entry cell is selected. If the user enters something which is not within the defined parameters, they are prevented from going further and an error message appears either as a regular error message box, or within the Office Assistant if it is active (again, as in Fig 3).

This is arranged using a new option, Validation, on the Data menu. You have many options from which to choose. The error message can be Stop, Warning, or Information. You write your own message box title and error message. It is also an option whether a title and input message is

#### Operating order

To help myself remember the order in which operators take precedence in Excel, I have devised the mnemonic, EMDAS, standing for Exponentiation, Multiplication and Division, Addition and Subtraction.

Lotus 1-2-3 can work differently in some respects but not for the following cases, which give the same results in both spreadsheets:

$2^2 * 2 + 2 / 2 - 2 = 7.0$   
 $2^2 / 2 + 2 * 2 - 2 = 4.0$   
 $2 / 2^2 - 2 + 2 * 2 = 2.5$   
 $2 + 2 / 2^2 * 2 - 2 = 1.0$   
 $2 + 2 / 2 - 2^2 * 2 = -5.0$

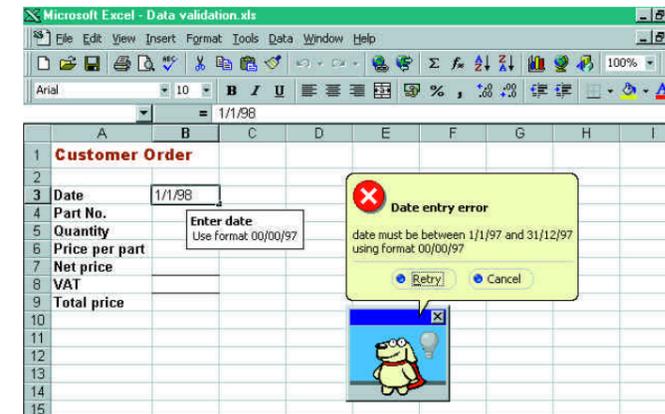


Fig 3 Excel 97 offers automatic data validation. It's easy to create parameters which must be followed and error messages if they aren't. Optional, if you have space...

displayed when a cell is selected.

If you ever have to design a template for any kind of data entry, whether for expenses, invoices, patient reports, ticket sales, you name it, you will find this built-in, easy-to-use feature can save hours of programming time.

#### Care to share?

With every new version of Excel, it becomes easier to share workbooks with other people on a network. The only limitation is that if a shared workbook were created in Excel 97, you can only make changes to it with Excel 97. But that's not unreasonable. Beyond that, the whole business of sharing is remarkably easy and there is little to be learnt. The intention is that the features be used without instruction from a systems administrator. The typical uses are for budgeting, forecasting, record keeping and project tracking.

Changes can be made in three ways. The first is that a workbook is made available on a network and different people can open it, make changes, and close it. The second is that the file can stay open on a network and several people can make changes simultaneously. The third is that a copy of the workbook can be sent to someone outside the internal network, modified, and the changes merged with the original workbook, together with a revision history.

To get started, all you do is open a workbook, then on the Tools menu choose Share Workbook and click the Edit tab. This is where you choose whether to allow more than one user at a time. Then, you save the workbook on a network location where the users can gain access to it.

Also on the Tools menu, you can select Track Changes, then Accept or Reject changes, and then the When, Who, and Where changes can be made. The When

might be "since a certain date". The Who might be "Everyone" or certain specified personnel. The Where indicates the ranges of the workbook which allow changes.

Under Tools, Track Changes, Highlight Changes, you can specify whether changes are visible on the screen, as a cell tip (when you hover the mouse over a cell), or listed on a separate worksheet, or both.

You can see who made a change, the date and time they made it and what they did (for instance, changed a numerical or text entry, or a formula). Cell borders can even be colour-coded corresponding to the person who made the changes.

#### On the PCW CD-ROM

■ In the Software Library, Hands On, Spreadsheets section there are two worksheets which are templates for financial analysis. Example.xls is for retail, wholesale or manufacturing companies (which carry stock) and Service.xls is for service companies (which don't). They can be used with Excel 4 and above, and Lotus 1-2-3 versions for Windows 3.1 and above.

■ Requests are again coming in for the templates which accompanied my series on financial analysis (Sept '94-Jan '96). I assume that people have been reading these articles on the various compilation CD-ROMs which have been issued. To satisfy demand I've included the templates on the CD-ROM, but you will have to assemble the back issues containing the explanatory articles if you need them (see "PCW Contacts", below).

#### PCW Contacts

Stephen Wells welcomes input on all spreadsheet matters. Write to him at PCW, or email [spreadsheets@pcw.vnu.co.uk](mailto:spreadsheets@pcw.vnu.co.uk)

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