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August 18, 2004

Mary L. Cottrell, Secretary
Department of Telecommunication and Energy
One South Station, 2nd Floor
Boston, MA 02202

Re: Boston Edison Company, D.T.E. 04-68

Dear Secretary Cottrell:

Enclosed please find the record request responses of Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric") asked by the Department of Telecommunications and Energy and the Attorney General in the above-referenced proceeding, as listed on the following page. Please note that the Company's response to RR-DTE-5 and several attachments related to the remaining responses are confidential and are being filed under separate cover with the Hearing Officer and the Attorney General only.

Thank you for your attention to this matter.

Very truly yours,

John K. Habib

John K. Habib

Enclosures

cc: Service List
Joan Foster Evans, Hearing Officer (2)
Colleen McConnell, Assistant Attorney General (2)

RESPONSES ATTACHED

RR-AG-1
RR-AG-2
RR-AG-3
RR-AG-4
RR-DTE-1
RR-DTE-2
RR-DTE-3
RR-DTE-5 **CONFIDENTIAL RESPONSE**
RR-DTE-6

Record Request AG-1 (Tr. 1, at 39)

Please provide copies of the pages in the FERC Form 1 documents for 2003, 2002 and 2001 which were used to determine Mr. Hevert's depreciation analysis.

Response

Please refer to Attachment RR-AG-1 for the requested information.

Attachment RR-AG-1

Name of Respondent	This Report Is:	Date of Report (Mo, Da, Yr)	Year/Period of Report
Ocean State Power	(1) [X] An Original (2) [ ] A Resubmission	04/30/2004	End of 2003/Q4

DEPRECIATION AND AMORTIZATION OF ELECTRIC PLANT (Account 403, 404, 405)
(Except amortization of aquisition adjustments)

1. Report in section A for the year the amounts for : (b) Depreciation Expense (Account 403; (c) Depreciation Expense for Asset Retirement Costs (Account 403.1; (d) Amortization of Limited-Term Electric Plant (Account 404); and (e) Amortization of Other Electric Plant (Account 405).
2. Report in Section 8 the rates used to compute amortization charges for electric plant (Accounts 404 and 405). State the basis used to compute charges and whether any changes have been made in the basis or rates used from the preceding report year.
3. Report all available information called for in Section C every fifth year beginning with report year 1971, reporting annually only changes to columns (c) through (g) from the complete report of the preceding year.
Unless composite depreciation accounting for total depreciable plant is followed, list numerically in column (a) each plant subaccount, account or functional classification, as appropriate, to which a rate is applied. Identify at the bottom of Section C the type of plant included in any sub-account used.
In column (b) report all depreciable plant balances to which rates are applied showing subtotals by functional Classifications and showing composite total. Indicate at the bottom of section C the manner in which column balances are obtained. If average balances, state the method of averaging used.
For columns (c), (d), and (e) report available information for each plant subaccount, account or functional classification Listed in column (a). If plant mortality studies are prepared to assist in estimating average service Lives, show in column (f) the type mortality curve selected as most appropriate for the account and in column (g), if available, the weighted average remaining life of surviving plant. If composite depreciation accounting is used, report available information called for in columns (b) through (g) on this basis.
4. If provisions for depreciation were made during the year in addition to depreciation provided by application of reported rates, state at the bottom of section C the amounts and nature of the provisions and the plant items to which related.

A. Summary of Depreciation and Amortization Charges

Line No.	Functional Classification (a)	Depreciation Expense (Account 403) (b)	Depreciation Expense for Asset Retirement Costs (Account 403.1) (c)	Amortization of Limited Term Electric Plant (Account 404) (d)	Amortization of Other Electric Plant (Acc 405) (e)	Total (f)
1	Intangible Plant					
2	Steam Production Plant	12,247,925				12,247,925
3	Nuclear Production Plant					
4	Hydraulic Production Plant-Conventional					
5	Hydraulic Production Plant-Pumped Storage					
6	Other Production Plant					
7	Transmission Plant	790,189				790,189
8	Distribution Plant					
9	General Plant	131,698				131,698
10	Common Plant-Electric					
11	TOTAL	13,169,812				13,169,812

B. Basis for Amortization Charges

Name of Respondent	This Report Is:	Date of Report (Mo, Da, Yr)	Year/Period of Report
Ocean State Power	(1) [X] An Original (2) [ ] A Resubmission	04/30/2003	End of 2002/Q4

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(Except amortization of aquisition adjustments)

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1	Intangible Plant				
2	Steam Production Plant	12,221,768			12,221,768
3	Nuclear Production Plant				
4	Hydraulic Production Plant-Conventional				
5	Hydraulic Production Plant-Pumped Storage				
6	Other Production Plant				
7	Transmission Plant	788,501			788,501
8	Distribution Plant				
9	General Plant	131,417			131,417
10	Common Plant-Electric				
11	TOTAL	13,141,686			13,141,686

B. Basis for Amortization Charges

Name of Respondent	This Report Is:	Date of Report (Mo, Da, Yr)	Year/Period of Report
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(Except amortization of aquisition adjustments)

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1	Intangible Plant				
2	Steam Production Plant	12,121,447			12,121,447
3	Nuclear Production Plant				
4	Hydraulic Production Plant-Conventional				
5	Hydraulic Production Plant-Pumped Storage				
6	Other Production Plant				
7	Transmission Plant	782,029			782,029
8	Distribution Plant				
9	General Plant	130,338			130,338
10	Common Plant-Electric				
11	TOTAL	13,033,814			13,033,814

B. Basis for Amortization Charges

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1	Intangible Plant					
2	Steam Production Plant	9,657,543				9,657,543
3	Nuclear Production Plant					
4	Hydraulic Production Plant-Conventional					
5	Hydraulic Production Plant-Pumped Storage					
6	Other Production Plant					
7	Transmission Plant	616,439				616,439
8	Distribution Plant					
9	General Plant					
10	Common Plant-Electric					
11	TOTAL	10,273,982				10,273,982

B. Basis for Amortization Charges

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Ocean State Power, II	(1) [X] An Original (2) [ ] A Resubmission	04/30/2004	End of 2002/Q4

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A. Summary of Depreciation and Amortization Charges

Line No.	Functional Classification (a)	Depreciation Expense (Account 403) (b)	Amortization of Limited Term Electric Plant (Acc 404) (c)	Amortization of Other Electric Plant (Acc 405) (d)	Total (e)
1	Intangible Plant				
2	Steam Production Plant	9,656,754			9,656,754
3	Nuclear Production Plant				
4	Hydraulic Production Plant-Conventional				
5	Hydraulic Production Plant-Pumped Storage				
6	Other Production Plant				
7	Transmission Plant	616,389			616,389
8	Distribution Plant				
9	General Plant				
10	Common Plant-Electric				
11	TOTAL	10,273,143			10,273,143

B. Basis for Amortization Charges

Name of Respondent	This Report Is:	Date of Report (Mo, Da, Yr)	Year/Period of Report
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A. Summary of Depreciation and Amortization Charges

Line No.	Functional Classification (a)	Depreciation Expense (Account 403) (b)	Amortization of Limited Term Electric Plant (Acc 404) (c)	Amortization of Other Electric Plant (Acc 405) (d)	Total (e)
1	Intangible Plant				
2	Steam Production Plant	9,648,053			9,648,053
3	Nuclear Production Plant				
4	Hydraulic Production Plant-Conventional				
5	Hydraulic Production Plant-Pumped Storage				
6	Other Production Plant				
7	Transmission Plant	615,833			615,833
8	Distribution Plant				
9	General Plant				
10	Common Plant-Electric				
11	TOTAL	10,263,886			10,263,886

B. Basis for Amortization Charges

Record Request AG-2 (Tr. 1, at 59)

Please provide a copy of the chapter in the book Principles of Corporate Finance, Brealy, Myers, Sick, Giammarino 1990 ISBN: 0-07-549923-1 referenced in footnote 3 of Exhibit AG-3-3.

Response

Please refer to Attachment RR-AG-2 for a copy of the requested document.

Attachment RR-AG-2

P·R·I·N·C·I·P·L·E·S *of* CORPORATE FINANCE

Second Canadian Edition

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London Business School

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Singapore Sydney Tokyo

PRINCIPLES OF CORPORATE FINANCE
Second Canadian Edition

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C · H · A · P · T · E · R

6

MAKING INVESTMENT DECISIONS WITH THE NET PRESENT VALUE RULE

We hope that by now you are convinced that wise investment decisions are based on the net present value rule. In this chapter we can think about how to apply the rule to practical investment problems. Our task is threefold. The first issue is to decide what should be discounted. We know the answer in principle: discount cash flows. But useful forecasts of cash flows do not arrive on a silver platter. Often the financial manager has to make do with raw data supplied by specialists in product design, production, marketing, taxation and so on, and must check such information for relevance, completeness, consistency, and accuracy and then pull everything together into a usable forecast.

Our second task is to explain how the net present value rule should be used when there are project interactions. These occur when a decision about one project cannot be separated from a decision about another. Project interactions can be extremely complex. We will make no attempt to analyze every possible case. But we will work through most of the simple cases, as well as a few examples of medium complexity.

Our third task is to develop procedures for coping with capital rationing or other situations in which resources are strictly limited. There are two aspects to this problem. One is computational. Resource constraints often create problems of such complexity that a hunt-and-peck search for the right answer cannot cope with the vast number of alternatives. Linear programming can solve this problem and help the financial manager handle some project interactions at the same time. The other part of the problem is deciding whether capital rationing really exists and whether it invalidates net present value as a criterion for capital budgeting. Our discussion of these issues will take us back to the first principles outlined in Chapter 2.

6-1 WHAT TO DISCOUNT

Up to this point we have been concerned mainly with the mechanics of discounting and with the various methods of project appraisal. We have had almost nothing to say about the problem of *what* one should discount. When you are faced with this problem, you should always stick to three general rules:

1. Only cash flow is relevant.
2. Always estimate cash flows on an incremental basis.
3. Be consistent in your treatment of inflation.

We will discuss each of these rules in turn.

Only Cash Flow is Relevant

The first and most important point is that the net present value rule is stated in terms of cash flows. Cash flow is the simplest possible concept; it is just the difference between dollars received and dollars paid out. Many people nevertheless confuse cash flow with accounting profits.

Accountants *start* with "dollars in" and "dollars out," but to obtain accounting income they adjust these data in two important ways. First, they try to show profit as it is *earned* rather than when the company and the customer get around to paying their bills. Second, they sort cash outflows into two categories: current expenses and capital expenses. They deduct current expenses when calculating profit but do *not* deduct capital expenses. Instead they "depreciate" capital expenses over a number of years and deduct the annual depreciation charge from profits. As a result of these procedures, profits include some cash flows and exclude others, and are reduced by depreciation charges, which are not cash flows at all.

It is not always easy to translate the customary accounting data back into actual dollars—dollars you can buy beer with. If you are in doubt about what is a cash flow, simply count the dollars coming in and take away the dollars going out. Don't assume without checking that you can find cash flow by simple manipulation of accounting data.

You should always estimate cash flows on an after-tax basis. Some firms do not deduct tax payments. They try to offset this mistake by discounting the cash flows before taxes at a rate higher than the opportunity cost of capital. Unfortunately, there is no reliable formula for making such adjustments to the discount rate.

You should also make sure that cash flows are recorded *only when they occur* and not when the work is undertaken or the liability incurred. For example, taxes should be discounted from their actual payment date, not from the time when the tax liability is recorded in the firm's books.

Estimate Cash Flows on an Incremental Basis

The value of a project depends on *all* the additional cash flows that follow from project acceptance. Here are some things to watch for when you are deciding which cash flows should be included:

Do Not Confuse Average with Incremental Payoffs Most managers naturally hesitate to throw good money after bad. For example, they are reluctant to invest more money in a losing division. But occasionally you will encounter "turnaround" opportunities in which the *incremental* NPV on investment in a loser is strongly positive.

Conversely, it does not always make sense to throw good money after good. A division with an outstanding past profitability record may have run out of good opportunities. You

would not pay a large sum for a 20-year-old horse, sentiment aside, regardless of how many races that horse had won or how many champions it had sired.

Here is another example illustrating the difference between average and incremental returns. Suppose that a railroad bridge is in urgent need of repair. With the bridge the railroad can continue to operate; without the bridge it can't. In this case the payoff from the repair work consists of all the benefits of operating the railroad. The incremental NPV of the investment may be enormous. Of course, these benefits should be net of all other costs and all subsequent repairs; otherwise the company may be misled into rebuilding an unprofitable railroad piece by piece.

Include All Incidental Effects It is important to include all incidental effects on the remainder of the business. For example, a branch line for a railroad may have a negative NPV when considered in isolation, but still be a worthwhile investment when one allows for the additional traffic that it brings to the main line.

Do Not Forget Working Capital Requirements *Net working capital* (often referred to simply as *working capital*) is the difference between a company's short-term assets and liabilities. The principal short-term assets are cash, accounts receivable (customers' unpaid bills), and inventories of raw materials and finished goods. The principal short-term liabilities are accounts payable (bills that *you* have not paid). Most projects entail an additional investment in working capital. This investment should, therefore, be recognized in your cash-flow forecasts. By the same token, when the project comes to an end, you can usually recover some of the investment. This is treated as a cash inflow.

Forget Sunk Costs Sunk costs are like spilt milk: they are past and irreversible outflows. Because sunk costs are bygones, they cannot be affected by the decision to accept or reject the project, and so they should be ignored.

This fact is often forgotten. For example, in 1971 Lockheed sought a United States government guarantee for a bank loan to continue development of the TriStar airplane. Lockheed and its supporters argued it would be foolish to abandon a project on which nearly $1 billion had already been spent. Some of Lockheed's critics countered that it would be equally foolish to continue with a project that offered no prospect of a satisfactory return on that $1 billion. Both groups were guilty of the so-called *sunk-cost fallacy*; the $1 billion was irrecoverable and, therefore, irrelevant.[1]

Include Opportunity Costs The cost of a resource may be relevant to the investment decision even when no cash changes hands. For example, suppose a new manufacturing operation uses land that could otherwise be sold for $100,000. This resource is not free: it has an opportunity cost, which is the cash it could generate for the company if the project were rejected and the resource sold or put to some other productive use.

This example prompts us to warn you against judging projects on the basis of "before versus after." The proper comparison is "with or without." A manager comparing before versus after might not assign any value to the land because the firm owns it both before and after:

Before		After	
Firm owns land	Take Project →	Firm still owns land	Cash Flow, Before versus After = 0

[1] U.E. Reinhardt provides an analysis of the values of the TriStar in 1971: "Break-even Analysis for Lockheed's TriStar: An Application of Financial Theory," *Journal of Finance*, **28**: 821–838 (September 1973). (Reinhardt does not fall into the sunk-cost fallacy.)

The proper comparison, which is with or without, is as follows:

Before		After	
Firm owns land	Take Project →	Firm still owns land	Cash Flow, With Project = 0
	Do Not Take Project →	Firm sells land for $100,000	Cash Flow, Without Project = $100,000

Comparing the two possible "afters," we see that the firm gives up $100,000 by undertaking the project. This reasoning still holds if the land will not be sold but is worth $100,000 to the firm in some other use.

Sometimes opportunity costs may be very difficult to estimate;[2] however, where the resource can be freely traded, its opportunity cost is simply equal to the market price. Why? It cannot be otherwise. If the value of a parcel of land to the firm is less than its market price, the firm will sell it. On the other hand the opportunity cost of using land in a particular project cannot exceed the cost of buying an equivalent parcel to replace it.

Beware of Allocated Overhead Costs We have already mentioned that the accountant's objective in gathering data is not always the same as the investment analyst's. A case in point is the allocation of overhead costs. Overheads include such items as supervisory salaries, rent, heat, and light. These overheads may not be related to any particular project, but they have to be paid for somehow. Therefore, when the accountant assigns costs to the firm's projects, a charge for overhead is usually made. Now our principle of incremental cash flows says that in investment appraisal we should include only the *extra* expenses that would result from the project. A project may generate extra overhead expenses—and then again it may not. We should be cautious about assuming that the accountant's allocation of overheads represents the true extra expenses that would be incurred.

t Inflation onsistently

Interest rates are usually quoted in *nominal* rather than *real* terms. In other words, if you buy a Treasury bill the government promises to pay you so many dollars. It makes no promises about what that money will buy. Investors take that into account when they decide what is a fair rate of interest.

For example, suppose that the rate of interest on a one-year Government of Canada Treasury bill is 8% and that next year's inflation is expected to be 6%. If you buy the bill, you get back principal and interest in period-1 dollars, which are worth 6% less than current dollars:

Invest Current Dollars		Receive Period-1 Dollars	Result
$1,000	→	$1,080	8% *nominal* rate of return

[2] They may be so difficult to estimate that it is often preferable just to note their existence rather than attempt to quantify them.

How much actual purchasing power is represented by the $1,080 return? Let us measure units of purchasing power in terms of current dollars. We convert period-1 dollars into current dollars by dividing by 1.06 (one plus the expected inflation rate):[3]

$$\text{Purchasing power of 1,080 period-1 dollars} = \text{number of current dollars having same purchasing power} = \frac{\$1{,}080}{1.06} = \$1{,}018.87$$

This is the *real* payoff to the bill holder:

Invest Current Dollars		Expected Real Value of Period-1 Receipts	Result
$1,000	→	$1,018.87	Expected real rate of return is 0.0187, or about 1.9%

Thus we could say "The bill offers an 8% nominal rate of return" *or* "It offers a 1.9% expected real rate of return." Note that the nominal rate is certain but the real rate is only expected. The actual real rate cannot be calculated until period 1 arrives and the inflation rate is known.

If the discount rate is stated in nominal terms, then consistency requires that cash flows be estimated in nominal terms, taking account of trends in selling price, labour and materials cost, and so on. This calls for more than simply applying a single assumed inflation rate to all components of cash flow. Labour cost per hour of work, for example, normally increases at a faster rate than the consumer price index because of improvements in productivity and increasing real wages throughout the economy. Tax shields on depreciation (capital cost allowance) do not increase with inflation; they are calculated in nominal terms because tax law allows only the original cost of assets to be depreciated.

Of course, there is nothing wrong with discounting real cash flows at a real discount rate, although this is not commonly done. Here is a simple example showing the equivalence of the two methods.

Suppose your firm usually forecasts cash flows in nominal terms and discounts at a 15% nominal rate. In this particular case, however, you are given project cash flows estimated in real terms, that is, current dollars:

Real Cash Flows (thousands of dollars)

C_0	C_1	C_2	C_3
−100	+35	+50	+30

It would be inconsistent to discount these real cash flows at 15%. You have two alternatives: either restate the cash flows in nominal terms and discount at 15%,

[3] A 6% inflation rate means that $1.00 now has the same purchasing power as $1.06 next year. Thus, the real purchasing power of $1,080 next year is $1,080/1.06. Real purchasing power is measured in terms of today's dollars.

or restate the discount rate in real terms and use this to discount the real cash flows. We will now show you that both methods produce the same answer.

Assume that inflation is projected at 10% a year. Then the first cash flow for year 1, which is \$35,000 in current dollars, will be \$35,000 × 1.10 = \$38,500 in year-1 dollars. Similarly the cash flow for year 2 will be \$50,000 × $(1.10)^2$ = \$60,500 in year-2 dollars, and so on. If we discount these nominal cash flows at the 15% nominal discount rate, we have

$$\text{NPV} = -100 + \frac{38.5}{1.15} + \frac{60.5}{(1.15)^2} + \frac{39.9}{(1.15)^3} = 5.5 \textit{ or } \$5{,}500$$

Instead of converting the cash-flow forecasts into nominal terms, we could convert the discount rate into real terms by using the following relationship:

$$\text{Real discount rate} = \frac{1 + \text{nominal discount rate}}{1 + \text{inflation rate}} - 1$$

In our example this gives

$$\text{Real discount rate} = \frac{1.15}{1.10} - 1 = 0.045 \textit{ or } 4.5\%$$

If we now discount the real cash flows by the real discount rate, we have an NPV of \$5,500, just as before:

$$\text{NPV} = -100 + \frac{35}{1.045} + \frac{50}{(1.045)^2} + \frac{30}{(1.045)^3} = 5.5 \textit{ or } \$5{,}500$$

Note that the real discount rate is approximately equal to the *difference* between the nominal discount rate of 15% and the inflation rate of 10%. Discounting at 5% would give NPV = \$4,600—not exactly right, but close.

The message of all this is quite simple. Discount nominal cash flows at a nominal discount rate. Discount real cash flows at a real rate. Obvious as this rule is, it is sometimes violated. For example, in 1974 there was a political storm in Ireland over the government's acquisition of a stake in Bula Mines. The price paid by the government reflected an assessment of £40 million as the value of Bula Mines; however, one group of consultants thought that the company's value was only £8 million and others thought that it was as high as £104 million. Although these valuations used different cash-flow projections, a significant part of the difference in views seemed to reflect confusion about real and nominal discount rates.[4]

6-2 CORPORATE TAXES IN CANADA—THE BASICS

Businesses have many dealings with governments. They pay out money in the form of income taxes, property taxes, license fees, and stumpage charges, and they get some of it back as government grants and subsidies. The most important of these cash flows is the corporate income tax and you must know how it is calculated.

Income tax is paid at both the federal and provincial levels. Each province has

[4] In some cases it is unclear what procedure was used. At least one expert seems to have discounted nominal cash flows at a real rate. For a review of the Bula Mines controversy see E. Dimson and P.R. Marsh, *Cases in Corporate Finance*, Wiley International, London, 1987.

its own tax laws. Since provincial laws are generally similar to the federal law, we will concentrate on federal law.[5]

Federal and provincial income taxes currently total about 36% of a company's taxable income.[6] However, when calculating taxable income, the firm is allowed to make a deduction for depreciation. In Canada this depreciation is called **capital cost allowance (CCA)**. Thus

$$\text{Taxable income} = \text{revenues} - \text{expenses} - \text{CCA}$$

$$\text{Tax} = 0.36 \times \text{taxable income}$$

Notice that CCA is not itself a cash flow, though it does affect the cash flow by reducing the tax paid by 0.36 × CCA. This tax saving is sometimes called the **CCA tax shield** or **depreciation tax shield**. Also, CCA is not necessarily the same as the depreciation figure shown in the company's profit statement: Revenue Canada allows the company to keep one set of books for the tax collector and a different set for stockholders.

The Asset Class System

A few assets, such as land or securities, cannot be depreciated at all. The others are divided by Revenue Canada into different CCA **asset classes**. Some classes of assets can be depreciated much more rapidly than other classes.

Most industrial buildings acquired after 1987 fall into Class 1. Class 1 assets can be depreciated each year by 4% of the undepreciated balance. For example, suppose you start up a new business by investing \$10 million in a new factory. In the first year you are entitled to a CCA deduction of 4% of this capital cost:

$$\text{CCA} = 0.04 \times 10 = \$0.4 \text{ million}$$

In the next year the undepreciated balance (known as the **undepreciated capital cost** or **UCC**) declines to \$10 − 0.4 = \$9.6 million. Therefore, in the second year you are entitled to a CCA deduction of 0.04 × \$9.6 = \$0.384 million, and so on.

A great deal of machinery falls into Class 8. Class 8 assets can be depreciated at a 20% rate. Thus, if you invested that \$10 million in machinery, you would be entitled to a CCA deduction in the first year of 0.2 × \$10 = \$2 million. In the second year the UCC would decline to \$10 − \$2 = \$8 million and you would be entitled to a deduction of 0.2 × \$8 = \$1.6 million, and so on.

All assets within a particular CCA class are depreciated as if they were one asset. For example, suppose that after the first year you acquire a second machine for \$10 million. Your UCC of Class 8 assets would rise to \$8 + \$10 = \$18 million, and the CCA deduction in the next year would be 0.2 × \$18 = \$3.6 million.

The Disposition of Assets

The tax laws provide a complex set of rules that arise when an asset is sold. The procedure is as follows:

A. When a depreciable asset is sold, the lower of the sale price or the initial cost is deducted from the undepreciated capital cost of its asset class.

[5] The province of Quebec deviates the most sharply from the federal tax law.

[6] Appendix 6-1 discusses these tax rates in more detail. They vary according to province, size of the business, as well as whether it is a manufacturing or processing firm. Typically, a large firm in general industry pays tax at approximately 40% while a small firm pays at 22%. If a large firm is in a manufacturing or processing business, the rate is reduced to about 36% in many provinces.

B. If Step A leaves a negative balance, this amount is called **recaptured depreciation** and is added to taxable income. The undepreciated capital cost of the asset class is then set to zero.

C. If Step A leaves a positive balance and *there are no other assets remaining* in the class, this remaining balance is called a **terminal loss**, and is deducted from taxable income. Also, the undepreciated capital cost is set to zero, so that the class ceases to generate CCA tax shields. But if Step A leaves a positive balance and *there are other assets remaining* in the class, this balance becomes the new UCC of the class and it continues to generate CCA tax shields.[7]

D. When an asset is sold for more than its initial cost, the difference between the sale price and initial cost is called a **capital gain**.[8] Three-quarters of the capital gain is taxable and therefore is added to the year's taxable income.[9]

EXAMPLE 1 Suppose you start a new business by purchasing a Class 8 machine for $10 million. After taking two years of CCA, the undepreciated capital cost of that machine is $6.4 million. At that point you sell the machine for $12 million. Because the sale price is higher than the asset cost, the machine has appreciated in value, not depreciated. Thus the tax authorities calculate that you have taken $10 − $6.4 = $3.6 million of depreciation to which you were (in an economic sense) not entitled. This $3.6 million of depreciation is, therefore "recaptured" and added to your income. In addition, you have also made a capital gain of $12 − $10 = $2 million. Three quarters of this gain is taxable, and is added to your taxable income.

Now, we have assumed that the machine is your only Class 8 asset. Suppose instead that there are other items in Class 8, and just before you dispose of the machine, Class 8 has a UCC greater than $10 million. Then there is no recaptured depreciation, but there is still the $2 million capital gain and a reduction of the UCC of Class 8 by $10 million.

EXAMPLE 2 Again, suppose you buy a Class 8 machine for $10 million. But now suppose you sell the machine for $4 million after taking two years of CCA tax shields. If it is the only asset you have in Class 8, the UCC of the class is again $6.4 million at the time of sale, and you are allowed to deduct $6.4 − $4 = $2.4 million from your income as a terminal loss. In reality, the machine suffered economic depreciation to a value of $4 million, but the tax laws only allowed you to depreciate it to $6.4 million. The terminal loss can thus be regarded as an extra depreciation tax shield that brings the total tax depreciation into line with the economic depreciation.

You already know what happens in this example if there are other Class 8 assets: if the UCC of Class 8 exceeds $4 million at the time of sale, you simply deduct $4 million from the UCC and nothing else happens, but if the UCC is less than $4 million, you have recaptured depreciation.

[7] Many classes contain a large number of assets, so this CCA treatment of the sale of an asset is very common.

[8] Capital gains or losses also arise from the sale of non-depreciable assets such as land and financial securities. However, you never get a capital loss with a depreciable asset: Steps A, B, and C apply instead.

[9] The 75% rate at which capital gains are included in taxable income applies for 1990 onward. Prior to 1988, the inclusion rate was 50% and for 1988 and 1989 it is a transitional 66⅔%.

Present Values of CCA Tax Shields

Our two examples illustrate a peculiar feature of the asset class system embodied in Canadian tax law: an asset can still generate CCA tax shields for the firm even after it is sold, provided there are other assets remaining in its class. To calculate the PV of a project, you must know how to calculate the PV of a perpetual CCA tax shield.

Suppose you start a new asset class by buying an asset. We'll use this notation to describe the asset and your firm:

C = capital cost of an asset acquired in year 0
d = CCA rate for the asset class
T_c = corporate tax rate
r = discount rate
UCC_t = undepreciated capital cost in year t after deducting CCA for the year

For simplicity, we'll assume you get your first CCA tax shield from the asset in year 1.[10] The UCC of the class starts out at $UCC_0 = C$, so the CCA you get for year 1 is $d \times UCC_0 = Cd$.

After deducting the CCA, the UCC for year 1 becomes:

$$\begin{aligned} UCC_1 &= UCC_0 - CCA \\ &= C - Cd \\ &= C(1 - d) \end{aligned}$$

Similarly, the CCA taken for year 2 is

$$d \times UCC_1 = Cd(1 - d)$$

In year t, you will have taken $t-1$ previous CCA tax shields, so the UCC at the start of the year is $UCC_{t-1} = C(1-d)^{t-1}$. Thus, your CCA for year t will be

$$d \times UCC_{t-1} = Cd(1-d)^{t-1}$$

There are two ways you can handle CCA tax shields when computing the net present value of a project. On the one hand, you can compute the taxable income every year from the revenues, expenses, and CCA, and multiply by the tax rate to get the annual tax cash flow. Don't forget to include any recaptured depreciation or terminal loss when the project is salvaged. You must also account for any perpetual CCA tax shields left in the class after salvaging the project's assets. This approach is illustrated in Section 6-3. It is cumbersome unless you have access to a spreadsheet program on a personal computer.[11]

On the other hand, you can apply the tricks you learned in Chapter 3 to get simple formulas for the present value of the CCA tax shields themselves. Then you can add the PV of the CCA tax shields to the PV of the annual "after-tax" revenues and expenses to get the overall PV of the project. The after-tax revenues and expenses are simply revenues and expenses multiplied by $(1 - T_c)$. This

[10] This simplifies two aspects of Canadian tax law. First, there is the "half-year rule" which says that half of the asset cost C is added to the class in year 0 and the other half is added in year 1. Second, CCA is based on the UCC of the asset class at the tax year-end. Thus, you actually get half of the first year's CCA tax shield in year 0 and half in year 1. We'll get a simple formula that is not too far from the truth if we assume that all of the first year's CCA tax shield occurs in year 1. For a more precise analysis, see Appendix 6-1.

[11] But you *must* use this approach if your firm is likely to have tax losses at some time in the future. These are carried back and forward against other years' income, as discussed in Appendix 6-1. This means that any benefit from CCA tax shields may be deferred until the firm has taxable income.

approach gives the overall PV of the project because of the additivity property of present values discussed in Section 5-2. That is, if we let ATCF stand for the annual after-tax cash flow and Rev and Exp stand for revenues and expenses, respectively, then after-tax cash flow equals after-tax revenues net of expenses plus the CCA tax shield:

$$\text{ATCF} = (1 - T_c) \times (\text{Rev} - \text{Exp}) + T_c \times \text{CCA}$$

Because present values are additive, the PV of after-tax cash flows equals the PV of the after-tax revenues net of expenses plus the PV of the CCA tax shield:

$$\text{PV (ATCF)} = \text{PV}((1 - T_c) \times (\text{Rev} - \text{Exp})) + \text{PV}(T_c \times \text{CCA})$$

Thus we have two equivalent approaches to calculating present values in the presence of taxes, and we shall use both in this text. They give the same answers.

Let's see how to calculate the PV of a CCA tax shield. First, let's suppose you never sell the asset. The project generates the following CCA tax shields.

Year	1	2	3	⋯	t	⋯
CCA tax shield	CdT_c	$CdT_c(1-d)$	$CdT_c(1-d)^2$	⋯	$CdT_c(1-d)^{t-1}$	⋯

This forms a perpetuity in the amount CdT_c that is growing (really declining) at the rate $-d$. From Section 3-2 we know that the present value of this is:[12]

$$\text{PV of perpetual CCA tax shield} = \frac{CdT_c}{r + d}$$

What happens if you sell the asset after using it for a few years? We use the same type of trick you saw in Section 3-2: we combine the present value of two declining perpetuities to calculate the present value of a declining annuity. Let's look at some examples showing how to combine tax principles and present value principles to get the PV of the tax shields. You can sharpen your understanding of these principles by doing some of the problems at the end of the chapter.

While going through these examples, remember that we always analyze the *incremental* cash flows created by the project in order to calculate its present value. In particular, we are looking for incremental changes in CCA and UCC that arise because of the purchase (or sale) of assets for the project. Fortunately the formula given above for the PV of a perpetual CCA tax shield still works if the firm already has other assets in the class to which the assets of the project are to be added. In this case the formula gives the PV of the incremental perpetual tax shields generated by the purchase of the asset for an amount C. This is exactly what we need in calculating the PV of the project.

EXAMPLE 3 Suppose you buy an airplane hangar for C ($1 million) in year 0 (Class 6, CCA rate $d = 0.10$). You will sell the hangar in year 10 for S ($200,000), at which time you will still have other assets in the class (which includes your

[12] To see this, use the formula for a growing perpetuity with $C_t = CdT_c(1-d)^{t-1}$ and $g = -d$. Thus, $C_1 = CdT_c$. We have

$$\text{PV} = \frac{C_1}{1+r} + \frac{C_1(1-d)}{(1+r)^2} + \frac{C_1(1-d)^2}{(1+r)^3} + \cdots = \frac{C_1}{r-(-d)} = \frac{CdT_c}{r+d}$$

fences and wharves) and a UCC in excess of $200,000. Your tax rate is 36% and your discount rate is 15%. You want to know the present value of the incremental tax shields generated by the ownership and sale of the asset. Since you have other assets in the class and a UCC in excess of the sale price, you will have neither recaptured depreciation nor a terminal loss. The only tax effect of the sale of the asset will arise from the reduction of the UCC of Class 6 by $200,000 in year 10. You have:[13]

$$\begin{aligned}
&\text{PV of CCA tax shields}\\
&\quad = \text{PV of perpetual tax shield on \$1 million in year 0}\\
&\qquad - \text{PV of perpetual tax shield on \$200,000 in year 10}\\
&\quad = \frac{CdT_c}{r+d} - \frac{1}{(1+r)^{10}}\frac{SdT_c}{r+d}\\
&\quad = \frac{1{,}000{,}000 \times 0.1 \times 0.36}{0.15 + 0.1} - \frac{1}{(1.15)^{10}} \times \frac{200{,}000 \times 0.1 \times 0.36}{0.15 + 0.1}\\
&\quad = \$136{,}886
\end{aligned}$$

Note that the UCC generated by the hanger after ten years of CCA tax shields is $\text{UCC}_{10} = (1 - 0.1)^{10} \times \$1{,}000{,}000 = \$348{,}678$. Even *after* selling the hanger assets in year 10, you will continue to depreciate $348,678 − $200,000 = $148,678 of it because of the special features in Canadian tax law.

The calculations in Example 3 are easy, since you do not need to know UCC_{10} to calculate an amount of recaptured depreciation or terminal loss. Most asset classes are very broadly defined and include many assets; the situation described in Example 3 is quite common. However, the Income Tax Regulations also specify many situations where an asset must be in a class by itself,[14] so the disposition of such an asset will always generate a terminal loss or recaptured depreciation.

EXAMPLE 4 Suppose you have the same situation as in Example 3, except that the hanger is the only Class 6 asset you have from years 0 through 10. You get a terminal loss of $\text{UCC}_{10} - S = \$148{,}678$, but you must also subtract UCC_{10} from the class balance to close it out when the asset is sold. You have:

$$\begin{aligned}
&\text{PV of ten years of CCA tax shields and terminal loss}\\
&\quad = \text{PV of perpetual tax shield on \$1,000,000 in year 0}\\
&\qquad + \text{PV of terminal loss tax shield on \$148,678 in year 10}\\
&\qquad - \text{PV of perpetual tax shield on \$348,678 in year 10}\\
&\quad = \frac{CdT_c}{r+d} + \frac{T_c}{(1+r)^{10}}(\text{UCC}_{10} - S) - \frac{1}{(1+r)^{10}}\frac{\text{UCC}_{10}dT_c}{r+d}\\
&\quad = \frac{1{,}000{,}000 \times 0.1 \times 0.36}{0.15 + 0.1} + \frac{0.36}{(1.15)^{10}}(348{,}678 - 200{,}000)\\
&\qquad - \frac{1}{(1.15)^{10}}\frac{348{,}678 \times 0.1 \times 0.36}{0.15 + 0.1}\\
&\quad = \$144{,}819
\end{aligned}$$

[13] Here we assume, for simplicity, that the first CCA tax shield lost due to the sale occurs in year 11, or the year after the sale. The $SdT_c/(r + d)$ formula has already discounted the effect of the lost tax shields back to one year before the first lost tax shield, year 10, so you must discount it back another ten years. In reality, half of the first lost tax shield will be in year 10 and the other half will be in year 11, because the half-year rule effectively applies to asset dispositions as well. See Appendix 6-1.

[14] Separate classes are required for rental properties worth more than $50,000, for many types of ships, for telecommunication spacecraft, and for assets associated with different "businesses."

Some Asset Classes Give Straight-Line Depreciation

Not all asset classes in Canada's tax system have the declining balance feature you have just seen. For example, a "two-year writeoff" (that is, straight-line depreciation over two years) is allowed for some pollution control and energy conservation equipment. Also patents, franchises, and improvements to leasehold interests (for example, redecoration of a store you have leased) generate straight-line capital cost allowances. The CCA tax shield is just an annuity in these cases.

The Investment Tax Credit

In addition to allowing a company to deduct CCA from taxable income, Canadian tax laws sometimes allow an **investment tax credit** (ITC). A **tax credit** is a reduction of taxes owing, while an **allowance** (such as CCA) is only a reduction of taxable income. One type of ITC applies to acquistions of *new depreciable* property in the manufacturing and processing, farming, fishing, logging, or mineral processing industries. Another type of ITC applies to qualified expenditures in scientific research and experimental development (R&D). For property acquisitions, the ITC is only available in Atlantic Canada, where it is 15% of the cost of the property. For R&D, the ITC is 30% of the R&D expenditure in Atlantic Canada and 20% elsewhere in Canada. For small business (with income less than $200,000 in the previous year), the ITC rate for R&D is 35% throughout Canada. The depreciable cost of the property is reduced by the amount of the ITC. If the ITC exceeds 75% of the federal tax payable, there is a complicated set of rules that may limit how much ITC you can claim for the year, and how much can be applied against other years.

For example, suppose your Newfoundland division invests $10 million is a fish processing plant. If you owe more than $2 million in federal tax, your tax bill for the year is reduced by 0.15 × $10 million or $1.5 million. However, you are only allowed to claim CCA on a net capital cost of $(10–1.5) million or $8.5 million. Now consider a more complicated case and suppose you are paying only $1 million in tax for the year. You can apply the ITC against only 75% of $1 million or $0.75 million of income for the year.[15] Then you are allowed to apply the unused $(1.5–0.75) million or $0.75 million ITC against income in any of the previous three years (and receive a retroactive refund)—this is called a **carry-back.** Suppose your income for the previous three years totalled only $0.4 million. They you still have an unused credit of $(0.75–0.4) million or $0.35 million. In the year you acquire the asset, the federal government will give you a refund of up to 40% of this unused amount, or 0.4 × $0.35 million = $0.14 million.[16] Now you have an unused credit of $(0.35 − 0.14) million or $0.21 million that you can **carry-forward** for up to ten years against future taxes.

That sounds a little complicated, doesn't it? Here is a summary of what you do:

1. Apply the ITC against as much as 75% of current income.
2. Apply any unused ITC against the three prior years of income.
3. Apply for a refund of 40% of the amount not used to this point.

[15] Actually, the situation is even more complicated; you can apply the ITC against 100% of the tax on your first $200,000 of income and against 75% of the income above that. The difference between this and what we describe in the text will be almost eaten up by your tax accountant's fees.

[16] Actually, if your taxable income for the previous year was less than $200,000, you get a 100% refund, rather than a 40% refund. The refund is paid as a cheque to you, if you pay no other tax.

4. Carry the remainder forward for up to ten years.
5. Sit back and relax with your favourite beverage.

6-3 ANOTHER EXAMPLE—IM&C PROJECT

As the newly appointed financial manager of International Mulch and Compost Company (IM&C), you are about to analyze a proposal for marketing guano as a garden fertilizer. (IM&C's planned advertising campaign features a rustic gentleman who steps out of a vegetable patch singing, "All my troubles have guano way.")[17]

You are given the forecasts shown in Table 6-1. The project requires an investment of $10 million in plant and machinery (line 1), which is in Asset Class 10 (30%). This machinery can be dismantled and sold for net proceeds estimated at $1 million in period 7 (line 1, column 7). This amount is the plant's *salvage value.* IM&C always has many assets and a positive balance in Class 10.

Table 6-1 shows the incremental effects of accepting the project. For example, the undepreciated capital costs and the tax cash flows are incremental. Thus, a negative tax means a reduction in taxes paid by IM&C on its other projects. The raw data for a project are often presented in a "massaged form" like this to reflect the book value of the investment and estimated annual profits. Indeed, the pro forma depreciation figures that are usually given are those that would appear on annual financial statements. But we know they do not represent cash flows, so we have presented the capital cost allowances instead, which generate tax shields.[18]

Lines 5 to 11 in Table 6-1 show a simplified income statement for the guano project. This might be taken as a starting point for estimating cash flow. However, you discover that all figures submitted to you are based on costs and selling prices prevailing in year 0. IM&C's production managers realize there will be inflation, but they have assumed that prices can be raised to cover increasing costs. Thus they claim that inflation won't affect the real value of the project.

Though this line of argument sounds plausible, it will get you into trouble. First, opportunity costs of capital are usually expressed as *nominal* rates. You cannot use a nominal rate to discount real cash flows. Second, not all prices and costs increase at the same rate. For example, the tax savings provided by capital cost allowances are unaffected by inflation, since tax law allows you to depreciate only the original cost of the equipment, regardless of what happens to prices after the investment is made. On the other hand, wages generally increase faster than the inflation rate. Labour cost per tonne of guano will rise in real terms unless technological advances allow more efficient use of labour.

Assume that future inflation is forecasted at 10% a year. Table 6-2 restates Table 6-1 in nominal terms, assuming, just for simplicity, that sales, investment, operating costs, and required working capital appreciate at this general rate. You can see, however, that CCA is not affected by inflation.

Table 6-3 derives cash-flow forecasts from the investment and income data given in Table 6-2. Cash flow from operations is defined as sales less operating

[17] Sorry.

[18] This presents a problem if you are a financial analyst outside the firm. You may have access to audited financial statements for shareholders, but will not have access to the information on the tax return.

Table 6-1
IM&C's Guano Project—Initial Projections (figures in thousands of dollars)

Period	0	1	2	3	4	5	6	7
1. Capital investment	10,000							−1,000[a]
2. Undepreciated capital cost at year end	10,000	7,000	4,900	3,430	2,401	1,681	1,177	−176[b]
3. Working capital		500	1,065	2,450	3,340	2,225	1,130	0
4. Total book value[c] (2 + 3)	10,000	7,500	5,965	5,880	5,741	3,906	2,306	−176
5. Sales		475	10,650	24,500	33,400	22,250	11,130	
6. Operating costs		761	6,388	14,690	20,043	13,345	6,678	
7. Other costs	4,000	2,000						
8. Capital cost allowance (30% for Class 10)		3,000	2,100	1,470	1,029	720	504	353
9. Taxable income (5−6−7−8)	−4,000	−5,286	2,162	8,340	12,328	8,185	3,948	−353
10. Tax at 36%	−1,440	−1,903	778	3,002	4,438	2,947	1,421	−127
11. Profit after tax[c] (9 − 10)	−2,560	−3,383	1,384	5,338	7,890	5,238	2,527	−50[d]

[a] Salvage value.

[b] UCC of $824 in period 7 less salvage value. Since this is negative, it gives a reduction in future CCA tax shields on IM&C's other Class 10 assets.

[c] Based on depreciation charges being equal to CCA.

[d] This includes the $176 profit on salvage: −353 −(−127) + 176 = −50.

Table 6-2
IM&C's Guano Project—Revised Projections Reflecting Inflation (figures in thousands of dollars)

Period	0	1	2	3	4	5	6	7
1. Capital investment	10,000							−1,949[a]
2. Undepreciated capital cost at year end	10,000	7,000	4,900	3,430	2,401	1,681	1,177	−1,125[b]
3. Working capital		550	1,289	3,261	4,890	3,583	2,002	0
4. Sales		523	12,887	32,610	48,901	35,834	19,717	
5. Operating costs		837	7,729	19,552	29,345	21,492	11,830	
6. Other costs	4,000	2,200						
7. Capital cost allowances (30% for Class 10)		3,000	2,100	1,470	1,029	720	504	353
8. Taxable income (4−5−6−7)	−4,000	−5,514	3,058	11,588	18,527	13,622	7,383	−353
9. Tax at 36%	−1,440	−1,985	1,101	4,172	6,670	4,904	2,658	−127
10. Profit after tax (8−9)	−2,560	−3,529	1,957	7,416	11,857	8,718	4,725	−899[c]

[a] Salvage value.

[b] UCC of $824 in period 7 less salvage value.

[c] Includes $1,125 profit on salvage.

Table 6-3
IM&C's Guano Project—Cash Flow Analysis (figures in thousands of dollars)

Period	0	1	2	3	4	5	6	7
1. Sales		523	12,887	32,610	48,901	35,834	19,717	
2. Operating and other costs	4,000	3,037	7,729	19,552	29,345	21,492	11,830	
3. Tax on operations	−1,440	−1,985	1,101	4,172	6,670	4,904	2,658	−127
4. Cash flow from operations (1−2−3)	−2,560	−529	4,057	8,886	−12,886	9,438	5,229	127
5. Change in working capital		−550	−739	−1,972	−1,629	1,307	1,581	2,002
6. Capital investment and disposal	−10,000							1,949
7. PV of CCA tax shields lost on other projects								−243[a]
8. Net cash flow and lost tax shield (4 + 5 + 6 + 7)	−12,560	−1,079	3,318	6,914	11,257	10,745	6,810	3,835
9. Present value at 20%	−12,560	−899	2,303	4,003	5,426	4,319	2,281	1,070

Net present value = $5,943

[a] Salvage value exceeds UCC (Table 6-2, line 2, column 7) by 1,125, so PV of lost CCA tax shields on other projects $= \frac{1{,}125 \times 0.3 \times 0.36}{0.2 + 0.3} = 243$

costs, other costs, and taxes.[19] The remaining cash flows include the changes in working capital, the initial capital investment, and the final recovery of salvage value. The salvage value exceeds the undepreciated capital cost of the assets at the time of disposal. Since IM&C has other assets in the same class, this will not result in recaptured depreciation. However, it will reduce the UCC of those other assets at the time of disposal. The item in line 7, column 7 reflects the loss of the present value of the associated tax shields.

IM&C estimates the nominal opportunity cost of capital for projects of this type as 20%. (We have already used this discount rate to calculate the PV of lost CCA on salvage.)[20] When all cash flows are added up and discounted, the guano project is seen to offer a net present value of $5.9 million:

$$\text{NPV} = -12{,}560 - \frac{1{,}079}{1.20} + \frac{3{,}318}{(1.20)^2} + \frac{6{,}914}{(1.20)^3} + \frac{11{,}257}{(1.20)^4} + \frac{10{,}745}{(1.20)^5} + \frac{6{,}810}{(1.20)^6} + \frac{3{,}835}{(1.20)^7} = 5{,}943 \text{ or } \$5{,}943{,}000$$

Separating Investment and Financing Decisions

Our analysis of the guano project takes no notice of how that project is financed. It may be that IM&C would decide to finance partly by debt, but, if it did, we would not subtract the debt proceeds from the required investment, nor would we recognize interest and principal payments as cash outflows. We would treat the project as if it were all equity-financed, treating all cash outflows as coming from stockholders and all cash inflows as going to them.

We approach the problem in this way so that we can separate the analysis of the investment decision from the financing decision. Then, when we have calculated NPV, we can undertake a separate analysis of financing. Financing decisions and their possible interaction with investment decisions are covered later in the book.

*A Further Note on Estimating Cash Flow

Now here is an important point. You can see from line 5 of Table 6-3 that working capital increases in the early and middle years of the project. Why is this? There are several possibilities.

1. Sales recorded on the income statement overstate actual cash receipts from guano shipments because customers are slow to pay their bills. Therefore, accounts receivable increase.
2. Projected operating costs understate cash outlays for raw materials and production. Therefore inventory increases.
3. An offsetting effect occurs if payments for materials and services used in guano production are delayed. In this case accounts payable will increase.

Thus a detailed cash-flow forecast for, say, year 3 might look like Table 6-4. In practice you may find, for example, that the accounts receivable and payable are

[19] Sales revenue may not represent actual cash inflow. Costs and taxes may not represent cash outflows. This is why change in working capital must be taken into account, as it is in Table 6-3. The "Further Note on Estimating Cash Flow" in this section discusses the relationship between operating cash flow and change in working capital in more detail.

[20] By discounting the depreciation tax shields at 20%, we implicitly assume that they are as risky as the other cash flows. Since they depend only on tax rates, depreciation method, and IM&C's ability to generate taxable income, they may well be less risky. In some contexts—the analysis of financial leases, for example—depreciation tax shields are treated as safe, nominal cash flows and discounted at an after-tax borrowing or lending rate. See Chapter 26.

proportional to forecasted sales for the year, while inventories are proportional to forecasted sales for the same or the next year. The constants of proportionality could be determined by analyzing an existing operation, and we have made assumptions about typical values to get the data in Table 6-4. Since these sales represent real cash flows, working capital is also real.

Table 6-4
Details of Cash-flow Forecast for IM&C's Guano Project in Year 3 (figures in thousands of dollars)

Cash Flows		Data From Forecasted Income Statement		Working Capital Changes
Cash inflow	=	Sales	−	Increase in accounts receivable
$31,110	=	32,610	−	1,500
Cash outflow	=	Operating costs and taxes	+	Increase in inventory net of increase in accounts payable
$24,196	=	(19,552 + 4,172)	+	(972 − 500)
Net cash flow	=	Cash inflow	−	Cash outflow
$6,914	=	31,110	−	24,196

Instead of worrying about changes in working capital, you could estimate cash flow directly by counting up the dollars coming in and taking away the dollars going out. But you would still need to put together a projected income statement to estimate taxes. In Chapter 28 we discuss techniques for modelling cash flows in more detail.

A Final Comment on Project Analysis

Let's review. A few pages ago, you embarked on an analysis of IM&C's guano project. It appeared, at first, that you had all the facts you needed in Table 6-1, but many of those numbers had to be thrown away because they didn't reflect expected inflation. So you worked out revised projections and calculated project net present value.

You were lucky to get away with just one NPV calculation. In real situations, it often takes several tries to purge all inconsistencies and mistakes. Then there are "what if" questions. For example: what if inflation rages at 15% per year, rather than 10%? What if technical problems delay startup to year 2? What if gardeners prefer chemical fertilizers to your natural product?

You won't truly understand the guano project until these questions are answered. *Project analysis* is more than one or two NPV calculations, as we will see in Chapter 10.

However, before you become too deeply immersed in guano, we should now turn to the subject of project interactions.

6-4 PROJECT INTERACTIONS

Almost all decisions about capital expenditure involve either-or choices. The firm can build either a 9,000-square-metre warehouse or a 10,000-square-metre warehouse in one of several locations. It can heat it either by oil or by natural gas, and so on. These mutually exclusive options are simple examples of *project interactions*.

Project interactions can arise in countless ways. The literature of operations research and industrial engineering sometimes addresses cases of extreme complexity and difficulty. We will concentrate on five simple but important cases.

Case 1 — Optimal Timing of Investment

The fact that a project has a positive NPV does not mean that it is best undertaken now. It might be even more valuable if undertaken in the future. Similarly, a project with a currently negative NPV might become a valuable opportunity if we wait a bit. Thus *any* project has two mutually exclusive alternatives: do it now, or wait and invest later.

The question of optimal timing of investment is not difficult under conditions of certainty. We first examine alternative dates (t) for making the investment and calculate its net *future* value as of each date. Then, to find which of the alternatives would add most to the firm's *current* value, we must work out

$$\frac{\text{Net future value as of date } t}{(1+r)^t}$$

For example, suppose you own a large tract of inaccessible timber. To harvest it, you have to invest a substantial amount in access roads and other facilities. The longer you wait, the higher the investment required. On the other hand, lumber prices will rise as you wait, and the trees will keep growing, although at a gradually decreasing rate.

Let us suppose that the net value of the harvest at different future dates is as follows:

Year of Harvest	0	1	2	3	4	5
Net *future* value (thousands of dollars)	50	64.4	77.5	89.4	100	109.4
Change in value from previous year, %		+28.8	+20.3	+15.4	+11.9	+9.4

As you can see, the longer you defer cutting the timber, the more money you will make. However, your concern is with the date that maximizes the net *present* value of your investment. You therefore need to discount the net future value of the harvest back to the present. Suppose the appropriate discount rate is 10%. Then if you harvest the timber in year 1, it has a net *present value of* $58,500:

$$\text{NPV if harvested in year 1} = \frac{64.4}{1.10} = 58.5 \text{ or } \$58{,}500$$

The net present value (at $t = 0$) for other harvest dates is as follows:

Year of Harvest	0	1	2	3	4	5
Net present value (thousands of dollars)	50	58.5	64.0	67.2	68.3	67.9

The optimal point to harvest the timber is year 4 because this is the point that maximizes NPV.

Notice that before year 4 the net future value of the timber increases by more than 10% a year: the gain in value is greater than the cost of the capital that is tied up in the project. After year 4 the gain in value is still positive but less than the cost of capital. You maximize the net present value of your investment if you harvest your timber as soon as the rate of increase in value drops below the cost of capital.[21]

The problem of optimal timing of investment under uncertainty is, of course, much more complicated. An opportunity not taken at $t = 0$ might be either more or less attractive at $t = 1$; there is rarely any way of knowing for sure. Perhaps it is better to strike while the iron is hot even if there is a chance it will become hotter. On the other hand, if you wait a bit you might obtain more information and avoid a bad mistake.[22]

Case 2 — Choosing Between Long- and Short-Lived Equipment

Suppose the firm is forced to choose between two machines, A and B. The two machines are designed differently, but have identical capacity and do exactly the same job. Machine A costs $15,000, and will last three years. It costs $4,000 per year to run. Machine B is an "economy" model costing only $10,000, but it will last only two years, and costs $6,000 per year to run. These are real cash flows: The costs are forecasted in dollars of constant purchasing power.[23]

Because the two machines produce exactly the same product, the only way to choose between them is on the basis of cost. Suppose we compute the present value of cost:

	Costs (thousands of dollars)				
Machine	C_0	C_1	C_2	C_3	Present Value at 6% (thousands of dollars)
A	+15	+4	+4	+4	25.69
B	+10	+6	+6		21.00

Should we take machine B, the one with the lower present value of costs? Not necessarily, because B will have to be replaced a year earlier than A. In other words, there is a future investment decision contingent on today's choice of A or B.

So, a machine with total PV (costs) of $21,000 spread over three years (0, 1, and 2) is not necessarily better than a competing machine with PV (costs) of

[21] Our timber-cutting example conveys the right idea about investment timing, but it misses an important practical point: the sooner you cut the first crop of trees, the sooner the second crop can start growing. Thus, the value of the second crop depends on when you cut the first. This more complex and realistic problem might be solved in one of two ways:
1. Find the cutting dates that maximize the present value of a series of harvests, taking account of the different growth rates of young and old trees.
2. Repeat our calculations, counting the future market value of cut-over land as part of the payoff to the first harvest. The value of cut-over land includes the present value of all subsequent harvests.
The second solution is far simpler if you can figure out what cut-over land will be worth.

[22] H. Bierman and S. Smidt discuss the tree-cutting problem in *The Capital Budgeting Decision*, 7th ed., New York: The Macmillan Company, 1988, pp. 281–286.

[23] The following calculations are best done in real terms. Of course we must be consistent and use a real discount rate. We will assume it is 6%.

$25,690 spread over four years (0 to 3). Somehow we have to convert total PV (costs) to a cost *per year*.

Suppose the financial manager is asked to *rent* machine A to the plant manager actually in charge of production. There will be three equal rental payments starting in year 1. Obviously the financial manager has to make sure that the rental payments are worth $25,690, the total PV (costs) of machine A. This fair rental payment, which is usually called the *equivalent annual cost*, turns out to be 9.61 or $9,610 per year:

	Cash Flows (thousands of dollars)				NPV at 6% (thousands of dollars)
	C_0	C_1	C_2	C_3	
Machine A	+15	+4	+4	+4	25.69
Equivalent annual cost		+9.61	+9.61	+9.61	25.69

The fair rental payment, or equivalent annual cost, is the annuity that has exactly the same life and present value as machine A. How did we know that the right cash flow from the annuity is 9.61? It was easy! We set the NPV of the annuity equal to the present value of A and solved for the payment of the annuity:

$$\begin{aligned}\text{PV of annuity} &= \text{PV of cash outflows of A} = 25.69\\ &= \text{annuity payment} \times \text{three-year annuity factor}\end{aligned}$$

Therefore the annuity payment equals the present value divided by the annuity factor, which is 2.673 for three years and a 6% cost of capital.[24]

$$\text{Annuity payment} = \frac{25.69}{2.673} = 9.61$$

If we make a similar calculation for machine B, we get:

	Costs (thousands of dollars)			Present Value at 6% (thousands of dollars)
	C_0	C_1	C_2	
Machine B	+10	+6	+6	21.00
Equivalent two-year annuity		+11.45	+11.45	21.00

We see that machine A is better, because its equivalent annual cost is less ($9,610 versus $11,450 for machine B). In other words, machine A could be rented to the production manager for less than machine B.

Our rule for comparing assets of different lives is, therefore, as follows. Select the machine that has the lowest equivalent annual cost. The equivalent annual cost is simply the net present value of the cost divided by the annuity factor.

Now any rule this simple cannot be completely general. The rule implicitly assumes that like will be replaced with like—that no cheaper machine will come along in year 2 or 3. Suppose, for example, that machine C will arrive in year 2

[24] This factor can be obtained from a PV table or from the annuity formula given in Section 3-2.

with equivalent annual cost of only $5,000. We would then have to consider scrapping or selling machine A at year 2 (more on this decision below). The financial manager could not choose between machines A and B in year 0 without taking a detailed look at what each machine could be replaced with.

Finally, remember why equivalent annual costs are necessary in the first place. The reason is tht A and B will be replaced at different future dates. The choice between them therefore affects future investment decisions. If subsequent decisions are not affected by the initial choice—for example, because neither machine will be replaced—then we do *not need to take future decisions into account.*[25]

Case 3—Deciding When to Replace an Existing Machine

The previous example took the life of each machine as fixed. In practice the point at which equipment is replaced reflects economic considerations rather than total physical collapse. *We* must decide when to replace. The machine will rarely decide for us.

Here is a common problem. You are operating an elderly machine that is expected to produce a net cash *inflow* of $4,000 in the coming year and $4,000 next year. After that it will give up the ghost. You can replace it now with a new machine, which costs $15,000 but is much more efficient and will provide a cash inflow of $8,000 a year for three years. You want to know whether you should replace your equipment now or wait a year.

We can calculate the NPV of the new machine and also its equivalent annual cash flow, that is, the three-year annuity that has the same net present value:

	Cash Flows (thousands of dollars)				NPV at 6% (thousands of dollars)
	C_0	C_1	C_2	C_3	
New machine	−15	+8	+8	+8	6.38
Equivalent three-year annuity		+2.387	+2.387	+2.387	6.38

In other words, the cash flows of the new machine are equivalent to an annuity of $2,387 per year. So we can equally well ask at what point we would want to replace our old machine with a new one producing $2,387 a year. When the question is put this way, the answer is obvious. As long as your old machine can generate a cash flow of $4,000 a year, who wants to put in its place a new one that generates only $2,387 a year?

It is a simple matter to incorporate salvage values into this calculation. Suppose the current salvage value is $8,000 and next year's value is $7,000. Let's see where you come out next year if you wait and then sell. On the one hand you gain $7,000, but you lose today's salvage value *plus* a year's return on that money. That is, $8,000 × 1.06 = $8,480. Your net loss is $8,480 − $7,000 = $1,480, which only partly offsets the operating gain. You should not replace yet.

Remember: the logic of such comparisons requires that the new machines should be the best of the available alternatives and that it, in turn, will be replaced at the optimal point.

[25] However, if neither machine will be replaced, then we would have to consider the extra revenue generated by machine A in its third year, when it will be operating but B will not.

ıse 4—Cost of ıcess Capacity

Any firm with a computer encounters many proposals for using it. Recently installed computers tend to have excess capacity, and, since the immediate marginal cost of using such computers seems to be negligible, management often encourages new uses. Sooner or later, however, the load on the machine will increase to a point at which management must either terminate the uses they originally encouraged or invest in another computer several years earlier than they had planned. Such problems can be avoided if a proper charge is made for the use of spare capacity.

Suppose we have a new investment project that requires heavy use of the computer. The effect of adopting the project is to bring the purchase date of a new computer forward from year 4 to year 3. This new computer has a life of five years, and at a discount rate of 6% the present value of the cost of buying and operating it is $500,000.

We begin by converting the $500,000 present value of cost of the computer to an equivalent annual cost of $118,700 for each of five years.[26] Of course, when the new computer in turn wears out, we will replace it with another. So we face the prospect of computing expenses of $118,700 a year. If we undertake the new project, the series of expenses begins in year 4; if we do not undertake it, the series begins in year 5. The new project, therefore, results in an *additional* computing cost of $118,700 in year 4. This has a present value of $118{,}700/(1.06)^4$, or $94,010. This cost is properly charged against the new project. When we recognize it, the NPV of the project may prove to be negative. If so, we still need to check whether it is worthwhile undertaking the project now and abandoning it later when the excess capacity of the present computer disappears.

Case 5—Fluctuating Load Factors

Although a $10 million warehouse may have a positive net present value, it should be built only if it has a higher NPV than a $9 million alternative. In other words, the NPV of the $1 million *marginal* investment required to buy the more expensive warehouse must be positive.

One case in which this is easily forgotten occurs when equipment is needed to meet fluctuating demand. Consider the following problem. A widget manufacturer operates two machines, each of which has a capacity of 1,000 units a year. They have an indefinite life and no salvage value, and so the only costs are the operating expenses of $2 per widget. Widget manufacture, as everyone knows, is a seasonal business, and widgets are perishable. During the fall and winter, when demand is high, each machine produces at capacity. During the spring and summer, each machine works at 50% of capacity. If the discount rate is 10% and the machines are kept indefinitely, the present value of the costs is $30,000:

	Two Old Machines
Annual output per machine	750 units
Operating cost per machine	2 × 750 = $1,500
PV operating cost per machine	1500/0.10 = $15,000
PV operating cost of two machines	2 × 15,000 = $30,000

[26] The present value of $118,700 for five years discounted at 6% is $500,000.

The company is considering whether to replace these machines with newer equipment. The new machines have a similar capacity, and so two would still be needed to meet peak demand. Each new machine costs $6,000 and lasts indefinitely. Operating expenses are only one dollar per unit. On this basis the company calculates that the present value of the costs of two new machines would be $27,000:

	Two New Machines
Annual output per machine	750 units
Capital cost per machine	$6,000
Operating cost per machine	1 × 750 = $750
PV total cost per machine	6,000 + 750/0.10 = $13,500
PV total cost of two machines	2 × 13,500 = $27,000

Therefore, it scraps both old machines and buys two new ones.

The company was quite right in thinking that two new machines are better than two old ones, but unfortunately it forgot to investigate a third alternative: to replace just one of the old machines. Since the new machine has low operating costs, it would pay to operate it at capacity all year. The remaining old machine could then be kept simply to meet peak demand. The present value of the costs under this strategy is $26,000:

	One Old Machine	One New Machine
Annual output per machine	500 units	1,000 units
Capital cost per machine	0	$6,000
Operating cost per machine	2 × 500 = $1,000	1 × 1000 = $1000
PV total cost per machine	1,000/0.10 = $10,000	6,000 + 1000/0.10 = $16,000
PV total cost of both machines	$26,000	

Replacing one machine saves $4,000; replacing two machines saves only $3,000. The net present value of the *marginal* investment in the second machine is −$1,000.

6-5 CHOOSING THE CAPITAL EXPENDITURE PROGRAM WHEN RESOURCES ARE LIMITED

The entire discussion of methods of capital budgeting rests on the proposition that the wealth of a firm's shareholders is highest if the firm accepts *every* project that has a positive net present value. Suppose, however, that there are limitations on the investment program that prevent the company from undertaking all such projects. If this is the case, we need a method of selecting the package of projects that is within the company's resources yet gives the highest possible net present value.

Profitability Index Under Capital Rationing

Let us start with a very simple example. Suppose that there is a 10% opportunity cost of capital, that our company has total resources of $10 million, and that it has the following opportunities:

Project	Cash Flows (millions of dollars) C_0	C_1	C_2	NPV at 10% (millions of dollars)	Profitability Index
A	−10	+30	+5	21	3.1
B	−5	+5	+20	16	4.2
C	−5	+5	+15	12	3.4

The firm has sufficient resources to invest either in project A or in projects B and C. Although individually B and C have lower net present values than project A, when taken together they have the higher net present value. It is clear, therefore, that we cannot choose between projects solely on the basis of individual net present values. When funds are limited, we need to concentrate on getting the biggest bang for our buck. In other words, we much pick the projects that offer the highest ratio of present value to initial outlay. This ratio is simply the profitability index, or benefit-cost ratio, that we described in Chapter 5:

$$\text{Profitability index} = \frac{\text{present value}}{\text{investment}}$$

Of our three projects, B has the highest profitability index and C the next highest. Therefore, if our budget limit is $10 million, we should accept these two projects.

Unfortunately, there are some limitations to these simple ranking methods. One of the most serious is that they break down whenever more than one resource is rationed. For example, suppose that a $10 million budget limit applies to cash flows in *each* of years 0 and 1 and that our menu is expanded as follows:

Project	Cash Flows (millions of dollars) C_0	C_1	C_2	NPV at 10% (millions of dollars)	Profitability Index
A	−10	+30	+5	21	3.1
B	−5	+5	+20	16	4.2
C	−5	+5	+15	12	3.4
D	0	−40	+60	13	1.4

One strategy is to accept projects B and C; however, if we do this, we cannot also accept D, which costs more than our budget limit for period 1. An alternative is to accept project A in period 0. Although this has a lower net present value than the combination of B and C, it provides a $30 million positive cash flow in period 1. With that added to the $10 million budget we can also afford to undertake D. A and D have *lower* profitability indexes than B and C, but they have a *higher* total net present value.

The reason that ranking on the profitability index fails in this example is that resources are constrained in each of two periods. In fact, this ranking method is inadequate whenever there is *any* other constraint on the choice of projects. This means that it cannot cope with cases in which two projects are mutually exclusive or in which one project is dependent on another.

*Some More Elaborate Capital Rationing Models

The simplicity of the profitability-index method may sometimes outweigh its limitations. For example, it may not pay to worry about expenditures in subsequent years if you have only a hazy notion of future capital availability or investment opportunities. But there are also circumstances in which the limitations of the profitability-index method are intolerable. For such occasions we need a more general method for solving the capital rationing problem.

We begin by restating the problem just described. Suppose that we were to accept proportion x_A of project A in our example. Then the net present value of our investment in the project would be $21x_A$. Similarly the net present value of our investment in project B can be expressed as $16x_B$, and so on. Our objective is to select the set of projects with the highest *total* net present value. In other words we wish to find the values of x that maximize

$$\text{NPV} = 21x_A + 16x_B + 12x_C + 13x_D$$

Our choice of projects is subject to several constraints. First, total cash outflow in period 0 must not be greater than $10 million. In other words,

$$10x_A + 5x_B + 5x_C + 0x_D \leq 10$$

Similarly, total outflow in period 1 must not be greater than $10 million.

$$-30x_A - 5x_B - 5x_C + 40x_D \leq 10$$

Finally, we cannot invest a negative amount in a project and we cannot purchase more than one of each. Therefore we have

$$0 \leq x_A \leq 1,\ 0 \leq x_B \leq 1, \ldots$$

Collecting all these conditions, we can summarize the problem as follows:

$$\text{Maximize } 21x_A + 16x_B + 12x_C + 13x_D$$

Subject to

$$10x_A + 5x_B + 5x_C + 0x_D \leq 10$$

$$-30x_A - 5x_B - 5x_C + 40x_D \leq 10$$

$$0 \leq x_A \leq 1,\ 0 \leq x_B \leq 1, \ldots$$

One way to tackle such a problem is to keep selecting different values for $x_A, \ldots, x_D$, noting which combination both satisfies the constraints and gives the highest net present value. But it's smarter to recognize that the equations above constitute a linear programming (LP) problem. It can be handed to a computer equipped to solve LPs.

The answer given by the LP method is somewhat different from the one we obtained earlier. Instead of investing in one unit of project A and one of project D, we are told to take half of project A, all of project B, and three-quarters of D. The reason is simple. The computer is a dumb, but obedient, pet, and since we did not tell it that $x_A, \ldots, x_D$ had to be whole numbers, it saw no reason to make them so. By accepting "fractional" projects, it is possible to increase NPV by $2.25 million. For many purposes this is quite appropriate. If project A represents an investment in 1,000 square metres of warehouse space or in 1,000 tonnes of steel plate, it might be feasible to accept 500 square metres or 500 tonnes, and quite

reasonable to assume that cash flow would be reduced proportionately. If, however, project A is a single crane or oil well, such fractional investments make little sense.

When fractional projects are not feasible, we can use a form of linear programming known as *integer* (or *zero-one*) programming, which limits the variables to being integers. Unfortunately, integer programs are less common and more awkward to use.

ses of Capital Rationing Models

Linear programming models seem tailor-made for solving capital budgeting problems when resources are limited. Why then are they not universally accepted either in theory or in practice? One reason is that these models are often not cheap to use. We know of an oil company that spent more than $4 million in one year on an investment planning model using integer programming. While linear programming is considerably cheaper in terms of computer time, it cannot be used when large, indivisible projects are involved.

Second, as with any sophisticated long-range planning tool, there is the general problem of getting good data. It is just not worth applying costly, sophisticated methods to poor data. Furthermore, these models are based on the assumption that all future investment opportunities are known. In reality, the discovery of investment ideas is an unfolding process.

Our most serious misgivings centre on the basic assumption that capital is limited. When we come to discuss company financing, we shall see that most firms do not face capital rationing and can raise very large sums of money on fair terms. Why then do many company presidents tell their subordinates that capital is limited? If they are right, the capital market is seriously imperfect. What then are they doing maximizing NPV?[27] We might be tempted to suppose that if capital is not rationed, they do not need to use the LP model and, if it is rationed, then surely they *ought* not to use it. But that would be too quick a judgement. Let us look at this problem more deliberately.

Soft Rationing Many firms' capital constraints are "soft." They reflect no imperfections in capital markets. Instead they are provisional limits adopted by management as an aid to financial control.

Some ambitious divisional managers habitually overstate their investment opportunities. Rather than trying to distinguish which projects really are worthwhile, headquarters may find it simpler to impose an upper limit on divisional expenditures and thereby force the divisions to set their own priorities. In such instances budget limits are a rough but effective way of dealing with biased cash-flow forecasts. In other cases management may believe that very rapid corporate growth could impose intolerable strains on management and the organization. Since it is difficult to quantify such constraints explicitly, the budget limit may be used as a proxy.

Because such budget limits have nothing to do with any inefficiency in the capital market, there is no contradiction in using an LP model in the division to maximize net present value subject to the budget constraint. On the other hand, there is not much point in elaborate selection procedures if the cash-flow forecasts of the division are seriously biased.

Even if capital is not rationed, other resources may be. The availability of management time, skilled labour, or even other capital equipment often constitutes an important constraint on a company's growth. In Appendix 6-2 we show you how the programming model we have described can be extended to incorporate such constraints. And we also show how they may be used to cope with project interactions.

[27] Don't forget that we had to assume perfect capital markets to derive the NPV rule.

Hard Rationing Soft rationing should never cost the firm anything. If capital constraints become tight enough to hurt—in the sense that projects with significant positive NPVs are passed up—then the firm raises more money and loosens the constraint. But what if it *can't* raise more money—what if it faces *hard* rationing?

Hard rationing implies market imperfections, but that does not necessarily mean we have to throw away net present value as a criterion for capital budgeting. It depends on the nature of the imperfection.

Sunshine Coast Aquaculture (SCA) borrows as much as the banks will lend it, yet it still has good investment opportunities. This is not hard rationing as long as SCA can issue stock. But perhaps it can't. Perhaps the founder and majority shareholder vetoes the idea from fear of losing control of the firm, or perhaps a stock issue would bring costly red tape or legal complications.[28]

This does not invalidate the NPV rule. SCA's *shareholders* can borrow or lend, sell their shares, or buy more. They have free access to security markets. The type of portfolio they hold is independent of SCA's financing or investment decisions. The only way SCA can help its shareholders is to make them richer. Thus SCA should invest its available cash in the package of projects having the largest aggregate net present value.

A barrier between the firm and capital markets does not undermine net present value so long as the barrier is the *only* market imperfection. The important thing is that the firm's *shareholders* have free access to well-functioning capital markets.

The method of net present value *is* undermined when imperfections restrict shareholders' portfolio choice. Suppose that Beachcomber Aquaculture, Inc. (BAI) is solely owned by its founder, Alexander Turbot. Mr. Turbot has no cash or credit remaining, but he is convinced that expansion of his operation is a high-NPV investment. He has tried to sell stock but has found that prospective investors, skeptical of prospects for fish farming in the desert, offer him much less than he thinks his firm is worth. For Mr. Turbot capital markets hardly exist. It makes little sense for him to discount the prospective cash flows at a market opportunity cost of capital.

6-6 SUMMARY

By now, present value calculations should be a matter of routine. However, forecasting cash flows will never be routine. It will always be a skilled, hazardous occupation. Mistakes can be minimized by following three rules.

1. Concentrate on cash flows after taxes. Be wary of accounting data masquerading as cash-flow data.
2. Always judge investments on an incremental basis. Tirelessly track down all cash-flow consequences of your decision.
3. Treat inflation consistently. Discount nominal cash-flow forecasts at nominal rates and real forecasts at real rates.

We might add a fourth rule: recognize project interactions. Decisions involving only a choice of accepting or rejecting a project rarely exist, since capital projects can rarely be isolated from other projects or alternatives. The simplest decision normally encountered is accept or reject or delay. A project having a positive NPV if undertaken today may have a still higher NPV if undertaken tomorrow.

Another kind of project interaction stems from *capital rationing*. If capital is strictly limited, then acceptance of project A may preclude acceptance

[28] A majority owner who is "locked in" and has much personal wealth tied up in SCA may be effectively cut off from capital markets. The NPV rule may not make sense to such an owner, though it will to the other shareholders.

of B. If capital is limited in only one period, the objective of the firm shifts from maximizing NPV to maximizing NPV *per dollar of capital*. Projects can be ranked by their profitability index, and top-ranked projects chosen until funds are exhausted. This procedure fails when capital is rationed in more than one period or when there are other constraints on project choice. The only general solution is linear or integer programming.

"Hard" capital rationing always reflects a market imperfection—a barrier between the firm and capital markets. If that barrier also implies that the firm's shareholders lack free access to a well-functioning capital market, the very foundations of net present value crumble. Fortunately, hard rationing is rare for corporations in the United States and Canada. Many firms do use "soft" capital rationing, however. That is, they set up self-imposed limits as a means of financial planning and control.

This chapter is concerned with the mechanics of applying the net present value rule in practical situations. All our analysis boils down to two simple themes. First, be careful about the definition of alternative projects. Make sure you are comparing like with like. Second, make sure that your calculations include all incremental cash flows.

FURTHER READING

Canadian income tax law is consolidated in:

H.H. Stikeman, *Income Tax Act: Annotated*, 20th ed., Richard DeBoo, Don Mills, 1990.

A more readable but less comprehensive source of tax information is:

Canadian Master Tax Guide, 46th ed., CCH Canadian Limited, Don Mills, 1991.

The tax act and extensive editorial comment is provided in ten volumes, updated on a weekly subscription basis:

Canadian Tax Reporter, CCH Canadian Limited, Don Mills, 1991.

There are several good general texts on capital budgeting that cover project interactions. Two examples are:

H. Bierman and S. Smidt, *The Capital Budgeting Decision*, 7th ed., The Macmillan Company, New York, 1988.

E.L. Grant, W.G. Ireson, and R.S. Leavenworth, *Principles of Engineering Economy*, 7th ed., Ronald Press, New York, 1982.

Terborgh treats decisions involving machine replacement in detail.

G.W. Terborgh, *Business Investment Management*, Machinery and Allied Products Institute and Council for Technological Advancement, 1967.

The classic treatment of linear programming applied to capital budgeting is:

H.M. Weingartner, *Mathematical Programming and the Analysis of Capital Budgeting Problems*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1963.

There is a long scholarly controversy on whether capital constraints invalidate the NPV rule. Weingartner has reviewed this literature.

H.M. Weingartner, "Capital Rationing: *n* Authors in Search of a Plot," *Journal of Finance*, **32**: 1403–1432 (December, 1977).

Reinhardt provides an interesting case study of a capital investment decision in:

U.E. Reinhardt, "Break-Even Analysis for Lockheed's TriStar: An Application of Financial Theory," *Journal of Finance*, **32**: 821–838 (September 1973).

APPENDIX 6-1 CORPORATE INCOME TAXES IN CANADA

In this appendix we will discuss some more complicated issues in Canadian tax law, particularly as they relate to capital budgeting.

Corporate Tax Rates

The basic Canadian corporate tax rate is 38%, although this is reduced for manufacturing and processing (M&P) business and for small business. Starting in 1991, the M&P tax rate will be 33%, a result of a phased-in reduction from 36% in 1988. The *small business deduction* reduces the rate on first $200,000 of taxable income for all businesses to 22%.

The federal government allows a further 10% deduction from corporate taxes to allow for provincial taxes. The provinces often used the federal definition of taxable income, but they each charge taxes at their own rates. In 1988, provincial tax rates for general business varied from 13% to 17%, the rates for M&P business varied from 5.9% to 14.5% and the rates for small business varied from 0% to 10%.

From time to time, the federal government also imposes a surtax or allows an abatement to help implement short-term fiscal policy. Starting in 1987, the surtax was 3% of federal tax paid. Some overall tax rates are illustrated in Table 6-5.

Table 6-5
Calculation of 1988 Corporate Tax Rates for a Manufacturing and Processing Business

	British Columbia		Québec	
	Small Business	Ordinary Business	Small Business	Ordinary Business
Federal tax	22%	36%	22%	36%
Less: provincial tax credit	10%	10%	10%	10%
	12%	26%	12%	26%
Plus surtax (3% of federal tax)	0.36%	0.78%	0.36%	0.78%
	12.36%	26.78%	12.36%	26.78%
Plus provincial tax	9%	14%	3.22%	5.90%
Net income tax rate	21.36%	40.78%	15.58%	32.68%

Loss Carry-forward and Carry-back

Recall that capital losses can only occur on the sale of non-depreciable assets, like land or securities. However, capital gains can occur on the sale of depreciable and non-depreciable assets. Taxpayers are allowed to:

1. deduct capital losses from capital gains in the same year;
2. **carry-back** capital losses for up to three years to be applied against previous capital gains; and
3. **carry-forward** capital losses against any future capital gains.

Ordinary losses (that is, non-capital losses) may be carried back up to three years or carried forward up to seven years, to be applied against taxable income.

Clearly you should carry losses back before you carry them forward, because you can benefit from their tax shields as they occur. However, the government only rebates excess taxes paid under a carry-back. It does not pay any interest on these taxes.

*The "Half-Year Rule" for Capital Cost Allowance and the Timing of Tax Payments

We made two simplifying assumptions in our analysis of CCA tax shields in Section 6-2. Fortunately, the formula we gave there for the PV of CCA tax shields is quite accurate because the two simplifications generally create errors that offset each other. The first simplification was to ignore a feature of tax law called the "half-year rule." This rule requires that, when depreciable assets are purchased, only half of the value of asset purchases (net of dispositions) are added to the asset class balance. The other half is added to the asset class balance in the next year. The second issue we have simplified is the relative timing of asset purchase and the receipt of the tax benefit from the CCA. Now we want to discuss these issues more carefully because they often lead to some confusion.

Let's use the same notation as in Section 6-2:

C = capital cost of an asset (year 0)
S = salvage value of asset (year n)
d = CCA depreciation rate
T_c = corporate tax rate
r = discount rate
UCC_t = undepreciated capital cost after deducting CCA tax shield for year t

The incremental effect of purchasing the asset is to start depreciating half of it in year 0 and the other half in year 1, as follows:

Year	0	1	2	...	t	...
CCA on first half of asset	$Cd/2$	$Cd(1-d)/2$	$Cd(1-d)^2/2$	...	$Cd(1-d)^t/2$	...
CCA on second half of asset	0	$Cd/2$	$Cd(1-d)/2$	...	$Cd(1-d)^{t-1}/2$	...

We can multiply by T_c and discount these tax shields to get:[29]
PV of perpetual CCA tax shields

$$= \frac{1}{2}\left(CdT_c + \frac{CdT_c(1-d)}{1+r} + \frac{CdT_c(1-d)^2}{(1+r)^2} + \cdots\right)$$
$$+ \frac{1}{2}\left(\frac{CdT_c}{1+r} + \frac{CdT_c(1-d)}{(1+r)^2} + \cdots\right)$$
$$= \frac{1}{2}\frac{CdT_c}{r+d}(1+r) + \frac{1}{2}\frac{CdT_c}{r+d}$$
$$= \frac{CdT_c}{r+d}(1+r/2)$$

Compared to the formula in Section 6-2, this formula gives a PV of a perpetual CCA tax shield that is larger by a half-year of interest.[30] Clearly this is not a significant difference in many situations, but it could be important in evaluating

[29] To see this, you could grind out the sums of geometric series, as in Section 3-2, or simply note that the formula in Section 6-2 gives the PV of the tax shields (if they start in year 1) as $CdT_c/(r+d)$. If the tax shields start in year 0, there is one less year of discounting, so they would have a PV of $(1+r)CdT_c/(r+d)$.

[30] Some textbooks suggest that the PV of a perpetual CCA tax shield under the half-year rule is $\frac{CdT_c}{r+d}\left(\frac{1+r/2}{1+r}\right)$ because the tax shields on half of the asset start in year 1 and the tax shields on the other half don't start until year 2. This is analogous to taking tax shields in year 2 for cash expenses that occur in year 1, although these texts generally do not split the timing of

projects (like leases) where competitive market forces drive the NPV of the pr close to zero.

Now suppose the asset is in a class that has many other assets and a substa UCC. We'll also assume that in the salvage year n other assets are added to same class (for example, a replacement asset) with a cost greater than S. S the half-year rule works on acquisitions *net* of dispositions, the *incremental* e of selling the asset for S in year n is to deduct $S/2$ from the UCC of the cla each of years n and $n+1$. Thus we have:

PV of incremental CCA tax shields
$$= \frac{CdT_c}{r+d}\left(1+\frac{r}{2}\right) - \frac{1}{(1+r)^n}\frac{SdT_c}{r+d}\left(1+\frac{r}{2}\right)$$

On the other hand, suppose the asset is always in a class by itself. Then

$$UCC_t = \frac{C}{2}((1-d)^{t+1} + (1-d)^t) = C(1-d)^t\left(1-\frac{d}{2}\right)$$

A little algebra shows that the recapture and terminal loss cases can be comb to give:

PV of CCA tax shield and tax effect of recaptured depreciation or terminal l
$$= \frac{CdT_c}{r+d}\left(1+\frac{r}{2}\right) - \frac{1}{(1+r)^n}UCC_n\frac{dT_c}{r+d} + \frac{T_c}{(1+r)^n}(UCC_n - S)$$

This analysis assumes the owner gets the CCA tax shield for year n. But tax shield is lost immediately because of the recapture. Thus we could get same results by re-working the formulas for lost PV of CCA and UCC to re the assumption that no CCA tax shield is taken in year n.

*Project Interactions Arising From Recaptured Depreciation

Since Canadian tax law often groups the assets of many projects together single class, interactions can arise amongst projects regarding recaptured dep ation and terminal losses. For example, if you are about to face recapt depreciation from the disposal of assets of an existing project, any project re ing new assets in the same class will effectively get a "fast write-off" of the assets. On the other hand, if the existing project is about to get a terminal benefit, acquiring other assets in the same class will generate an onerous liability that should be avoided. Let's look at two examples of this. In both c we are evaluating a project that entails:

C = $100,000 of assets
d = 0.1 (Class 6)
T_c = 0.4
r = 0.15
S = $20,000, salvage in year 6

We'll ignore the half-year rule, and use the simple formulas of Section 6

expenses and their tax shields in this way. Even though there can be complicated schemes o tax-instalment payments under various circumstances, taking expenses and their tax shields the same year gives the most accurate PV calculations. Thus, it is best to treat the CCA tax shields as starting in year 0, as we do here. See G.A. Sick and G.A. Mumey, "The Timing of Cash Flows and Related Taxes," *Administrative Sciences Association of Canada, Finance Proceedings*, **11**: 151–158 (1990), and a related note with the same title and authors: "The Timing of Cash Flows and Related Taxes," *Financial Management*, **19**, No. 4: 14–15 (December 1990).

EXAMPLE 1 Suppose your firm is planning to liquidate some assets in year 0, generating recaptured depreciation of $150,000. By accepting the new project and putting $100,000 back into Class 6 before the end of the tax year, your firm can avoid immediate recapture of $100,000. In effect, all of the incremental CCA tax shield will be realized in year 0, as though there were a one-year tax write-off for the project. However, Class 6 will have a UCC of $0 for years 1 to 5 and the salvage in year 6 will generate a recapture. The overall effect is:

$$\begin{aligned}&\text{PV of incremental CCA tax shield and recapture}\\ &= T_c \times \text{recapture avoided in year 0}\\ &\quad - \text{PV of } T_c \times \text{recapture in year 6}\\ &= 0.4 \times 100{,}000 - \frac{0.4}{(1.15)^6} \times 20{,}000\\ &= \$36{,}541\end{aligned}$$

EXAMPLE 2 Suppose your firm is planning to liquidate all of its Class 6 assets in year 0, generating a terminal loss of $130,000. If you add the new assets to Class 6 before the tax year-end, you cannot close out the asset class and hence you will be ineligible for the terminal loss. Instead, the UCC of Class 6 will rise to $230,000 (the original $130,000 plus the new $100,000). Salvage of the asset in year 6 will generate a terminal loss based on a UCC of $230{,}000 \times (1 - 0.1)^6 = \$122{,}231$. In effect, the terminal loss on the old assets is deferred from year 0 to year 6, so we have

$$\begin{aligned}&\text{PV of deferred terminal loss and incremental CCA tax shields}\\ &= -0.4 \times 130{,}000 + \frac{230{,}000 \times 0.1 \times 0.4}{0.15 + 0.1} - \frac{1}{(1.15)^6}\frac{122{,}231 \times 0.1 \times 0.4}{0.15 + 0.1}\\ &\quad + \frac{1}{(1.15)^6} \times 0.4 \times (122{,}231 - 20{,}000) = -\$5{,}976\end{aligned}$$

Note that this is actually negative. You should try to avoid this situation by incorporating the project as a separate firm for tax purposes, by delaying the purchase of the asset until year 1, or by leasing the asset.

APPENDIX 6-2 SOME EMBELLISHMENTS TO THE CAPITAL RATIONING MODEL

In Section 6-5 we showed that when capital is rationed you can set up the investment decision as a linear programming problem. In this appendix we describe some embellishments to these models, and we show how you can use them to cope with other resource constraints and project interactions.

Cash Carry-forward

A plant manager who is forced to return the unspent part of an annual capital allocation may be goaded into a substantial year-end investment in pink carpeting for the foundry floor or other equally silly assets. (How can you argue for a high budget next year if there's money left over this year?) Headquarters can alleviate this problem by permitting the manager to carry forward any unspent balance. (Then the manager could at least wait until January and get a better selection of carpet colours.) Let us take the sample problem that we described in Section 6-5. To incorporate the possibility of cash carry-forward, we simply need to add another term to our spending constraint. Let s denote funds transferred from year 0 to

year 1 and let them earn interest at the rate of r. Then we can rewrite constraint for year zero as

$$10x_A + 5x_B + 5x_C + 0x_D + s = 10$$

Similarly, the constraint for year 1 becomes

$$-30x_A - 5x_B - 5x_C + 40x_D \leq 10 + (1 + r)s$$

Since carrying forward a negative amount is equivalent to borrowing, we probably wish to add the constraint $s \geq 0$.

Mutually Exclusive Projects

Suppose now that projects B and C are mutually exclusive. We can take ca this in an *integer* program by specifying that our *total* investment in the projects cannot be greater than one.

$$x_B + x_C \leq 1,\ x_B, x_C = 0 \text{ or } 1$$

In other words, if x_B is 1, x_C must be 0; if x_C is 1, x_B must be 0.

Contingent Projects

Suppose next that project D is an attachment to project A, and we cannot a D *unless* we also accept A. In this case we need to add

$$x_D - x_A \leq 0;\ x_D, x_A = 0 \text{ or } 1$$

In other words, if x_A is 1, x_D can be 0 or 1; but if x_A is 0, x_D must likewise

Constraints on Nonfinancial Resources

Money may not be the only scarce resource. Each of our projects may re services from a 12-person technical design department. If project A would en three designers, project B two, and so on, we would need to add a constrain

$$3x_A + 2x_B + 8x_C + 3x_D \leq 12$$

Constraints on Nonfinancial Output

Sometimes it is appropriate to place constraints on the total increase in phy capacity. Suppose that projects A and C produce four and three units, respecti of the same product. If the company is unable to sell more than five units, necessary to add

$$4x_A + 3x_C \leq 5$$

We could go on—but you get the idea.

QUIZ

1. Which of the following should be treated as incremental cash flows deciding whether to invest in a new manufacturing plant? The site is al owned by the company, but existing buildings would need to be demoli
   (a) The market value of the site and existing buildings
   (b) Demolition costs and site clearance
   (c) The cost of a new access road put in last year
   (d) Lost earnings on other products due to executive time spent on the facility

(e) A proportion of the cost of leasing the president's jet airplane
(f) Future depreciation of the new plant
(g) The reduction in the corporation's tax bill resulting from the investment tax credit
(h) The initial investment in inventories of raw materials
(i) Money already spent on engineering design of the new plant

2. M. Loup Garou will be paid 100,000 French francs one year hence. This is a nominal flow, which he discounts at a 15% nominal discount rate:

$$PV = \frac{100{,}000}{1.15} = 86{,}957 \text{ francs}$$

The inflation rate is 10%.

Calculate the present value of M. Garou's payment using the equivalent *real* cash flow and *real* discount rate. (You should get exactly the same answer as he did.)

3. Machines A and B are mutually exclusive and are expected to produce the following cash flows:

	Cash Flows (thousands of dollars)			
Machine	C_0	C_1	C_2	C_3
A	−100	+110	+121	−
B	−120	+110	+121	+133

The opportunity cost of capital is 10%.
(a) Calculate the NPV of each machine.
(b) Use present value tables to calculate the equivalent annual cash flow from each machine.
(c) Which machine should you buy?

4. Machine C was purchased five years ago for $200,000 and produces an annual cash flow of $80,000. It has no salvage value but is expected to last another five years. The company can replace machine C with machine B (see question 3, above) *either* now *or* at the end of five years. Which should it do?

5. Suppose you have the following investment opportunities, but only $100,000 available for investment. Which projects should you take?

Project	NPV	Investment
1	5,000	10,000
2	5,000	5,000
3	10,000	90,000
4	15,000	60,000
5	15,000	75,000
6	3,000	15,000

6. What is the difference between "hard" and "soft" capital rationing? Does soft rationing mean the manager should stop trying to maximize NPV? How about hard rationing?

7. You are considering whether to undertake a project that will generate revenues of $50,000 a year and expenses of $20,000 a year for eight years. To undertake the project you must invest $150,000 in machinery in Class 8 (20%). The corporate tax rate is 40% and your discount rate for the project is

12%. Calculate the NPV of the project under each of the following scenari
(a) You always have other assets and a positive UCC in Class 8, and y can salvage the machinery in nine years for:
(i) $20,000
(ii) $200,000
(b) The machine will always be in its own asset class and you can salva the machinery in nine years for:
(i) $20,000
(ii) $30,000
(iii) $200,000
(c) The machinery can be lumped in with other Class 8 assets, on whi you are about to immediately realize recaptured depreciation $100,000, and you can salvage the new machinery in nine years $20,000. You do not plan any other purchases or sales of Class 8 ass for the next nine years.

8. You are planning to purchase a low-rise apartment building in Class 1 (4 for $250,000 (net of the cost of land). Under Canadian tax law, this buildi must be in its own asset class, so you may have recaptured depreciati when you sell it. Indeed, you expect to sell the building in six years $220,000, even though the UCC, after five years of CCA, would then be or $203,843. A friend has pointed out that the 10% CCA rate for Class 32 only a *maximum* CCA rate, and you may take CCA at a lower rate if y wish. He recommends that you avoid recapture by taking CCA at a reduc rate so that the UCC in six years is exactly $220,000. What do you thin

9. A project requires an investment of $10,000 in Class 8 (20%) producti equipment. It will generate real pretax revenues of $3,000 per year for fi years. You can liquidate the equipment in year 6. Currently, six-year-c production equipment of that type sells for $1,500. You feel that both these figures are likely to keep pace with inflation. Your tax rate is 36%, y expect an inflation rate of 5% over the next six years, and the real opportun cost of capital is 3%. Round off the nominal rate of interest so you can re PV factors from the Appendix tables.
(a) You always have assets and a positive balance in the production equi ment class. What is the NPV of the project?
(b) The production equipment is in a class by itself, resulting in recaptu or terminal loss when it is liquidated. What is the NPV of the projec

QUESTIONS AND PROBLEMS

1. When appraising mutually exclusive projects, many companies calcula the projects' equivalent annual costs and rank the projects on this bas Why is this necessary? Why not just compare the projects' NPVs?

2. Calculate the NPV of some personal investment decision, such as buying washing machine instead of using the laundromat, insulating the attic, replacing the car. Ignore the extra convenience of the new asset. Just foc on the cash costs and benefits.

3. Discuss the following statement: "We don't want individual plant manage to get involved in the firm's tax position. So instead of telling them discount after-tax cash flows at 10%, we just tell them to take the pret cash flows and discount at 15%. With a 36% tax rate, 15% pretax generat approximately 10% after tax."

4. Discuss the following statement: "We like to do all our capital budgeting calculations in real terms. It saves making any forecasts of the inflation rate."
5. A project requires use of spare computer capacity. If the project is not terminated, the company will need to buy an additional disk at the end of year 2. If it is terminated, the disk will not be required until the end of year 4. If disks cost $10,000 and become filled with data every five years, and if the opportunity cost of capital is 10%, what is the present value of the cost of this extra usage if the project is terminated at the end of year 2? What if the project continues indefinitely?
6. Mrs. T. Potts, the treasurer of Ideal China, has a problem. The company has just ordered a new kiln for $400,000. Of this sum, $50,000 is described by the supplier as "installation cost." Mrs. Potts does not know whether Revenue Canada will permit the company to treat this cost as a current expense or as a capital investment. In the latter case, the company could claim a 15% investment tax credit on the $50,000 and put it in Class 8 (20%). If the tax rate is 36% and the opportunity cost of capital is 5%, what is the present value of the tax shield in either case?
7. You own 500 hectares of timberland, with young timber worth $40,000 if logged now. This represents 1,000 cords of wood worth $40 per cord net of costs of cutting and hauling. A paper company has offered to purchase your tract for $140,000. Should you accept the offer? You have the following information:
   (a)

Years	Yearly Growth Rate of Cords Per Hectare
1–4	16%
5–8	11
9–13	4
14 and subsequent years	1

   (b) You expect price per cord to increase at 4% per year indefinitely.
   (c) The cost of capital is 9%. Ignore taxes.
   (d) The market value of your land would be $100 per hectare if you cut and removed the timber this year. The value of cut-over land is also expected to grow at 4% per year indefinitely.
8. The Borstal Company has to choose between two machines that do the same job but have different lives. The two machines have the following costs:

Year	Machine A	Machine B
0	$40,000	$50,000
1	10,000	8,000
2	10,000	8,000
3	10,000 + replace	8,000
4		8,000 + replace

These costs are expressed in real terms.

   (a) Suppose you are Borstal's financial manager. If you had to buy one or the other machine, and rent it to the production manager for that machine's economic life, what annual rental payment would you have to charge? Assume a 6% real discount rate and ignore taxes.
   (b) Which machine should Borstal buy?
   (c) Usually the rental payments you derived in part (a) are just hypothetical—a way of calculating and interpreting equivalent annual cost. Suppose you actually do buy one of the machines and rent it to the production manager. How much would you actually have to charge in each future year if there is steady 8% per year inflation? (*Note:* The rental payments calculated in part (a) are real cash flows. You would have to mark those payments up to cover inflation.)
9. What biases or errors might be introduced by using nominal cash flows and discount rates to calculate equivalent annual costs? Think of situations like that described in problem 8 above.
10. Borghia Pharmaceuticals has $1 million allocated for capital expenditures. Which of the following projects should the company accept to stay within the $1 million budget? How much does the budget limit cost the company in terms of its market value? The opportunity cost of capital for each project is 11%.

Project	Investment (thousands of dollars)	NPV (thousands of dollars)	IRR, %
1	300	66	17.2
2	200	−4	10.7
3	250	43	16.6
4	100	14	12.1
5	100	7	11.8
6	350	63	18.0
7	400	48	13.5

11. The *Financial Analysts Journal* currently offers the following subscription options: one year, $48; two years, $84; three years, $108. These rates are expected to increase at the general rate of inflation. What is your optimal strategy, assuming you intend to be a permanent subscriber? Make other assumptions as appropriate.
12. The president's executive jet is not fully utilized. You judge that its use by other officers would increase direct operating costs by only $20,000 a year and would save $100,000 a year in airline bills. On the other hand, you believe that with the increased use the company will need to buy another jet at the end of three years rather than four. A new jet costs $1.1 million. The corporate fleet is generally expanded by one jet every six years. Assume that the company does not pay taxes and that the opportunity cost of capital is 12%. Should you try to persuade the president to allow other officers to use the plane?
13. A project requires an initial investment of $100,000 and is expected to produce a cash inflow before tax of $26,000 per year for five years. Company A has substantial accumulated tax losses and is unlikely to pay taxes in the foreseeable future. Company B pays corporate taxes at a rate of 36% and can depreciate the investment for tax purposes in Class 8 (20%), which

has many other assets and a substantial UCC. The asset will have no salvage value after five years.

Suppose the opportunity cost of capital is 8%.

(a) Calculate project NPV for each company.

(b) What is the IRR of the after-tax cash flows for each company? What does comparison of the IRRs suggest is the effective corporate tax rate?

14. A widget manufacturer currently produces 200,000 units a year. It buys widget lids from an outside supplier at a price of $2 a lid. The plant manager believes that it would be cheaper to make these lids rather than buy them. Direct production costs are estimated to be only $1.50 a lid. The necessary machinery would cost $150,000. This investment would be placed in Class 10 (30%). The plant manager estimates that the operation would require additional working capital of $30,000 but argues that this sum can be ignored since it is recoverable at the end of the ten years. If the company pays tax at a rate of 36%, and the opportunity cost of capital is 15%, would you support the plant manager's proposal? State clearly any additional assumptions that you need to make.

15. Reliable Electric is considering a proposal to manufacture a new type of industrial electric motor, which would replace most of its existing product line. A research breakthrough has given Reliable a two-year lead on its competitors. The project proposal is summarized in Table 6-6.

(a) Read the notes to the table carefully. Which entries make sense? Which do not? Why or why not?

(b) What additional information would you need to construct a version of Table 6-6 that makes sense?

(c) Construct such a table and recalculate NPV. Make additional assumptions as necessary.

16. Suppose the IM&C guano project will be incorporated as a separate firm for income tax purposes, and the capital assets are eligible for a 15% investment tax credit. How does this change its NPV?

17. Your firm is planning to produce and sell a new type of widget, called a "midget" (a male widget). You already have a building on some land, but would require $5 million of Class 8 (20%) machinery. You paid $200,000 for the land five years ago and the building is in a class by itself—Class 1 (4%)—with an undepreciated capital cost of $150,000. Right now the land could be sold for $300,000 and the building for $100,000, but in 11 years they could be sold for $500,000 and $100,000 respectively. You can sell $2 million worth of midgets per year for ten years, with annual production costs of $1 million. The machinery can be salvaged in 11 years for $1.2 million. You always have many assets in Class 8, with a large UCC. There is no investment tax credit for this project. Your corporate tax rate is 36% and your opportunity cost of capital is 10%. What is the NPV of the project?

18. Recalculate your answer to problem 17 by assuming that the 10% nominal opportunity cost of capital consists of a real 6% return and expected inflation of 4%. The salvage values for land, buildings, and machinery are real.

Table 6-6
Cash Flows and Present Value of Reliable Electric's Proposed Investment (see problem 15) (annual cash flows in thousands of dollars)

	1990	1991	1992	1993–2000
1. Capital expenditure	−10,400			
2. Research and development	−2,000			
3. Working capital	−4,000			
4. Revenue		8,000	16,000	40,000
5. Operating costs		−4,000	−8,000	−20,000
6. Overhead		−800	−1,600	−4,000
7. Depreciation		−1,040	−1,040	−1,040
8. Interest		−2,160	−2,160	−2,160
9. Income	−2,000	0	3,200	12,800
10. Tax	0	0	432	4,608
11. Net cash flow	−16,400	0	2,768	8,192
Net present value = +13,489				

Notes:

1. *Capital expenditure*: $8 million for new machinery and $2.4 million for a warehouse extension. The full cost of the extension has been charged to this project, although only about half of the space is currently needed. Since the new machinery will be housed in an existing factory building, no charge has been made for land and building.
2. *Research and development*: $1.82 million spent in 1989. This figure was corrected for 10% inflation from the time of expenditure to date. Thus 1.82 × 1.1 = $2 million.
3. *Working capital*: Initial investment in inventories.
4. *Revenue*: These figures assume sales of 2,000 motors in 1991, 4,000 in 1992, and 10,000 per year from 1993 through 2000. The initial unit price of $4,000 is forecasted to remain constant in real terms.
5. *Operating costs*: These include all direct and indirect costs. Indirect costs (heat, light, power, fringe benefits, and so on) are assumed to be 200% of direct labour costs. Operating costs per unit are forecasted to remain constant in real terms at $2,000.
6. *Overhead*: Marketing and administrative costs, assumed equal to 10% of revenue.
7. *Depreciation*: Straight-line for ten years.
8. *Interest*: Charged on capital expenditure and working capital at Reliable's current borrowing rate of 15%.
9. *Income*: Revenue less the sum of research and development, operating costs, overhead, depreciation, and interest.
10. *Tax*: 36% of income. However, income is negative in 1990. This loss is carried forward and deducted from taxable income in 1992.
11. *Net cash flow*: Assumed equal to income less tax.
12. *Net present value*: NPV of net cash flow at a 15% discount rate.

Record Request AG-3 (Tr. 1, at 150)

Please refer to Exhibit AG-1-30 (Att) at page 4. Please recalculate Mr. Hevert's analysis reflected in this attachment by fixing the power market price at the current level from the years 2005 through 2011.

Response

CONFIDENTIAL ATTACHMENTS

Please refer to Attachment RR-AG-3(a) **CONFIDENTIAL CD-ROM** for a recalculation of Mr. Hevert's analysis fixing the power market prices at the current level from the years 2005 through 2011. The recalculation of the power prices fixed at current levels results in savings of 17.67 percent. In addition, Attachment RR-AG-3(b) **CONFIDENTIAL CD-ROM** performs the same calculation, but adjusts the inflation rate as requested in Record Request DTE-4, resulting in savings of 19.55 percent.

Record Request AG-4 (Tr. 1, at 151)

Please refer to Exhibit DTE-2-6(a) (Att). Please provide a complete, updated copy of the entire Blue Chip Forecast.

Response

Please refer to Attachment AG-4 for a copy of the Blue Chip Economic Indicators, Vol. 29, No. 10, October 10, 2004. Please note that there is no material change in the projected *Consumer Price Index*, cited in Exhibit DTE-2-6.

Attachment RR-AG-4

Blue Chip Economic Indicators

Top Analysts' Forecasts Of The U.S. Economic Outlook For The Year Ahead

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Persistence Of High Energy Prices Is Depressing Forecasts Of GDP Growth In 2005

Domestic Commentary The consensus forecast of inflation-adjusted growth in gross domestic product (real GDP) this year rose for the first time since June as analysts' factored in an upward revision in the government's latest estimate of growth in Q2 and raised their own forecasts of GDP growth in Q3. This offset a drop in the consensus forecast of Q4 growth and lifted the forecast of the year-over-year (y/y) percent change in real GDP 0.1 of a percentage point to its August level of 4.4%. Real GDP is now believed to have increased at an annualized rate of 3.8% in the quarter just ended, 0.4 of a point higher than a month ago and half a percentage point higher than the upwardly revised rate of 3.3% in Q2. The predicted growth rate in Q4, however, fell 0.2 of a point over the past month to 3.7%. As recently as August, the consensus predicted that growth in the second half of this year would hit at least 4%. Moreover, the consensus forecast of y/y real GDP growth in 2005 fell 0.1 of a point to 3.5% this month, marking the third consecutive drop of that magnitude. Real GDP on a fourth quarter-over-fourth quarter basis (Q4/Q4) is now forecast to hit 3.8% this year and 3.5% in 2005. That represented a 0.1 of a point increase in the 2004 estimate while the 2005 forecast went unchanged.

This month's rebound in the consensus forecast of Q3 GDP growth appears to stem from increased optimism about the pace of consumer spending, construction activity and inflation. A sharp upward revision in the government's estimate of personal consumption expenditures (PCE) in July and a solid rise in September vehicle sales hint of a sizable acceleration in consumption during Q3 despite disruptions along the East Coast due to repeated hurricanes. The consensus now predicts – perhaps conservatively – that real PCE grew at an annualized rate of 3.8% in Q3 versus the paltry 1.6% reading in Q2. Moreover, better than expected total construction spending data for August and an upward revision to July's figures point to stronger than previously thought residential and business investment during the quarter. A drop in inflation versus what we saw in the first half of this year also appears to have boosted inflation-adjusted PCE growth in Q3. The personal consumption deflator was unchanged in July and August after surging at annualized rates of 3.3% in Q1 and 3.1% in Q2 and likely grew at an annualized rate of only 1.0% or so during Q3.

Now troubling analysts about economic prospects in Q4 of this year and in 2005 is the renewed surge in the price of crude oil and its derivative products that threaten continued strength in consumer spending, business investment and corporate profits. Crude oil is now trading comfortably above $50 per barrel (West Texas Intermediate), home heating oil is at record levels and gasoline prices are once again on the rise. Few, if any analysts anticipated this year's sharp rise in crude oil prices and most thought it would prove relatively temporary. Indeed, many suspected that energy prices had peaked this spring when crude traded up to the mid-$40 per barrel level. Prices subsequently fell back to the mid-$30's by early July and gasoline prices fell over the remainder of the summer despite a rebound in crude prices. The increase in oil prices from the low-$40's to its recent peak of over $53 per barrel has come as a major surprise. As recently as a month ago, the consensus predicted that crude oil prices would fall to below $40 per barrel by the end of this year and to less than $34 per barrel by the end of 2005. However, soaring demand due to the strongest global economic growth in a generation, and a variety of events that have served to constrain supply, are now making analysts at least consider the possibility that energy prices may remain elevated well into next year.

Unfortunately, this comes at a time when other factors were already expected to dampen consumption and investment in 2005. The Federal Reserve has already begun reversing the super-accommodative monetary policy enacted during the 2001-2003 period and most analysts anticipate further interest rates hikes over the coming year. Fiscal policy also is likely to become more restrictive in 2005 as federal spending ebbs after several years of sizable increases. Moreover, large federal budget deficits argue against passage of major tax cuts on par with those seen in recent years. Nonetheless, analysts were, and for the most part remain, confident that accelerating job and wage growth would keep personal consumption on a solid footing, and that coupled with continued strength in capital spending, GDP growth would merely slow to a trend-like pace of 3.5%-4.0% in 2005. However, the possibility that energy prices will stay near current levels or move even higher has raised the specter of a sharper slowdown in consumption and investment next year.

Most analysts currently appear to view the renewed surge in energy prices as a larger threat to the pace of economic growth than a precursor of higher inflation down the road. This may be in part due to the fact that inflation slowed in Q3 from its first half pace. The Consumer Price Index (CPI) fell 0.1 of a point in July and rose only 0.1 of a point in August. For the entire quarter it likely rose at an annualized rate of 2% or less compared with rates of 4.8% in Q2 and 3.5% in Q1. The growth rate of the CPI excluding food and energy prices, too, eased this summer, falling from a y/y pace of 1.9% in June to 1.7% in August. A majority of business economists currently think that intense competitive forces and still strong productivity growth will prevent a significant pass-through of sharply higher input prices (oil and a host of other commodities) into the costs of finished goods and services, raising core inflation in the process. The consensus looks for the CPI to increase 3.2% on a Q4/Q4 basis this year but rise only 2.3% in 2005. Most of this retreat is expected to result from lower energy prices. As of last month, the consensus foresaw a December-over-December increase of 2.2% in the core CPI during 2005, matching its expected rise this year.

The consensus nonetheless believes the most recent run up in energy prices will serve to cap the annualized rate of real PCE growth in the final quarter of this year to 2.9%, perhaps a full percentage point or more slower than in Q3. Growth in Q4 business investment may also be curtailed if energy prices continue to rise as cautious executives scale back purchases of software and equipment. For all of 2004, the consensus expects real PCE will be up 3.5% on a calendar year basis and that nonresidential fixed investment will register growth of 9.9%. The real PCE estimate rose 0.1 of a point over the past month while the forecast of nonresidential investment jumped 0.4 of a point. The consensus now forecasts total housing starts will hit 1.92 million units in 2004, the highest estimate of the year. The consensus estimate of total unit sales of cars and trucks remained at 16.8 million units.

Next year's consensus estimate of a 3.5% real GDP growth will be supported by real PCE growth of 3.1% and an 8.3% increase in nonresidential fixed investment, says the consensus. The PCE estimate was unchanged from a month ago but the estimate of business investment fell 0.2 of a point. Corporate profits will increase 9.7% in 2005 following a 16.0% gain this year, according to the consensus. Housing starts next year will total 1.78 million units, 7.3% below the 2004 level. Total industrial production will register y/y growth of 4.6% next year following growth of 4.7% in 2004.

International Commentary Canada's economy continues to exhibit solid growth and real GDP will expand by 2.9% this year and 3.4% in 2005, says the consensus. Growth in the U.K., on the other hand, will likely slow to 2.7% in 2005 after growing by 3.3% this year. Many analysts suspect that high crude oil prices pose particularly large risks to Asia's manufacturing-based economies next year *(see pages 6 and 7 for international forecasts).*

Special Questions This issue contains our latest long-range survey results. On page 14 are forecasts for all the variables found on pages 2 and 3 for the years 2006 through 2010 and an average for the five-year period 2011-2015. Page 15 compares our most recent survey results with those obtained last October and the latest estimates of the Bush Administration and the Congressional Budget Office.

GREEN indicates the Blue Chip consensus forecast of near-term U.S. inflation-adjusted economic growth (real GDP) is 3.0 percent or higher.
YELLOW cautions that the consensus forecast of near-term real GDP growth is between 1.0 percent and 3.0 percent.
RED warns that near-term consensus forecast of real GDP growth is below 1.0 percent.

2004 Real GDP Consensus Forecast Rises Back To 4.4%

October 2004 Forecast For 2004 SOURCE:	Percent Change 2004 From 2003 (Year-Over-Year)									Average For 2004			Total Units-2004		-2004-
	1 Real GDP (Chained) (2000 $)	2 GDP Price Index	3 Nominal GDP (Cur. $)	4 Consumer Price Index	5 Indust. Prod. (Total)	6 Dis. Pers. Income (2000 $)	7 Personal Cons. Exp (2000 $)	8 Non-Res. Fix. Inv. (2000 $)	9 Corp. Profits (Cur. $)	10 Treas. Bills 3-mo.	11 Treas. Notes 10-Year	12 Unempl. Rate (Civ.)	13 Housing Starts (Mil.)	14 Auto/Truck Sales (Mil.)	15 Net Exports (2000 $)
Bear, Stearns & Co.	4.6 H	2.1	6.8	2.6	4.6	3.1	3.6	10.1	16.9	1.4	4.4	5.5	1.85	16.5	-575.3
Conference Board*	4.6 H	2.1	6.7	2.5	5.5 H	2.8	3.8	9.9	23.6 H	1.3	4.4	5.5	1.95	17.0	-570.1
Genetski.com	4.6 H	2.1	6.7	2.7	4.7	3.1	na	na	16.6	1.4	4.3	5.5	na	16.8	na
Naroff Economic Advisors	4.5	2.7 H	7.2 H	2.9 H	5.2	3.5	3.2 L	9.0	15.0	1.3	4.4	5.4 L	1.94	16.7	-570.0
Wachovia	4.5	2.5	6.7	2.6	4.6	3.3	3.6	10.3	17.3	1.5	4.3	5.5	1.94	16.8	-574.0
Deutsche Bank Securities	4.5	2.3	6.9	2.7	4.2	3.3	3.6	10.0	na	1.5	4.3	5.5	na	na	-570.0
Moody's Investors Service	4.5	2.2	6.8	2.6	4.4	3.1	3.6	9.7	16.7	1.4	4.4	5.5	1.92	16.7	-561.0
Perna Associates	4.5	2.1	6.7	2.6	4.8	3.1	3.6	10.3	16.6	1.4	4.3	5.5	1.92	16.6	-575.0
Action Economics	4.5	2.1	6.7	2.6	4.6	3.1	3.5	9.6	17.6	1.4	4.3	5.5	1.96	17.2 H	-561.0
ClearView Economics	4.5	2.1	6.6	2.7	4.7	3.3	3.6	10.0	15.8	1.4	4.2	5.5	1.94	17.1	-575.0
Standard & Poors Corp.*	4.5	2.1	6.4	2.6	4.5	3.3	3.8	10.2	12.9	1.4	4.4	5.5	1.93	16.7	-579.8
Morgan Stanley	4.5	2.0	6.5	2.6	4.5	3.1	3.6	10.3	16.8	1.4	4.3	5.5	1.92	16.7	-575.6
Banc of America Corp.	4.5	1.8 L	6.3 L	2.6	4.4	3.5	3.6	10.1	23.0	1.4	4.3	5.5	1.93	16.3	-571.0
Credit Suisse First Boston	4.4	2.5	6.6	2.6	4.6	na	3.5	9.4	18.2	na	4.1 L	5.5	na	na	-568.8
Federal Express Corp.	4.4	2.4	6.8	2.7	4.4	3.1	3.6	9.5	15.8	1.3	4.3	5.5	1.95	16.6	-577.2
J.W. Coons Advisors	4.4	2.3	6.7	2.4 L	4.6	3.1	3.5	12.5 H	17.8	1.5	4.3	5.5	2.00 H	17.0	-584.0
Wells Capital Management	4.4	2.2	6.7	2.9 H	4.6	3.2	3.5	10.6	16.2	1.4	4.3	5.5	1.92	16.6	-577.0
Nomura Securities	4.4	2.2	6.7	2.6	4.5	3.0	3.6	10.0	15.6	1.4	4.3	5.5	1.92	17.1	-577.0
UBS Warburg	4.4	2.2	6.7	2.5	4.5	3.1	3.5	9.8	na	1.5	4.3	5.6 H	1.89	na	-575.0
LaSalle National Bank	4.4	2.2	6.7	2.7	4.8	na	3.4	9.8	16.5	1.3	4.3	5.6 H	1.80 L	16.6	-546.8
Wayne Hummer Investments LLC*	4.4	2.2	6.6	2.7	5.3	3.3	3.4	9.8	17.0	1.4	4.4	5.5	1.91	16.8	-553.0
Econoclast	4.4	2.2	6.6	2.6	5.3	3.7	3.2 L	10.2	11.8	1.4	4.5 H	5.5	1.81	16.6	-543.0
National City Corporation	4.4	2.1	6.7	2.6	4.4	3.4	3.7	10.5	15.2	1.3	4.3	5.5	1.94	17.2 H	-586.3
Northern Trust Company	4.4	2.1	6.6	2.6	4.4	na	3.5	10.0	na	1.3	4.3	5.6 H	1.93	16.8	-586.5
U.S. Chamber of Commerce	4.4	2.1	6.6	2.7	4.8	2.7 L	3.4	10.1	na	1.3	4.5 H	5.5	1.91	na	-581.4
Prudential Equity Group, LLC	4.4	2.1	6.6	2.6	4.7	3.1	3.5	10.3	19.4	1.3	4.3	5.5	1.89	16.6	-580.1
National Assn. of Home Builders	4.4	2.1	6.6	2.6	5.0	3.2	3.6	10.0	15.0	1.3	4.3	5.5	1.93	16.7	-575.2
SOM Economics, Inc.	4.4	2.1	6.5	2.7	4.5	3.0	3.4	9.8	12.0	1.4	4.3	5.5	1.94	17.0	-570.0
J P MorganChase	4.4	2.0	6.5	2.6	5.4	3.1	3.6	10.2	14.6	1.5	4.4	5.5	1.92	16.7	-589.0
Schwab Washington Research Group*	4.4	2.0	6.5	2.6	4.6	2.9	3.6	10.1	16.0	1.4	4.3	5.5	1.94	17.1	-576.0
Macroeconomic Advisers, LLC**	4.4	2.0	6.5	2.6	4.6	2.9	3.6	10.1	12.3	1.4	4.3	5.5	1.94	17.1	-575.0
Fannie Mae	4.4	2.0	6.5	2.6	4.6	2.9	3.6	10.0	16.1	1.4	4.3	5.5	1.91	na	-574.5
BMO Nesbitt Burns	4.3	2.3	6.7	2.6	4.5	3.5	3.4	10.3	15.0	1.4	4.3	5.5	1.91	16.6	-579.0
Eaton Corporation	4.3	2.3	6.7	2.5	5.2	3.1	3.3	9.5	13.4	1.3	4.3	5.5	1.91	16.6	-549.1
Merrill Lynch Economics	4.3	2.2	6.6	2.6	4.3	2.9	3.5	9.4	na	1.5	4.3	5.6 H	1.95	16.5	-572.0
Ford Motor Company*	4.3	2.2	6.6	2.4 L	4.9	3.3	3.3	9.1	na	1.6 H	4.3	5.5	1.91	na	-553.1
Comerica Bank*	4.3	2.2	6.6	2.7	3.9 L	3.7 H	3.9 H	8.0 L	17.0	1.3	4.3	5.4 L	1.83	17.0	-550.0
UCLA Business Forecasting Proj.*	4.3	2.2	6.5	2.6	4.6	3.0	3.5	9.3	9.0 L	1.3	4.3	5.5	1.93	16.7	-563.7
Swiss Re	4.3	2.1	6.5	2.6	4.6	3.0	3.5	10.2	13.9	1.4	4.3	5.5	1.92	17.0	-570.0
Goldman Sachs & Co.	4.3	2.1	6.4	2.6	4.5	3.0	3.4	9.8	14.0	1.6 H	4.3	5.5	1.92	16.2 L	-583.5
Motorola	4.3	2.1	6.4	2.6	4.5	3.3	3.5	10.5	na	1.4	4.4	5.5	1.95	16.7	-580.2
Global Insight	4.3	2.1	6.4	2.6	4.5	3.3	3.5	10.5	16.3	1.3	4.4	5.5	1.93	16.8	-580.2
Turning Points (Micrometrics)	4.2 L	2.3	6.5	2.7	4.9	3.2	3.4	10.1	14.4	1.4	4.4	5.5	1.93	16.9	-592.1 L
Inforum - Univ. of Maryland	4.2 L	2.2	6.6	2.7	4.7	3.1	3.5	9.6	15.4	1.3	4.4	5.5	1.98	16.6	-567.0
DuPont**	4.2 L	2.2	6.5	2.6	4.4	3.4	3.4	9.1	17.0	1.3	4.4	5.5	1.86	17.0	-578.0
Eggert Economic Enterprises, Inc.	4.2 L	2.2	6.4	2.8	5.1	3.5	3.3	9.6	17.3	1.3	4.4	5.5	1.90	16.9	-580.0
Georgia State University*	4.2 L	2.2	6.4	2.9 H	4.8	3.3	3.2 L	9.1	11.3	1.3	4.4	5.6	1.94	16.5	-538.6 H
Daiwa Institute of Research America	4.2 L	2.1	6.4	2.7	4.3	2.8	3.4	9.5	18.5	1.2 L	4.2	5.6 H	1.93	16.5	-586.0
General Motors Corporation	4.2 L	2.1	6.3 L	2.8	4.6	2.8	3.5	9.4	15.6	1.4	4.4	5.5	1.92	17.0	-581.9
Kellner Economic Advisers	4.2 L	2.1	6.3 L	2.6	4.8	3.3	3.4	9.8	16.5	1.4	4.3	5.5	1.88	16.6	-550.0
U.S. Trust Co.	4.2 L	2.0	6.4	2.6	4.8	3.1	3.6	9.7	18.9	1.4	4.3	5.5	1.95	16.7	-587.6
2004 Consensus: October Avg.	**4.4**	**2.2**	**6.6**	**2.6**	**4.7**	**3.2**	**3.5**	**9.9**	**16.0**	**1.4**	**4.3**	**5.5**	**1.92**	**16.8**	**-571.9**
Top 10 Avg.	4.5	2.4	6.8	2.8	5.2	3.5	3.7	10.6	19.2	1.5	4.4	5.6	1.96	17.1	-550.6
Bottom 10 Avg.	4.2	2.0	6.4	2.5	4.3	2.9	3.3	9.1	12.5	1.3	4.3	5.5	1.87	16.5	-585.8
September Avg.	4.3	2.2	6.6	2.7	4.8	3.3	3.4	9.5	16.4	1.4	4.4	5.5	1.90	16.8	-567.2
Historical Data: 2000	3.7	2.2	5.9	3.4	4.4	4.8	4.7	8.7	-3.9	5.8	6.0	4.0	1.57	17.8	-379.5
2001	0.8	2.4	3.2	2.8	-3.4	1.9	2.5	-4.2	-6.2	3.4	5.0	4.7	1.60	17.5	-399.1
2002	1.9	1.7	3.5	1.6	-0.6	3.1	3.1	-8.9	14.0	1.6	4.6	5.8	1.71	17.1	-472.1
2003	3.0	1.8	4.9	2.3	0.2	2.3	3.3	3.3	16.8	1.0	4.0	6.0	1.85	17.0	-518.5
Number Of Forecasts Changed From A Month Ago:															
Down	3	20	9	24	27	26	6	7	17	6	36	14	2	10	19
Same	20	27	21	20	18	15	19	17	12	31	12	36	17	23	8
Up	28	4	21	7	6	7	25	26	15	13	3	1	29	11	23
October Median	4.4	2.1	6.6	2.6	4.6	3.1	3.5	10.0	16.2	1.4	4.3	5.5	1.93	16.7	-575.0
October Diffusion Index	75 %	34 %	62 %	33 %	29 %	30 %	69 %	69 %	48 %	57 %	18 %	37 %	78 %	51 %	54 %

***Former winner of annual Lawrence R. Klein Award for Blue Chip Forecast Accuracy **Denotes two-time winner.**

2005 Real GDP Consensus Forecast Slips To 3.5%

October 2004 Forecast For 2005 SOURCE:	Percent Change 2005 From 2004 (Year-Over-Year)									Average For 2005			Total Units-2005		-2005-
	1 Real GDP (Chained) (2000 $)	2 GDP Price Index	3 Nominal GDP (Cur. $)	4 Consumer Price Index	5 Indust. Prod. (Total)	6 Dis. Pers. Income (2000 $)	7 Personal Cons. Exp (2000 $)	8 Non-Res. Fix. Inv. (2000 $)	9 Corp. Profits (Cur. $)	10 Treas. Bills 3-mo.	11 Treas. Notes 10-Year	12 Unempl. Rate (Civ.)	13 Housing Starts (Mil.)	14 Auto/Truck Sales (Mil.)	15 Net Exports (2000 $)
Conference Board*	5.4 H	1.8	7.3	3.4 H	6.9 H	2.4	4.7 H	15.1 H	22.3	3.3	5.3	4.7 L	1.91	17.8 H	-625.0
Genetski.com	4.7	2.2	6.8	2.6	4.9	3.1	na	na	9.9	3.2	5.3	5.4	na	17.1	na
Action Economics	4.3	2.3	6.8	2.2	5.3	3.3	3.7	8.1	13.8	3.1	5.0	5.3	1.93	17.7	-528.5
Bear, Stearns & Co., Inc.	4.2	2.3	6.6	2.1	5.3	3.7	3.9	9.2	8.9	3.2	5.6	5.0	1.75	17.0	-603.9
Deutsche Bank Securities	4.1	2.0	6.2	2.2	3.2	3.7	3.1	8.1	na	3.4	5.1	5.2	na	na	-550.6
National City Corporation	4.0	1.7	5.9	2.0	4.5	4.0	3.8	10.8	6.5	2.7	4.9	5.2	1.84	17.2	-581.4
Eaton Corporation	3.9	3.5 H	7.5 H	2.3	6.2	3.6	3.0	10.7	6.5	2.8	4.8	5.2	1.83	16.8	-553.3
Fannie Mae	3.9	1.5	5.4	2.1	5.9	3.3	3.2	10.8	5.9	2.5	4.5	5.2	1.80	na	-543.8
Macroeconomic Advisers, LLC**	3.9	1.2 L	5.2	1.8	5.8	3.8	3.3	10.5	18.4	2.8	4.9	5.1	1.81	17.2	-544.6
Moody's Investors Service	3.8	2.2	6.1	2.6	3.9	3.0	3.6	8.2	11.0	2.9	5.2	5.2	1.77	16.6	-560.0
Nomura Securities	3.8	2.0	5.9	2.4	4.8	3.5	3.4	9.8	4.0	2.8	4.9	5.3	1.78	17.6	-540.0
ClearView Economics	3.8	2.0	5.8	2.8	4.7	4.1	3.4	8.3	9.2	3.1	5.0	5.0	1.82	17.4	-567.0
Perna Associates	3.7	2.2	6.0	2.7	4.1	2.9	3.3	9.7	7.8	2.7	5.2	5.3	1.67	16.4	-588.0
J P MorganChase	3.7	2.0	5.8	2.2	5.0	3.7	3.6	9.6	7.7	3.3	5.6	5.0	1.63	16.7	-629.0
Prudential Equity Group, LLC	3.7	2.0	5.7	2.4	5.0	3.0	3.1	7.8	9.0	2.7	4.9	5.2	1.67	17.0	-577.8
National Assn. of Home Builders	3.7	1.7	5.5	2.1	5.6	3.6	3.2	8.0	8.0	2.8	5.0	5.3	1.85	16.8	-545.0
Swiss Re	3.7	1.5	5.3	2.2	5.3	2.7	2.8	11.3	7.5	3.3	5.2	5.1	1.85	17.0	-557.0
Banc of America Corp.	3.6	2.1	5.7	2.4	3.5	3.6	3.1	8.5	12.0	2.9	4.8	5.4	1.85	16.7	-567.0
LaSalle National Bank	3.6	2.0	5.7	2.1	5.2	na	3.0	7.5	6.7	2.8	4.5	5.4	1.70	16.8	-502.0
Eggert Economic Enterprises, Inc.	3.6	1.8	5.4	2.4	5.5	3.7	3.4	9.0	8.1	2.9	5.4	5.2	1.65	17.1	-555.0
Credit Suisse First Boston	3.6	1.7	5.6	2.5	4.3	na	3.1	8.2	6.3	na	na	5.2	na	na	-592.2
U.S. Trust Co.	3.6	1.4	5.1	2.1	5.7	3.1	3.2	7.3	5.1	2.4	4.7	4.9	1.89	16.8	-611.3
Comerica Bank*	3.5	2.6	6.2	2.8	3.7	2.5	2.9	7.0	12.0	2.5	5.1	5.2	1.72	16.7	-585.0
Wells Capital Management	3.5	2.4	6.1	3.3	4.3	2.9	3.0	10.7	6.3	2.8	4.8	5.2	1.81	15.9 L	-603.0
Ford Motor Company*	3.5	2.1	6.0	2.0	6.0	3.7	3.1	9.8	na	3.1	5.3	5.3	1.65	na	-506.2
Wayne Hummer Investments LLC*	3.5	2.1	5.7	2.7	5.0	3.4	3.4	9.0	8.9	3.1	5.5	5.3	1.76	16.7	-484.0 H
Econoclast	3.5	2.0	5.5	2.0	4.1	3.6	2.5	8.9	7.5	2.3	4.5	5.3	1.68	16.6	-519.0
U.S. Chamber of Commerce	3.5	1.8	5.3	2.3	5.7	4.2 H	2.9	5.3	na	2.9	5.7	5.2	1.66	na	-597.6
Morgan Stanley	3.5	1.6	5.2	2.6	5.1	4.0	3.3	10.7	7.4	2.6	4.8	5.5	1.83	16.4	-609.7
Schwab Washington Research Group*	3.5	1.3	4.9	2.0	4.9	3.4	3.1	9.8	5.0	2.5	4.7	5.3	1.83	17.1	-568.0
Federal Express Corp.	3.4	2.7	6.1	3.0	3.6	3.0	3.4	7.5	7.0	2.4	5.1	5.4	1.85	16.2	-570.0
Northern Trust Company	3.4	2.4	6.0	2.8	3.1	na	3.0	7.4	na	2.3	4.7	5.4	1.84	16.5	-624.8
J.W. Coons Advisors	3.4	2.2	5.7	2.7	5.0	3.1	3.0	11.1	11.2	2.7	4.6	5.4	2.00 H	17.1	-633.0
Standard & Poors Corp.*	3.4	1.9	5.4	2.0	4.0	2.4	2.8	4.1 L	36.5	2.8	5.0	5.4	1.78	16.8	-526.5
BMO Nesbitt Burns	3.3	2.1	5.5	2.4	3.5	3.6	2.5	10.4	8.0	3.2	4.8	5.2	1.75	16.7	-588.0
SOM Economics, Inc.	3.3	2.1	5.4	2.6	4.1	2.7	2.9	8.5	5.0	2.9	4.6	5.2	1.75	17.3	-568.0
Global Insight	3.3	1.9	5.4	1.9	3.7	2.6	2.9	7.4	7.3	2.8	5.0	5.4	1.79	17.0	-546.9
Motorola	3.3	1.9	5.4	1.9	3.7	2.6	2.9	7.4	na	2.9	5.0	5.3	1.78	17.1	-546.9
UCLA Business Forecasting Proj.*	3.3	1.8	5.2	2.7	4.5	3.1	3.2	4.1	49.5 H	2.6	4.5	5.5	1.57 L	16.9	-546.4
General Motors Corporation	3.3	1.7	5.1	2.8	5.7	3.3	3.2	8.4	2.3	2.5	5.3	5.4	1.63	17.0	-533.3
Wachovia	3.2	2.7	6.0	2.7	5.0	3.7	3.0	5.6	10.2	2.7	5.1	5.3	1.87	17.3	-583.0
Naroff Economic Advisors	3.2	2.3	5.5	2.5	3.5	3.7	3.1	6.5	9.7	3.9 H	5.9 H	4.8	1.74	16.9	-560.0
Inforum - Univ. of Maryland	3.2	2.2	5.5	2.8	4.8	3.0	2.3 L	7.6	4.3	2.9	5.3	5.3	1.90	16.2	-499.0
UBS Warburg	3.2	1.6	4.9	1.7 L	4.4	3.4	2.5	7.0	na	3.3	5.3	5.4	1.75	na	-544.0
Goldman Sachs	3.0	2.2	5.3	2.4	3.0 L	3.4	2.6	9.4	-1.3 L	3.2	4.9	5.2	1.79	16.2	-589.0
Kellner Economic Advisers	3.0	2.0	5.0	2.4	4.2	3.4	3.0	7.2	8.0	2.5	4.7	5.5	1.70	16.4	-550.0
Merrill Lynch Economics	3.0	1.8	4.8	1.8	3.3	2.0 L	2.7	4.4	na	2.2	3.9	5.6	1.80	16.2	-568.0
Turning Points (Micrometrics)	2.9	2.2	5.1	2.7	4.8	3.1	3.0	8.2	9.7	3.1	4.8	5.3	1.96	17.3	-671.4 L
Daiwa Institute of Research America	2.8	2.0	4.9	2.1	3.0 L	3.0	3.1	6.0	6.6	1.0 L	3.7 L	5.7 H	1.81	16.3	-648.0
Georgia State University*	2.8	1.9	4.7	2.9	4.8	3.1	2.4	6.2	5.1	2.6	5.1	5.7 H	1.68	16.2	-484.8
DuPont**	2.5 L	2.0	4.6 L	2.3	3.0 L	2.6	2.5	5.3	7.0	2.3	4.8	5.3	1.75	17.1	-588.0
2005 Consensus: October Avg.	**3.5**	**2.0**	**5.6**	**2.4**	**4.6**	**3.3**	**3.1**	**8.3**	**9.7**	**2.8**	**5.0**	**5.3**	**1.78**	**16.8**	**-567.3**
Top 10 Avg.	4.1	2.5	6.4	2.9	5.7	3.9	3.6	10.7	18.5	3.3	5.5	5.5	1.90	17.3	-512.3
Bottom 10 Avg.	3.0	1.5	4.9	1.9	3.3	2.6	2.6	5.5	4.2	2.2	4.4	5.1	1.65	16.2	-623.2
September Avg.	3.6	2.0	5.7	2.4	4.9	3.4	3.1	8.5	8.5	2.8	5.1	5.3	1.75	16.9	-558.7
Number Of Forecasts Changed From A Month Ago:															
Down	19	18	29	16	26	24	18	12	19	19	36	11	3	11	24
Same	24	23	11	17	18	16	16	19	10	18	10	32	19	23	10
Up	8	10	11	18	7	8	16	19	15	13	4	8	26	10	16
October Median	3.5	2.0	5.5	2.4	4.8	3.3	3.1	8.2	7.8	2.8	5.0	5.3	1.78	16.8	-567.0
October Diffusion Index	39 %	42 %	32 %	52 %	31 %	33 %	48 %	57 %	45 %	44 %	18 %	47 %	74 %	49 %	42 %

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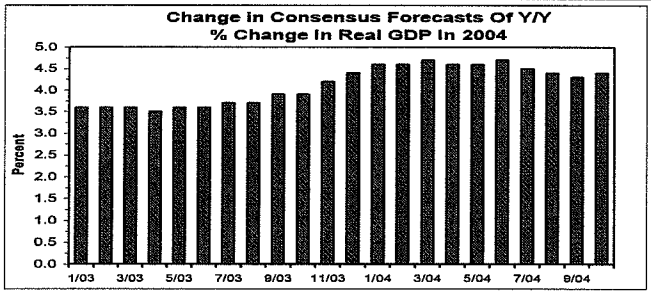
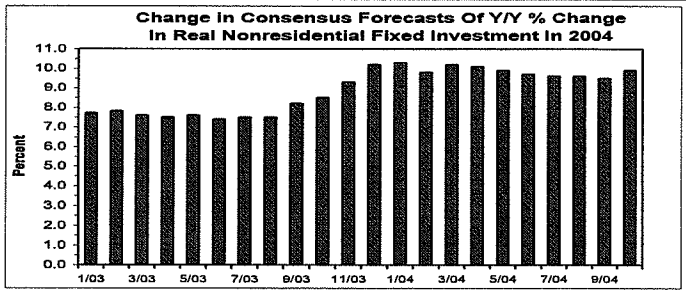
BASIC DATA SOURCES: [1]Gross Domestic Product (GDP), chained 2000$, National Income and Product Accounts (NIPA), Bureau of Economic Analysis (BEA); [2]GDP Chained Price Index, NIPA, BEA; [3]GDP, current dollars, NIPA, BEA; [4]Consumer Price Index-All Urban Consumers, Bureau of Labor Statistics (BLS); [5]Total Industrial Production, Federal Reserve Board (FRB); [6]Disposable Personal Income, 2000$, NIPA, BEA; [7]Personal Consumption Expenditures, 2000$, NIPA, BEA; [8]Non-residential Fixed Investment, 2000$, NIPA, BEA; [9]Corporate Profits Before Taxes, current dollars, with inventory valuation and capital consumption adjustments, NIPA, BEA; [10]Treasury Bills, 3-month, secondary market, bank discount basis, FRB; [11]10-Year Treasury note yield, FRB; [12]Unemployment Rate, civilian work force, BLS; [13]Housing Starts, Bureau of Census; [14]Total U.S. Auto and Truck sales (includes imports and all weight classes of trucks), BEA; [15]Net Exports of Goods and Services, 2000$, NIPA, BEA.

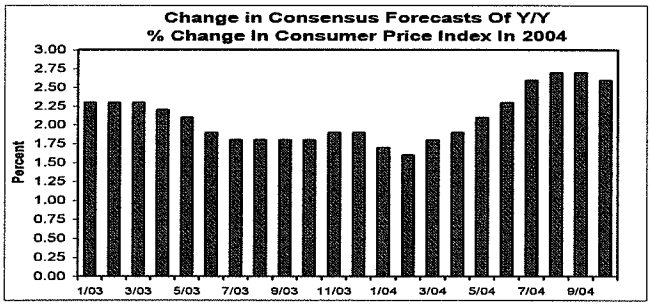
Previous Consensus Forecasts

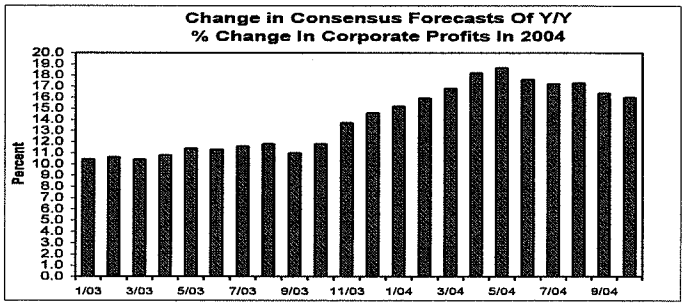
Consensus Forecasts For 2004	Real GDP Chained ('2000$)	GDP Price Index	Nominal GDP (Cur. $)	Consumer Price Index	Indust. Prod. (Total)	Dis. Pers. Income ('2000$)	Personal Cons. Exp. ('2000$)	Non-Res. Fix. Inv. ('2000$)	Corp. Profits (Cur. $)	Treas. Bills 3-mo.	Treas. Notes 10-Year	Unempl. Rate (Civ.)	Housing Starts (Mil.)	Auto/Truck Sales (Mil.)	Net Exports ('2000$)
January 2003 Consensus	3.6	1.9	5.5	2.3	4.4	3.4	3.1	7.7	10.4	2.9	5.2	5.5	1.60	16.7	-516.5
February 2003 Consensus	3.6	1.9	5.6	2.3	4.4	3.5	3.2	7.8	10.6	2.9	5.2	5.6	1.61	16.7	-526.7
March 2003 Consensus	3.6	1.8	5.5	2.3	4.3	3.6	3.2	7.6	10.4	2.8	5.1	5.6	1.61	16.7	-540.5
April 2003 Consensus	3.5	1.8	5.4	2.2	4.4	3.4	3.1	7.5	10.8	2.6	4.9	5.6	1.61	16.6	-548.1
May 2003 Consensus	3.6	1.8	5.4	2.1	4.2	3.5	3.2	7.6	11.4	2.4	4.9	5.7	1.62	16.5	-535.3
June 2003 Consensus	3.6	1.7	5.3	1.9	4.0	3.6	3.2	7.4	11.3	1.9	4.5	5.7	1.62	16.6	-530.5
July 2003 Consensus	3.7	1.5	5.2	1.8	4.0	3.7	3.2	7.5	11.6	1.6	4.3	5.8	1.64	16.6	-536.3
August 2003 Consensus	3.7	1.5	5.1	1.8	4.0	3.9	3.3	7.5	11.8	1.5	4.6	5.9	1.63	16.7	-566.1
September 2003 Consensus	3.9	1.4	5.3	1.8	4.0	4.0	3.5	8.2	11.0	1.5	4.8	5.9	1.65	16.8	-569.6
October 2003 Consensus	3.9	1.4	5.4	1.8	4.2	4.0	3.5	8.5	11.8	1.4	4.8	5.9	1.66	16.7	-571.3
November 2003 Consensus	4.2	1.5	5.8	1.9	4.3	4.0	3.6	9.3	13.7	1.4	4.8	5.9	1.67	16.9	-550.8
December 2003 Consensus	4.4	1.5	6.0	1.9	4.3	4.1	3.6	10.2	14.6	1.4	4.8	5.8	1.70	16.8	-553.7
January 2004 Consensus	4.6	1.4	6.1	1.7	4.8	4.2	3.7	10.3	15.2	1.3	4.7	5.7	1.75	16.9	-542.8
February 2004 Consensus	4.6	1.4	6.0	1.6	5.0	3.9	3.7	9.8	15.9	1.2	4.6	5.7	1.78	16.8	-517.5
March 2004 Consensus	4.7	1.4	6.1	1.8	4.9	3.8	3.7	10.2	16.8	1.2	4.5	5.6	1.80	16.8	-518.3
April 2004 Consensus	4.6	1.5	6.2	1.9	4.9	3.7	3.8	10.1	18.2	1.1	4.3	5.6	1.80	16.9	-519.7
May 2004 Consensus	4.6	1.7	6.4	2.1	5.0	3.8	3.9	9.9	18.7	1.2	4.5	5.6	1.83	16.8	-518.2
June 2004 Consensus	4.7	1.9	6.6	2.3	5.0	3.9	3.9	9.7	17.6	1.3	4.6	5.5	1.85	16.7	-524.9
July 2004 Consensus	4.5	2.1	6.7	2.6	5.3	3.9	3.8	9.6	17.2	1.3	4.7	5.5	1.88	16.8	-538.6
August 2004 Consensus	4.4	2.2	6.7	2.7	5.1	3.7	3.5	9.6	17.3	1.4	4.6	5.5	1.88	16.7	-546.1
September 2004 Consensus	4.3	2.2	6.6	2.7	4.8	3.3	3.4	9.5	16.4	1.4	4.4	5.5	1.90	16.8	-567.2
October 2004 Consensus	**4.4**	**2.2**	**6.6**	**2.6**	**4.7**	**3.2**	**3.5**	**9.9**	**16.0**	**1.4**	**4.3**	**5.5**	**1.92**	**16.8**	**-571.9**
Difference From Jan. 2003 Forecast	0.8	0.3	1.1	0.3	0.3	-0.2	0.4	2.2	5.6	-1.5	-0.9	0.0	0.32	0.1	-55.4
Forecast High	4.7	2.2	6.7	2.7	5.3	4.2	3.9	10.3	18.7	2.9	5.2	5.9	1.92	16.9	-516.5
Forecast Low	3.5	1.4	5.1	1.6	4.0	3.2	3.1	7.4	10.4	1.1	4.3	5.5	1.60	16.5	-571.9

Consensus Forecasts For 2005	Real GDP Chained ('2000$)	GDP Price Index	Nominal GDP (Cur. $)	Consumer Price Index	Indust. Prod. (Total)	Dis. Pers. Income ('2000$)	Personal Cons. Exp. ('2000$)	Non-Res. Fix. Inv. ('2000$)	Corp. Profits (Cur. $)	Treas. Bills 3-mo.	Treas. Notes 10-Year	Unempl. Rate (Civ.)	Housing Starts (Mil.)	Auto/Truck Sales (Mil.)	Net Exports ('2000$)
January 2004 Consensus	3.7	1.7	5.4	2.1	4.8	3.4	3.3	8.8	9.2	2.6	5.4	5.4	1.67	16.9	-522.9
February 2004 Consensus	3.7	1.6	5.4	2.0	4.8	3.4	3.3	8.7	9.0	2.5	5.3	5.4	1.68	16.8	-492.2
March 2004 Consensus	3.8	1.6	5.3	1.9	4.9	3.4	3.2	8.9	9.8	2.4	5.2	5.3	1.68	16.8	-488.3
April 2004 Consensus	3.8	1.6	5.4	2.0	4.8	3.4	3.2	8.9	10.6	2.3	5.1	5.3	1.68	16.9	-491.5
May 2004 Consensus	3.8	1.7	5.6	2.1	5.1	3.4	3.3	8.8	10.7	2.4	5.2	5.3	1.68	16.9	-494.2
June 2004 Consensus	3.7	1.9	5.7	2.2	5.1	3.4	3.2	8.8	11.9	2.7	5.4	5.3	1.69	16.8	-505.9
July 2004 Consensus	3.8	2.0	5.8	2.4	5.2	3.5	3.3	8.9	10.0	2.8	5.5	5.3	1.71	16.8	-524.4
August 2004 Consensus	3.7	2.1	5.9	2.4	5.0	3.5	3.1	8.8	10.1	2.9	5.3	5.3	1.73	16.8	-530.7
September 2004 Consensus	3.6	2.0	5.7	2.4	4.9	3.4	3.1	8.5	8.5	2.8	5.1	5.3	1.75	16.9	-558.7
October 2004 Consensus	**3.5**	**2.0**	**5.6**	**2.4**	**4.6**	**3.3**	**3.1**	**8.3**	**9.7**	**2.8**	**5.0**	**5.3**	**1.78**	**16.8**	**-567.3**
Difference From Jan. 2004 Forecast	-0.2	0.3	0.2	0.3	-0.2	-0.1	-0.2	-0.5	0.5	0.2	-0.4	-0.1	0.11	-0.1	-44.4
Forecast High	3.8	2.1	5.9	2.4	5.2	3.5	3.3	8.9	11.9	2.9	5.5	5.4	1.78	16.9	-488.3
Forecast Low	3.5	1.6	5.3	1.9	4.6	3.3	3.1	8.3	8.5	2.3	5.0	5.3	1.67	16.8	-567.3









3. Blue Chip Consensus: Quarterly Annualized Percent Change From Prior Quarter And Averages For Quarter.*

Actuals[1]	% Change From Prior Quarter At Annualized Rate							Average For Quarter				
	Real GDP	GDP Price Index	CPI	Producer Price Index	Total Industrial Production	Disposable Personal Income	Personal Consump. Expend.	Unemploy-ment Rate	3-Mo. Treas. Bills	10-Yr. Treas. Notes	Change in Business Inventories	Real Net Exports
2003 1Q	1.9	2.7	3.8	9.4	0.9	1.8	2.7	5.8	1.2	3.9	9.6	-511.7
2Q	4.1	1.1	0.7	-1.3	-4.0	4.3	3.9	6.2	1.0	3.6	-17.6	-525.2
3Q	7.4	1.4	2.4	2.8	3.8	8.2	5.0	6.1	1.0	4.3	-3.5	-508.7
4Q	4.2	1.6	0.7	3.7	5.6	1.4	3.6	5.9	0.9	4.3	8.6	-528.3
2004 1Q	4.5	2.8	3.5	3.9	6.6	2.4	4.1	5.6	0.9	4.0	40.0	-550.1
2Q	3.3	3.2	4.8	6.3	4.8	2.4	1.6	5.6	1.1	4.6	61.1	-580.3
Blue Chip Forecasts	% Change From Prior Quarter At Annualized Rate							Average For Quarter				
3Q Consensus	**3.8**	**1.7**	**2.2**	**2.2**	**3.9**	**2.4**	**3.8**	**5.5**	**1.6**	**4.3**	**52.1**	**-579.2**
Top 10 Avg.	4.5	2.6	3.1	5.4	5.6	3.9	4.5	5.5	1.8	4.5	69.0	-550.5
Bot. 10 Avg.	3.1	0.9	1.6	0.4	3.0	0.7	2.9	5.4	1.4	4.2	35.9	-599.0
4Q Consensus	**3.7**	**1.9**	**2.3**	**2.1**	**5.2**	**3.8**	**2.9**	**5.4**	**2.0**	**4.4**	**54.4**	**-578.8**
Top 10 Avg.	4.9	2.7	3.1	3.3	7.0	6.0	3.8	5.5	2.4	4.7	74.7	-539.6
Bot. 10 Avg.	2.6	1.2	1.5	0.6	3.3	2.5	1.9	5.3	1.7	4.0	31.4	-612.4
2005 1Q Consensus	**3.5**	**2.0**	**2.3**	**1.6**	**4.7**	**3.2**	**3.1**	**5.3**	**2.4**	**4.6**	**57.4**	**-573.9**
Top 10 Avg.	4.5	2.7	2.9	3.1	6.8	5.0	4.0	5.5	3.1	5.2	85.6	-529.7
Bot. 10 Avg.	2.6	1.4	1.7	0.2	2.7	0.9	2.0	5.1	1.9	4.1	36.1	-615.4
2Q Consensus	**3.5**	**2.0**	**2.2**	**1.3**	**4.4**	**3.5**	**3.1**	**5.3**	**2.7**	**4.8**	**56.0**	**-570.0**
Top 10 Avg.	4.4	2.6	3.0	2.8	6.1	4.3	3.8	5.6	3.3	5.4	88.6	-518.4
Bot. 10 Avg.	2.8	1.4	1.5	-0.3	2.9	2.7	2.4	5.1	2.0	4.2	34.0	-622.9
3Q Consensus	**3.5**	**2.0**	**2.3**	**1.3**	**4.3**	**3.4**	**3.2**	**5.2**	**3.0**	**5.0**	**55.7**	**-566.1**
Top 10 Avg.	4.2	2.7	3.0	2.8	6.2	4.3	3.8	5.5	3.8	5.6	89.3	-502.7
Bot. 10 Avg.	2.9	1.4	1.6	-0.5	2.7	2.6	2.5	4.9	2.3	4.3	34.3	-630.9
4Q Consensus	**3.5**	**2.0**	**2.4**	**1.4**	**4.3**	**3.3**	**3.1**	**5.2**	**3.3**	**5.1**	**54.9**	**-560.6**
Top 10 Avg.	4.2	2.7	3.1	2.9	6.2	4.1	3.8	5.5	4.3	5.8	90.0	-490.1
Bot. 10 Avg.	2.7	1.5	1.7	-0.5	2.5	2.5	2.4	4.8	2.5	4.3	31.0	-635.9

4. Blue Chip Consensus: Quarterly Annualized Values And Percent Change From Same Quarter In Prior Year.*

Real Gross Domestic Product

	Billions Of Chained 2000$ (SAAR)			% Change From Same Quarter In Prior Year[2]		
	Actual	Forecast[1]		Actual	Forecast	
Quarter	2003	2004	2005	2003	2004	2005
1Q	10184.4	10697.5	**11078.8**	1.9	5.0	**3.6**
2Q	10287.4	10784.7	**11174.8**	2.3	4.8	**3.6**
3Q	10472.8	**10885.6**	**11271.7**	3.5	**3.9**	**3.5**
4Q	10580.7	**10984.9**	**11368.5**	4.4	**3.8**	**3.5**

GDP Chained Price Index

	Index 2000 = 100 (SAAR)			% Change From Same Quarter In Prior Year[2]		
	Actual	Forecast[1]		Actual	Forecast	
Quarter	2003	2004	2005	2003	2004	2005
1Q	105.5	107.3	**109.7**	2.0	1.7	**2.2**
2Q	105.8	108.2	**110.3**	1.9	2.3	**1.9**
3Q	106.2	**108.6**	**110.8**	1.8	**2.3**	**2.0**
4Q	106.6	**109.2**	**111.4**	1.7	**2.4**	**2.0**

Total Industrial Production

	Index 1997 = 100 (SAAR)			% Change From Same Quarter In Prior Year[2]		
	Actual	Forecast[1]		Actual	Forecast	
Quarter	2003	2004	2005	2003	2004	2005
1Q	111.2	114.4	**119.8**	1.1	2.9	**4.7**
2Q	110.0	115.8	**121.1**	-1.0	5.3	**4.6**
3Q	111.1	**116.9**	**122.4**	-0.4	**5.2**	**4.7**
4Q	112.6	**118.4**	**123.7**	1.5	**5.2**	**4.4**

Consumer Price Index

	Index 1982-1984 = 100 (SAAR)			% Change From Same Quarter In Prior Year[2]		
	Actual	Forecast[1]		Actual	Forecast	
Quarter	2003	2004	2005	2003	2004	2005
1Q	183.1	186.4	**191.8**	2.9	1.8	**2.9**
2Q	183.4	188.6	**192.8**	2.2	2.8	**2.3**
3Q	184.5	**189.6**	**193.9**	2.2	**2.8**	**2.3**
4Q	184.8	**190.7**	**195.1**	1.9	**3.2**	**2.3**

*** See explanatory notes on inside of back cover for details of how this data is compiled.**

BLUE CHIP INTERNATIONAL CONSENSUS FORECASTS

	ANNUAL DATA						END OF YEAR			
	Real Economic Growth % Change GDP		Inflation % Change Consumer Prices		Current Account In Billions Of U.S. Dollars		Exchange Rate [1] Units Per U.S. $		Interest Rates 3-Month	
CANADA	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**2.9**	**3.4**	**1.8**	**2.1**	**21.7**	**17.8**	**1.32**	**1.32**	**2.44**	**3.35**
Top 3 Avg.	3.2	3.7	2.1	2.4	26.0	22.3	1.38	1.44	2.72	4.60
Bottom 3 Avg.	2.7	3.1	1.4	1.5	16.0	13.0	1.27	1.23	2.15	2.58
Last Month Avg.	2.9	3.4	1.8	2.1	20.6	16.7	1.33	1.34	2.48	3.53
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	3.3	1.7	2.3	2.7	14.9	18.4	1.26	1.34	2.44	2.59
MEXICO	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**3.9**	**3.5**	**4.6**	**4.5**	**-9.4**	**-11.0**	**11.40**	**11.80**	**6.92**	**7.19**
Top 3 Avg.	4.0	4.1	6.4	6.6	-6.0	-7.3	11.90	12.69	7.70	7.93
Bottom 3 Avg.	3.6	2.7	4.0	3.7	-11.7	-14.6	11.04	11.25	6.05	6.39
Last Month Avg.	3.9	3.5	4.5	4.3	-10.1	-10.9	11.46	11.86	6.85	7.07
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	0.7	1.3	5.0	4.5	-14.1	-9.2	11.29	11.17	7.61	4.47
JAPAN	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**4.0**	**2.4**	**-0.1**	**0.2**	**156.4**	**154.6**	**106.8**	**104.9**	**0.11**	**0.30**
Top 3 Avg.	4.7	3.0	0.2	0.8	169.1	177.1	111.3	115.7	0.40	0.50
Bottom 3 Avg.	3.0	1.5	-0.4	-0.2	136.7	128.3	102.4	95.0	0.01	0.05
Last Month Avg.	4.1	2.4	-0.1	0.2	156.6	152.3	106.7	105.1	0.12	0.30
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	-0.3	2.5	-0.9	-0.2	112.7	136.4	111.1	110.8	0.02	0.01
UNITED KINGDOM	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**3.3**	**2.7**	**1.9**	**2.0**	**-39.5**	**-41.6**	**1.82**	**1.78**	**4.93**	**5.21**
Top 3 Avg.	3.8	3.6	2.7	2.5	-31.7	-34.7	1.87	1.91	5.02	5.69
Bottom 3 Avg.	3.0	2.2	1.3	1.6	-45.3	-48.3	1.76	1.70	4.66	4.87
Last Month Avg.	3.3	2.7	1.9	2.0	-38.7	-41.9	1.82	1.78	4.96	5.19
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	1.7	2.3	1.3	1.4	-27.0	-42.7	1.79	1.67	4.88	3.66
SOUTH KOREA	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**5.1**	**4.8**	**3.8**	**3.5**	**20.6**	**16.1**	**1134**	**1122**	**3.92**	**4.56**
Top 3 Avg.	5.8	5.5	4.4	4.5	28.4	23.5	1172	1181	4.20	5.08
Bottom 3 Avg.	4.6	3.9	3.4	3.0	12.0	12.0	1087	1060	3.60	4.03
Last Month Avg.	5.1	4.7	3.7	3.3	18.7	14.5	1134	1124	4.00	4.67
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	7.0	3.1	2.7	3.5	5.4	12.3	1149	1149	3.53	3.80
GERMANY	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**1.6**	**1.9**	**1.6**	**1.4**	**70.5**	**74.9**	**1.23**	**1.22**	**2.27**	**2.80**
Top 3 Avg.	1.9	2.2	1.8	1.7	93.3	100.5	1.29	1.38	2.70	3.53
Bottom 3 Avg.	1.2	1.6	1.3	1.2	46.7	60.3	1.18	1.12	2.03	2.08
Last Month Avg.	1.6	1.9	1.6	1.4	66.4	68.9	1.23	1.22	2.28	2.86
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	0.2	-0.1	1.3	1.1	56.3	57.5	1.23	1.17	2.15	2.14
TAIWAN	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**5.4**	**4.3**	**1.4**	**1.8**	**24.8**	**25.7**	**33.43**	**33.27**	**1.56**	**2.06**
Top 3 Avg.	6.0	5.2	2.5	3.7	26.9	27.8	34.00	34.71	2.00	2.55
Bottom 3 Avg.	4.9	3.5	0.7	0.5	22.6	23.3	33.00	31.33	1.13	1.27
Last Month Avg.	5.4	4.3	1.4	1.8	24.8	25.7	33.43	33.27	1.56	2.06
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	3.6	3.2	-0.2	0.2	25.6	28.6	33.93	33.72	1.20	1.15
NETHERLANDS	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**1.3**	**1.9**	**1.4**	**1.5**	**15.7**	**15.1**	**1.23**	**1.22**	**2.27**	**2.80**
Top 3 Avg.	1.4	2.2	1.7	2.0	20.3	20.0	1.29	1.38	2.70	3.53
Bottom 3 Avg.	1.1	1.4	1.2	0.8	12.4	11.6	1.18	1.12	2.03	2.08
Last Month Avg.	1.2	1.9	1.4	1.5	14.7	13.7	1.23	1.22	2.28	2.86
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	0.2	-0.8	3.9	2.2	10.6	11.2	1.23	1.17	2.15	2.14

*Best estimates available. [1]All rates are amount of currency per U.S. dollar, except for U.K., Australia and the Euro, which are reported as U.S. dollar equivalents.

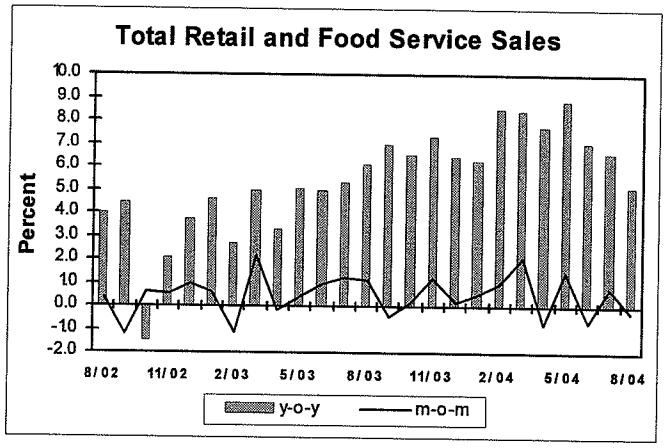
BLUE CHIP INTERNATIONAL CONSENSUS FORECASTS

	ANNUAL DATA						END OF YEAR			
	Real Economic Growth % Change GDP		Inflation % Change Consumer Prices		Current Account In Billions Of U.S. Dollars		Exchange Rate [1] Units Per U.S. $		Interest Rates 3-Month	
SINGAPORE	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**7.2**	**4.5**	**1.5**	**1.5**	**23.5**	**25.0**	**1.69**	**1.68**	**1.17**	**1.55**
Top 3 Avg.	8.5	5.7	2.0	2.1	25.4	26.1	1.70	1.75	1.47	2.04
Bottom 3 Avg.	5.6	3.5	1.1	1.0	21.3	23.5	1.67	1.61	0.96	1.14
Last Month Avg.	7.2	4.5	1.5	1.5	23.5	25.0	1.69	1.69	1.17	1.55
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	2.2	1.1	-0.4	1.1	18.9	28.2	1.69	1.73	1.38	0.81
FRANCE	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**2.3**	**2.3**	**2.0**	**1.8**	**13.0**	**18.6**	**1.23**	**1.22**	**2.27**	**2.80**
Top 3 Avg.	2.5	2.5	2.3	2.2	24.7	26.7	1.29	1.38	2.70	3.53
Bottom 3 Avg.	1.8	2.1	1.7	1.4	-1.0	6.3	1.18	1.12	2.03	2.08
Last Month Avg.	2.3	2.3	2.0	1.8	15.7	21.7	1.23	1.22	2.28	2.86
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	1.2	0.2	1.9	2.2	25.9	14.7	1.23	1.17	2.15	2.14
BRAZIL	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**3.9**	**3.7**	**7.2**	**6.4**	**3.3**	**2.4**	**3.02**	**3.15**	**14.99**	**12.89**
Top 3 Avg.	5.2	4.7	11.9	11.2	9.2	11.0	3.20	3.40	16.30	15.13
Bottom 3 Avg.	3.1	3.4	5.3	3.7	-1.4	-4.1	2.83	2.87	13.67	12.00
Last Month Avg.	3.7	3.6	7.2	6.4	1.6	-0.1	3.05	3.21	14.73	12.70
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	1.9	-0.2	8.4	14.8	-7.7	4.1	2.83	2.90	16.24	19.85
HONG KONG	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**6.0**	**4.6**	**0.2**	**1.4**	**15.4**	**17.0**	**7.78**	**7.78**	**1.54**	**2.54**
Top 3 Avg.	7.0	5.3	1.7	2.9	17.0	19.3	7.80	7.80	2.70	3.63
Bottom 3 Avg.	5.3	3.5	-0.5	0.5	12.8	14.4	7.73	7.71	0.81	1.46
Last Month Avg.	6.0	4.6	0.2	1.4	15.4	17.0	7.78	7.78	1.54	2.54
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	2.3	3.3	-3.0	-1.7	13.7	17.4	7.80	7.73	1.08	0.88
BELGIUM	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**2.3**	**2.3**	**1.8**	**1.8**	**14.0**	**15.7**	**1.23**	**1.22**	**2.27**	**2.80**
Top 3 Avg.	2.6	2.9	2.2	2.1	15.4	18.2	1.29	1.38	2.70	3.53
Bottom 3 Avg.	1.7	2.0	1.4	1.4	12.3	13.0	1.18	1.12	2.03	2.08
Last Month Avg.	2.3	2.3	1.8	1.8	14.0	15.7	1.23	1.22	2.28	2.86
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	0.7	1.1	1.6	1.5	13.3	13.7	1.23	1.17	2.15	2.14
CHINA	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**8.7**	**8.2**	**3.1**	**3.2**	**20.2**	**22.2**	**8.18**	**7.98**	**4.16**	**4.40**
Top 3 Avg.	9.5	11.0	5.2	6.3	39.0	46.7	8.33	8.65	6.43	6.38
Bottom 3 Avg.	7.8	7.1	-0.2	0.2	1.1	9.0	7.67	7.13	2.30	2.93
Last Month Avg.	8.6	8.1	2.8	3.0	16.5	16.7	8.17	8.08	4.67	4.82
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	8.0	9.1	-0.8	1.2	35.4	29.6	8.28	8.28	3.15	na
AUSTRALIA	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**3.6**	**3.2**	**2.4**	**2.5**	**-27.7**	**-27.4**	**0.71**	**0.70**	**5.44**	**5.52**
Top 3 Avg.	4.0	3.7	2.7	2.8	-20.7	-18.7	0.74	0.74	5.60	5.96
Bottom 3 Avg.	3.3	2.3	2.2	2.1	-36.6	-39.4	0.67	0.65	5.12	4.70
Last Month Avg.	3.6	3.1	2.4	2.5	-26.3	-24.9	0.70	0.69	5.46	5.51
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	3.8	3.0	3.0	2.8	-17.2	-30.5	0.72	0.68	5.42	4.92
EUROLAND	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
October Consensus	**1.8**	**2.1**	**2.0**	**1.9**	**53.6**	**58.7**	**1.23**	**1.22**	**2.27**	**2.80**
Top 3 Avg.	2.0	2.5	2.2	2.1	65.8	84.4	1.29	1.38	2.70	3.53
Bottom 3 Avg.	1.6	1.7	1.7	1.7	34.7	42.7	1.18	1.12	2.03	2.08
Last Month Avg.	1.8	2.2	2.0	1.9	52.0	57.5	1.23	1.22	2.28	2.86
	2002*	2003**	2002*	2003**	2002*	2003**	Latest	Year Ago	Latest	Year Ago
Actual	0.9	0.4	2.3	2.1	77.9	53.2	1.23	1.17	2.15	2.14

*Best estimates available. Contributors to Blue Chip International Survey: Ford Motor Company, USA; General Motors Corp., USA; Global Insight, USA; Federal Express Corporation, USA; Wells Capital Management, USA; J.P. MorganChase, Deutsche Bank Securities, USA; BMO Nesbitt Burns, Canada; Merrill Lynch, USA; DaimlerChrysler AG, USA; Standard & Poor's, USA; National City Corporation, USA; Westdeutsche Landesbank; Germany; Morgan Stanley; USA; Moody's Investor Services, USA; Wachovia, USA; LaSalle/ABN AMRO, USA; Wayne Hummer Investments, LLC, USA; The Northern Trust Company, USA; Daiwa Institute of Research America, USA; Grupo de Economistas y Asociados, Mexico; and International Monetary Fund's World Economic Outlook.

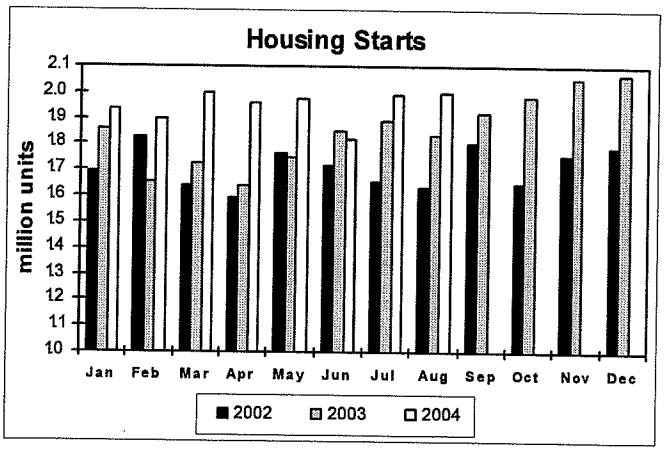
Recent Developments:

Total Retail Sales Rebounded In September Despite Hurricanes



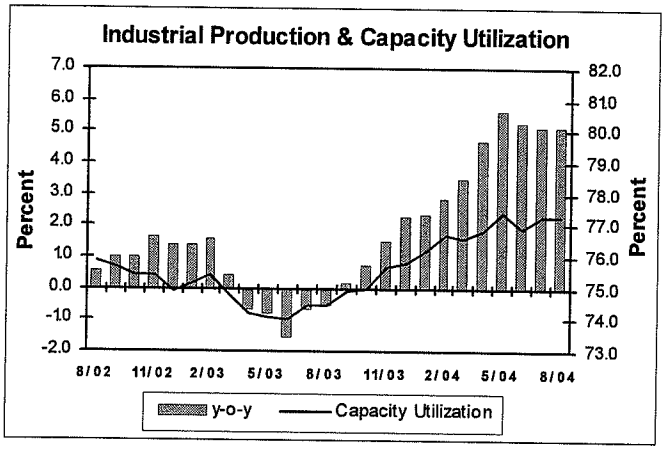
Total retail sales appear to have rebounded in September despite hurricanes that disrupted normal activity in southeastern portions of the country. Total sales fell 0.3% in August after increasing a revised 0.8% in July. Pulling August sales lower was a slump in sales of cars and light trucks following unit sales in July that were the highest of the year. Excluding sales by motor vehicle and parts dealers total retail sales rose 0.2% in August after registering a revised 0.3% gain in July. Indeed, non-auto sales have increased in each of the past four months. In September, unit sales of vehicles snapped back 5.5% led by a surge in light truck sales to the highest level in three years. While further hurricane activity appears to have dampened chain store sales during the month, the jump in vehicle sales should ensure at least a rise of 0.5% or so in total retail sales in September and bring annualized growth in Q3 to about 4.8%. Non-auto sales will likely be up 0.3% or so. Further out, analysts are worried that record high home heating oil and natural gas prices, coupled with the recent rebound in gasoline costs, may spell trouble for consumer spending in Q4.

Housing Starts Rose To Highest Level Of The Year In August



Total housing starts rose a slight 0.6% in August, but that was enough to boost the annualized rate to 2.000 million units, the highest level of the year and 9.0% above year ago levels. Single-family starts rose 0.4% to an annualized rate of 1.667 million units and 11.6% above the august 2003 level. Multi-family starts rose 1.5% during the month but were down 2.3% from a year earlier. Starts rose in all regions of the country except the West during august. Despite the rise in new starts building permits fell 5.5% in August almost reversing the 6.2% gain in July. Sales of new single-family homes rebounded by 9.4% in August to an annualized selling rate of 1.184 million units. The jump followed declines of 7.3% and 6.2%, respectively, in the two prior months. Starts likely fell in august, hurt by disruptions to building activity in the Southeast due to hurricane activity. Sales, too, may have felt the impact. In general, however, still low mortgage rates and rebuilding activity in the Southeast, may keep starts activity relatively robust in coming months. Most all analysts, however, look for this sector of the economy to cool off considerably over the coming year as mortgage rates rise.

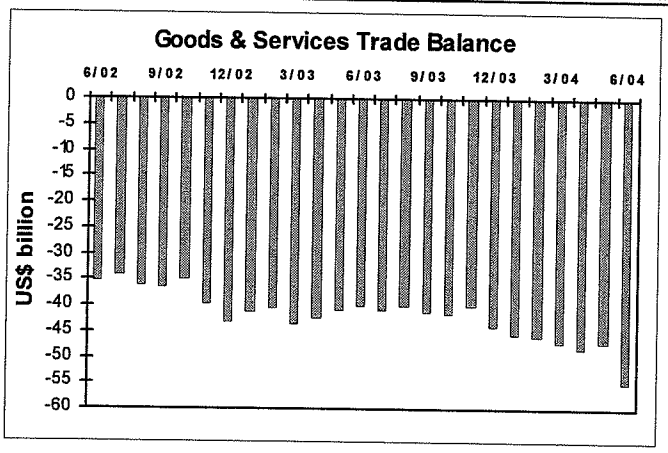
Total Industrial Production Up Slightly In August But Factory Output Remained Strong



Total industrial production rose just 0.1% in August following a revised 0.6% increase in July. The increase was smaller than expected but largely reflected a third consecutive monthly decline in utility output due to cooler than expected weather this summer. Manufacturing production, on the other hand, increased a solid 0.5% after a revised increase of 0.8% in July. Utility output fell by 2.4% in August while mining output recorded a 1.1% drop. Production of motor vehicles jumped 3.7% in August following declines in each of the prior five months. Excluding vehicle output, factory production rose 0.3%. Output in the high-tech sector remained strong, rising 1.8% in August and up 23.7% from year ago levels. Factory production appears to have remained relatively robust in September. While the ISM's overall index of activity in the factory sector dipped slightly to 58.5 versus 59.0 in August both the production and employment indexes rose. While the ISM orders index is off its highs of the year, it remains at elevated levels. Solid underlying demand and inventory building should continue to fuel solid factory activity in coming months.

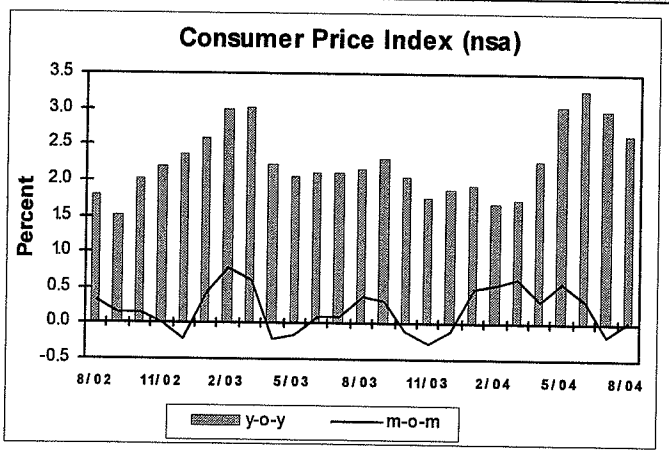
Recent Developments:

Goods And Services Trade Deficit Shrinks For A Change



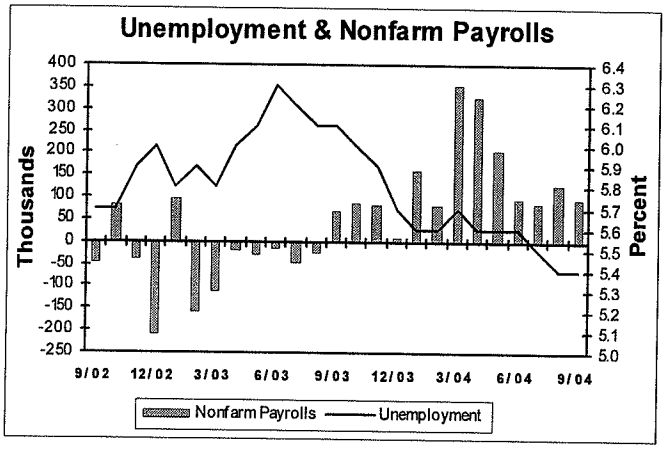
The goods and services deficit shrank by almost $4.9 billion in July but at $50.1 billion still remained at its second-highest level on record. Total exports jumped 3.0% in July after plunging by 3.9% in June. Exports of capital goods rose 5.8% after registering a June decline of 8.2% but remained up 13.7% from a year earlier. Non-auto consumer goods exports fell 2.1% marking the fourth consecutive monthly decline. Total imports fell 1.4% in July as petroleum imports plunged 9.4%. On a y/y basis, petroleum imports are actually down 2.2% but this year's sharp rise in crude oil costs has produced a 24.5% gain in the dollar cost of petroleum imports. The continued rise in crude oil prices since July, coupled with the low level of inventories, virtually assures that petroleum imports will contribute to widening deficits in August and September at a minimum. Imports of non-petroleum goods declined 0.4% in July but are up 15.5% from a year earlier. By country, the July trade deficit with China deepened to another record monthly high of $14.9 billion as imports rose 3.7% bringing the y/y increase to 30.7%. The deficit with Japan increased to $6.4 billion in July.

Inflation Looked Tame Again In August, But Higher Energy Prices Are In The Pipeline



Both the overall Consumer Price Index and the CPI excluding food and energy (core CPI) registered 0.1% increases in August. The increases dropped the y/y increase in the overall CPI to 2.7%. The y/y change in the core CPI fell back to 1.7%. Food prices rose just 0.1% in August while energy prices fell 0.3%. Deflation in consumer goods continued for a second month, rising only 0.1%. A number of categories combined to restrain the increase in the core CPI. Most important was moderation in several services categories that capped the core services index to a gain of just 0.1%, a six-month low. The key shelter gauge also rose only 0.1%, as increases in rent and owners' equivalent rent was offset by a sharp fall in hotel rates. Airfares plunged 3.7% and the cost of medical services increase just 0.2%, a 16-month low. Gasoline prices fell for a second month, dropping 1.4% in august. Fuel oil prices, however, rose 5.3%. In the pipeline, however, are sizable increases in energy prices that occurred in September that will likely reverse the recent softening in overall consumer price inflation. Moreover, energy prices continued to rise in the early days of October.

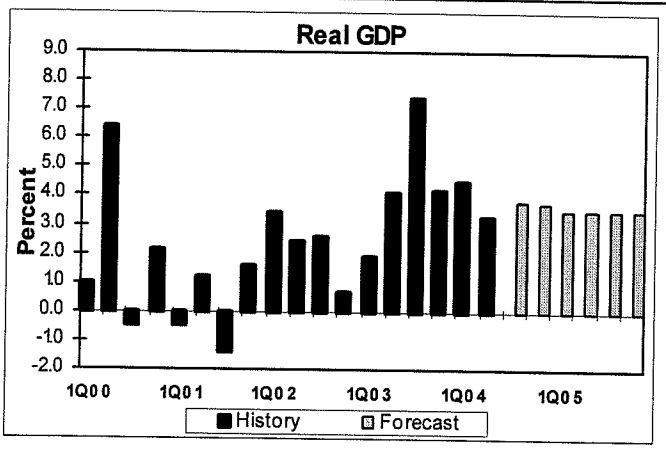
Job Growth Remained Softer Than Expected In September



Nonfarm payrolls rose by a smaller than expected 96,000 in September and the August payroll gain was reduced from 144,000 to 128,000. The unemployment rate remained at 5.4% for a second month. Goods-producing industry payrolls fell by 13,000 during the month as factory payrolls shrank by 18,000. That marked the third month this year in which manufacturing payroll employment fell. There was a modest gain of 4,000 in construction payrolls. Payroll employment at service-producing firms rose by 109,000 in September despite a contraction of 15,000 in the payrolls of retailers. Government payrolls rose by an unexpectedly large 37,000 during the month. The average workweek remained at 33.8 hours in September but the manufacturing workweek slipped 0.1 of an hour to 40.8 hours. Average hourly earnings (AHE) rose 0.2% after a 0.3% rise in August. The increase brought the y/y change in AHE to 2.4%. Data contained in the September employment report suggest that total industrial production was likely flat during the month – hurt by hurricane disruptions along the East coast --but that personal income rose by 0.3%-0.4%.

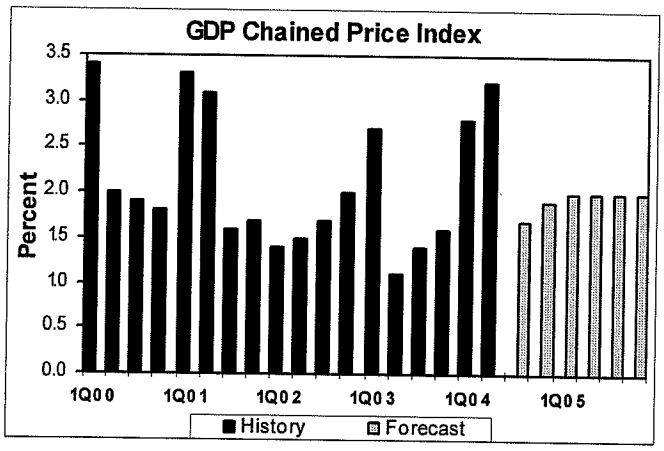
Quarterly U.S. Forecasts:

Real GDP



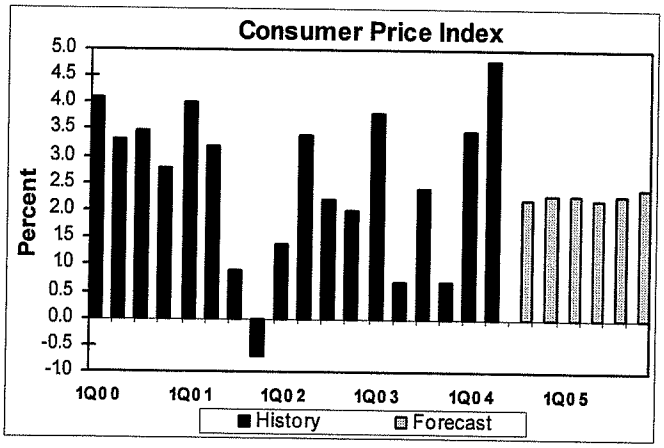
It turns out that the "soft patch" the economy experience last spring was not as soft as previously believed. Moreover, it appears that growth in Q3 was stronger than earlier thought. Government statisticians now say real GDP grew at an annualized rate of 3.3% in Q2, not the 2.8% previously estimated. And, the consensus now puts Q3 real GDP growth at 3.8%, 0.4 of a point higher than a month ago. Indeed, risks to the estimate of Q3 growth appears to be on the upside with personal consumption and construction data suggesting that some analysts remain too pessimistic about growth during the quarter. Going forward, however, the sharp spike in energy prices over recent weeks suggests the risk is growing that consumer spending may soften in Q4 as households cope with gasoline and home-heating costs well above year ago levels. The consensus now looks for Q4 real GDP growth of 3.7%, 0.2 of a point below last month's estimate. Real GDP is now expected to increase 4.4% on a calendar year basis this year and grow 3.8% on a Q4/Q4 basis. Real GDP growth in 2005 is now estimated to be a trend-like 3.5% on a calendar year and Q4/Q4 basis.

Chained-GDP Price Index



The GDP price index increased at an unrevised annualized rate of 3.2% in Q2, the fastest since Q1 2001. The above consensus rise largely resulted from downwardly revised annualized growth of 3.1% in the personal consumption price deflator that largely resulted from a spike in energy prices. The temporary halt to the energy price rise is expected by the consensus to drop the annualized change in the GDP price index to only 1.7% in Q3. However, rebounding energy prices now look to boost the price index in Q4. The price index for nondurable goods rose at an annual rate of 6.6% in Q2 following growth of 5.3% in Q1. Much of this irise was due to higher energy prices. In contrast, the price index for consumer durables fell at an annual rate of 0.1% following zero growth in Q1. The vast majority of economists had expected energy prices to ease considerably in the second half of this year but the rebound in crude oil prices to above $50 per barrel by late September is undercutting that optimistic assumption. At the moment, the consensus sees Q4 annualized growth of 1.9% in the GDP price index, bringing the calendar year increase to 2.2% and 2.4% Q4/Q4. In 2005, calendar year and Q4/Q4 increases of 2.0% are foreseen.

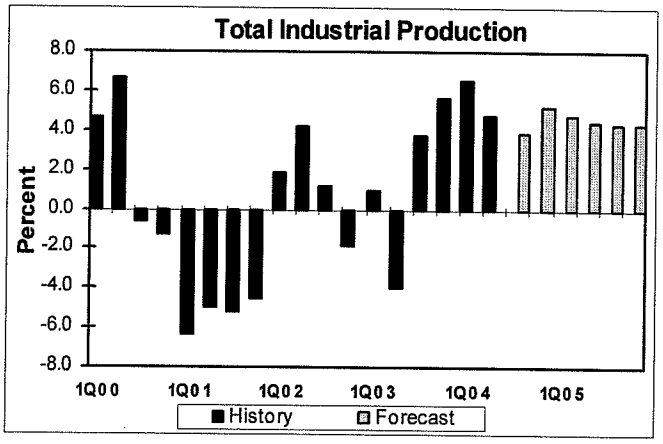
Consumer Price Index



The pace of consumer price inflation also moderated in Q3. However, assumptions about inflation thereafter are under pressure due to the sharp rebound in energy prices of late. Both the overall CPI and core CPI registered increases of only 0.1% in August. The increases dropped the y/y increase in the overall CPI to 2.7% from 3% in July and this year's high of 3.3% in June. The y/y change in the core CPI fell back to 1.7% from 1.8% in July and 1.9% in June. Measured from the beginning of this year, the 2004 increase in the core CPI fell back to 2.2% in August from 2.4% in July and a peak of 3.0% in April. The consensus now looks for annualized CPI increases of 2.2% in Q3 and 2.3% in Q4. While the Q3 estimate appears to be on target, the Q4 estimate is likely too optimistic if energy prices stay near current levels. Moreover, after three months of lower-than-expected readings, core inflation figures in coming months may be larger than expected. The consensus now sees a calendar year increase of 2.6% in the overall CPI this year and a Q4/Q4 rise of 3.2%. In 2005, the CPI is expected to be up 2.4% on a calendar year basis and 2.3% Q4/Q4.

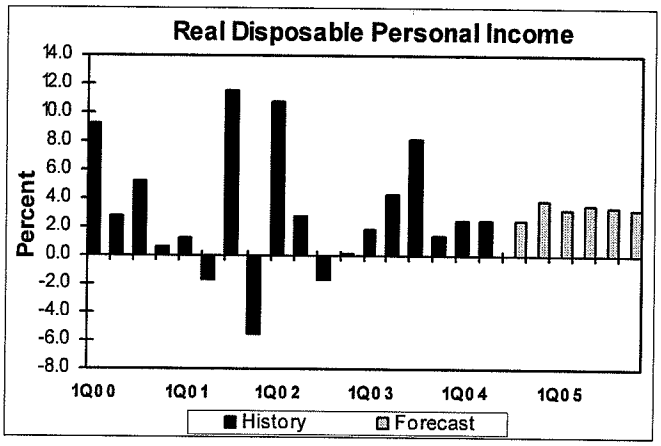
Quarterly U.S. Forecasts:

Industrial Production



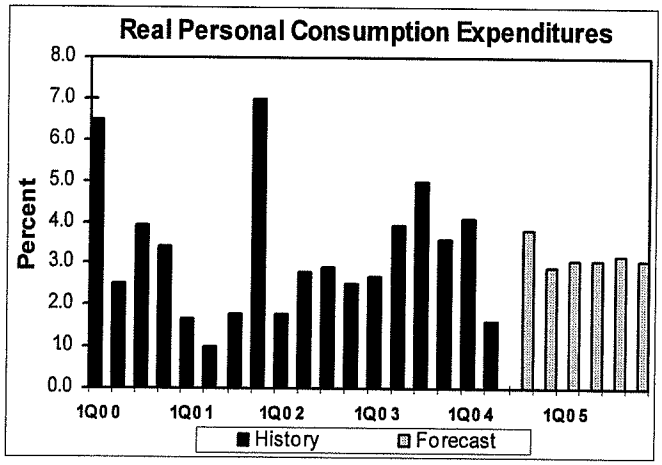
Total industrial production increased by an unexpectedly small 0.1% in August following a revised 0.6% increase in July. A third consecutive monthly decline in utility output due to cooler than expected weather this summer dampened the rise. In contrast, manufacturing output increased a solid 0.5% after a revised increase of 0.8% in July. Nonetheless, the weakness in utility output capped annualized growth in total industrial production at 3.9% in Q3, says the consensus, following growth rates of 4.8% and 6.6%, respectively in Q2 and Q1. Growth in manufacturing output was likely better than 6%. Helping lift factory output in August was the first increase in vehicle and parts production since February. Indeed, output of motor vehicle and parts producers contracted at a 10.4% rate in Q2. Absent the unexpected drag from weak utility output this summer, the consensus looks for industrial production to climb at a 5.2% rate in Q4. For the entire calendar year, total industrial production will climb at 4.7% and be up 5.2% on a Q4/Q4 basis. Next year, a calendar year rise of 4.6% is forecast with an increase of 4.4% on a Q4/Q4 basis.

Real Disposable Personal Income



Real disposable personal income rose at a revised annualized rate of only 2.4% in Q2, matching the Q1 pace. Holding down real income growth during the first half of the year was higher inflation, the waning effects of prior income tax cuts and tepid job growth. Less inflation in Q3, however, will boost growth in real DPI. The personal consumption deflator was unchanged in July and August after posting quarterly growth rates of 3.3% in Q1 and 3.1% in Q2. Nominal growth in disposable personal income rose at a 5.8% pace in Q1 and 5.6% rate in Q2. While nominal growth in Q3 may have been slightly weaker, the sharp drop in inflation likely lifted the real DPI growth pace well above the first half rate. The opposite may be true in Q4 due to higher rates of inflation stemming from the sharp recent rebound in energy prices. Hopefully, strengthening job markets will offset some of the drag from higher inflation during the remainder of the year. The consensus now looks for real DPI to growth 3.2% on a calendar year basis in 2004 and register an increase of 3.3% in 2005. Real DPI rose only 2.3% in 2003 and was up 3.1% in 2002.

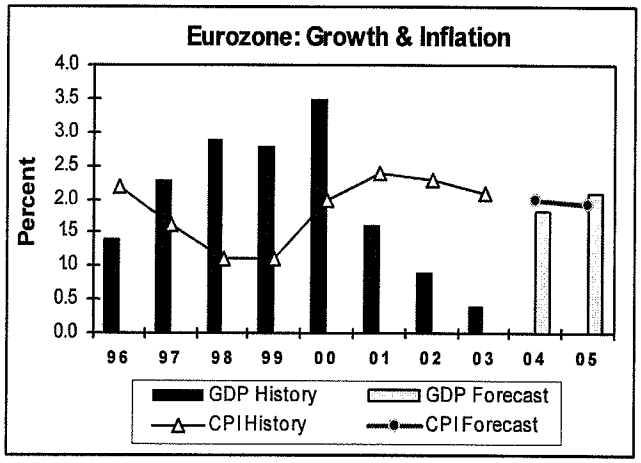
Real Personal Consumption Expenditures



Growth in real personal consumption expenditures during Q3 should easily exceed the Q2 pace of only 1.6% -- the smallest gain since Q2 2001. Though real PCE was unchanged in August it rose a strong, upwardly revised 1.1% in July and likely posted September growth of 0.2% or so based on a solid rebound in vehicle sales if nothing more. The consensus puts the Q3 real PCE growth rate at 3.8%, but it could have exceeded 4% if August consumption is revised up. Of increasing concern, however, is what will happen in Q4. Energy prices have skyrocketed again and analysts are beginning to fret that they will hurt consumer sentiment and spending over the remainder of this year. If nothing else, the jump in energy prices will raise nondurable consumer goods inflation and cut growth in real consumption, as was the case in Q2. There also remain concerns that the relatively tepid pace of growth in real incomes and the high levels of consumer debt may also weigh on consumer spending going forward. The consensus now looks for real PCE to grow 3.5% in 2004 but to increase by a smaller 3.1% in 2005 as consumers slow spending to boost the savings rate from its current historically low level.

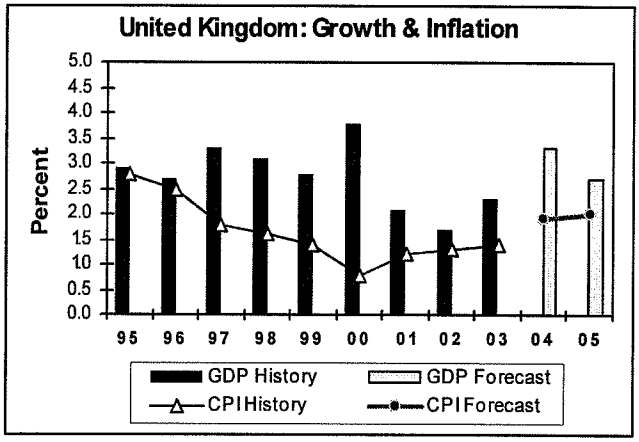
International Forecasts:

Eurozone



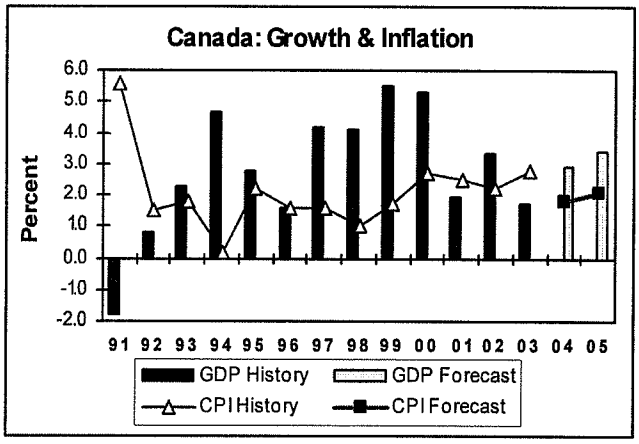
The European Central Bank (ECB) left its repo rate at a six-decade low of 2.0% on October 7th amid evidence that soaring energy costs and tepid job creation are dampening the pace of economic growth in the eurozone. While economic activity has certainly improved in the eurozone this year it has been heavily dependent on the export sector. In contrast, domestic demand has remained tepid in the face of high unemployment and job security fears. German business confidence fell for a fourth month in five in September and the unemployment rate rose to 10.7%, the highest level since February 1999. Inflation in the eurozone eased down to 2.2% in September from 2.3% in the prior two months but remains above the ECB's targeted ceiling of 2%. Core inflation remains relatively tame, however any signs of pass-through effects from the rise in energy prices would cause concern at the ECB. Financial markets have scaled back when they expect the ECB to begin raising interest rates next year. The consensus continues to predict real GDP will grow 1.8% in this calendar year and be up 2.1% in 2005, but should energy prices continue to rise those estimates may fall.

United Kingdom



The Banks of England's Monetary Policy Committee (MPC) left its benchmark base rate unchanged at a three-year high of 4.75% on October 7th. That marked the second consecutive time the MPC has met and left rates unchanged and many analysts are beginning to suspect that policymakers have finished tightening amid signs that earlier rate hikes have begun to bite and worries about future growth are escalating in the face of skyrocketing energy prices. The MPC has hiked interest rates five times since last November with the last 25 basis point rate hike coming in August. The MPC has raised rates in reaction to strong economic growth, tight labor markets and soaring home prices. However, recent data indicates that home price inflation has slowed, factory output has weakened, retail sales have softened and activity in the services sector has diminished. With inflation still below BoE targets, the bank is now likely to leave rates unchanged unless economic activity reaccelerates. The consensus continues to predict real GDP will register calendar year growth of 3.3% this year and 2.7% in 2005. Consumer inflation is predicted to increase 1.9% in 2004 and 2.0% in 2005.

Canada



The Bank of Canada, in contrast, has just begun to tighten, having hiked its overnight rate target by 25 basis points to 2.25% on September 8th. The move followed five straight cuts through April that dropped the bank's overnight rate to a 40-year low. A further 25 basis point hike is anticipated at its October 19th meeting and anopther in December. Canada's economy posted 4.3% annualized growth in Q2, fastest among the G-7 nations. Moreover, growth in Q3 many be similarly strong. Retail sales surged in July, aided by exceptionally strong vehicle sales. Canada's economy is also benefiting from strong demand and soaring prices for commodities such as oil, timber and minerals. Exports are strong, manufacturing output robust and housing activity solid. While core inflation looks tame at present, BoC policymakers worry that the "output gap" may be closing at a fairly rapid clip with consequent implications for inflation down the road. The consensus still forecasts that real GDP will record growth of 2.9% this year and 3.4% in 2005. Consumer price inflation is expected to increase 1.8% this year and post calendar year growth of 2.1% in 2005.

Databank:

2004

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jly	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	0.5	1.0	2.1	-0.8	1.5	-0.7	0.8	-0.3				
Total Auto & Truck Sales (b)	16.7	16.9	17.1	17.0	18.1	15.8	17.6	17.0				
Personal Income (a, current $)	0.3	0.4	0.4	0.6	0.5	0.2	0.2	0.4				
Personal Consumption (a, current $)	0.6	0.6	0.4	0.1	1.0	-0.3	1.1	0.0				
Consumer Credit (e)	10.5	1.5	2.8	3.5	2.7	2.6	6.4					
Consumer Sentiment (U. of Mich.)	103.8	94.4	95.8	94.2	90.2	95.6	96.7	95.9	94.2			
Household Employment (c)	87	-265	-3	278	196	259	629	21	-201			
Non-farm Payroll Employment (c)	159	83	353	324	208	96	85	128	96			
Unemployment Rate (%)	5.6	5.6	5.7	5.6	5.6	5.6	5.5	5.4	5.4			
Average Hourly Earnings ('82$)	8.27	8.27	8.24	8.25	8.21	8.20	8.23	8.25				
Average Hourly Earnings (current $)	15.49	15.52	15.55	15.59	15.63	15.66	15.71	15.75	15.78			
Non-farm Workweek (hrs.)	33.8	33.8	33.8	33.7	33.8	33.6	33.8	33.8	33.8			
Industrial Production (d)	2.3	2.9	3.5	4.7	5.6	5.3	5.1	5.1				
Capacity Utilization (%)	76.2	76.7	76.6	76.8	77.4	76.9	77.3	77.3				
ISM Index (formerly NAPM, g)	63.6	61.4	62.5	62.4	62.8	61.1	62.0	59.0				
Housing Starts (b)	1.934	1.895	2.000	1.963	1.979	1.817	1.988	2.000				
Housing Permits (b)	1.913	1.913	1.975	2.006	2.097	1.945	2.066	1.952				
New Home Sales (1-family, c)	1,155	1,165	1,270	1,176	1,244	1,167	1,082	1,184				
Construction Expenditures (a)	-0.4	0.6	2.3	1.3	0.6	0.0	1.1	0.8				
Consumer Price Index (s.a., d)	1.9	1.7	1.7	2.3	3.1	3.3	3.0	2.7				
CPI ex. Food and Energy (s.a., d)	1.1	1.2	1.6	1.8	1.7	1.9	1.8	1.7				
Producer Price Index (n.s.a., d)	3.3	2.1	1.5	3.7	5.0	4.0	4.0	3.4				
Durable Goods Orders (a)	-2.6	3.9	5.9	-2.7	-0.9	1.3	1.8	-0.5				
Leading Economic Indicators (g)	0.4	0.0	0.8	0.1	0.4	-0.3	-0.3	-0.3				
Balance of Trade & Services (f)	-45.8	-45.8	-47.1	-48.2	-47.1	-55.0	-50.2					
Federal Funds Rate (%)	1.00	1.01	1.00	1.00	1.00	1.03	1.26	1.43	1.61			
3-Mo. Treasury Bill Rate (%)	0.88	0.93	0.94	0.94	0.94	1.27	1.33	1.48	1.65			
10-Year Treasury Note Yield (%)	4.15	4.08	3.83	4.35	4.72	4.73	4.50	4.28	4.13			

2003

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jly	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	0.6	-0.9	2.2	-0.35	0.3	1.0	1.2	1.1	-0.4	0.2	1.2	0.2
Total Auto & Truck Sales (b)	16.6	16.0	16.5	16.8	16.5	16.8	17.2	18.2	17.3	16.4	17.3	17.8
Personal Income (a, current $)	0.3	0.4	0.5	0.2	0.6	0.5	0.3	0.4	0.4	0.4	0.7	0.4
Personal Consumption (a, current $)	0.0	0.4	0.7	0.2	0.2	0.5	0.5	0.8	-0.4	0.2	0.9	0.4
Consumer Credit (e)	9.6	1.8	0.7	6.0	7.3	0.3	4.1	6.0	6.9	5.9	0.5	4.5
Consumer Sentiment (U. of Mich.)	82.4	79.9	77.6	86.0	92.1	89.7	90.9	89.3	87.7	89.6	93.7	93.6
Household Employment (c)	988	-129	-18	278	-73	168	-69	89	-49	451	438	-54
Non-farm Payroll Employment (c)	94	-159	-110	-20	-28	-14	-45	-25	67	88	83	8
Unemployment Rate (%)	5.8	5.9	5.8	6.0	6.1	6.3	6.2	6.1	6.1	6.0	5.9	5.7
Average Hourly Earnings ('82$)	8.26	8.25	8.21	8.24	8.28	8.28	8.31	8.28	8.25	8.28	8.32	8.30
Average Hourly Earnings (current $)	15.18	15.27	15.27	15.25	15.31	15.34	15.40	15.41	15.41	15.43	15.46	15.45
Non-farm Workweek (hrs.)	33.8	33.7	33.8	33.7	33.7	33.7	33.6	33.6	33.6	33.7	33.8	33.5
Industrial Production (d)	1.4	1.6	0.5	-0.6	-0.8	-1.5	-0.6	-0.5	0.2	0.7	1.5	2.3
Capacity Utilization (%)	75.2	75.4	74.8	74.2	74.1	74.0	74.5	74.5	74.9	75.0	75.7	75.8
ISM Index (formerly NAPM, g)	53.0	49.4	46.6	46.2	50.0	50.4	52.6	55.0	54.7	57.1	61.3	63.4
Housing Starts (b)	1.856	1.657	1.728	1.637	1.748	1.850	1.893	1.835	1.922	1.983	2.054	2.067
Housing Permits (b)	1.816	1.866	1.754	1.798	1.846	1.871	1.892	1.964	1.943	2.015	1.920	1.979
New Home Sales (1-family, c)	1,001	932	1,006	1,027	1,093	1,194	1,156	1,189	1,127	1,141	1,086	1,120
Construction Expenditures (a)	2.2	0.0	-0.1	-0.4	0.0	0.8	1.6	0.9	1.4	1.3	0.5	0.2
Consumer Price Index (s.a., d)	2.6	3.0	3.0	2.2	2.1	2.1	2.1	2.2	2.3	2.0	1.8	1.9
CPI ex. Food and Energy (s.a., d)	1.9	1.7	1.7	1.5	1.6	1.5	1.5	1.3	1.2	1.3	1.1	1.1
Producer Price Index (n.s.a., d)	2.8	3.5	4.2	2.4	2.5	2.9	3.0	3.5	3.5	3.4	3.4	4.0
Durable Goods Orders (a)	2.1	-1.1	1.3	-1.4	0.0	2.5	1.6	-0.1	2.2	3.9	-2.4	1.7
Leading Economic Indicators (g)	0.2	-0.4	-0.2	0.1	1.1	0.3	0.6	0.4	0.0	0.5	0.2	0.2
Balance of Trade & Services (f)	-41.4	-40.4	-43.7	-42.5	-40.8	-40.0	-40.8	-40.2	-41.3	-41.5	-40.0	-44.0
Federal Funds Rate (%)	1.24	1.26	1.25	1.26	1.26	1.22	1.01	1.03	1.01	1.01	1.00	0.98
3-Mo. Treasury Bill Rate (%)	1.17	1.17	1.13	1.13	1.07	0.92	0.90	0.95	0.94	0.92	0.93	0.90
10-Year Treasury Note Yield (%)	4.05	3.90	3.81	3.96	3.57	3.33	3.98	4.45	4.27	4.29	4.30	4.27

(a) month-over-month % change; (b) millions, saar; (c) thousands, saar; (d) year-over-year % change; (e) annualized % change; (f) $ billions; (g) level. Most series are subject to frequent government revisions. Use with care.

Long-Range Consensus U.S. Economic Projections

I. The table below shows the latest U.S. Blue Chip Consensus[1] projections by years for 2006 through 2010, an average for the five-year period 2006-2010, and an average for the next five-year period 2011-2015. There are also Top 10 and Bottom 10 averages for each variable. Apply these projections cautiously. The vast majority of economic and political forces cannot be evaluated over such a long time span.

ECONOMIC VARIABLE		YEAR 2006	2007	2008	2009	2010	Five-Year Averages 2006-10	2011-15
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2000 dollars)	**CONSENSUS**	**3.4**	**3.2**	**3.2**	**3.1**	**3.3**	**3.2**	**3.2**
	Top 10 Avg.	3.9	3.6	3.6	3.5	3.9	3.7	3.5
	Bottom 10 Avg.	2.8	2.7	2.6	2.6	2.7	2.7	2.9
2. GDP Chained Price Index	**CONSENSUS**	**2.0**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.2**
	Top 10 Avg.	2.7	2.7	2.8	2.6	2.7	2.7	2.8
	Bottom 10 Avg.	1.4	1.5	1.5	1.5	1.6	1.5	1.7
3. Nominal GDP (current dollars)	**CONSENSUS**	**5.5**	**5.4**	**5.4**	**5.3**	**5.5**	**5.4**	**5.5**
	Top 10 Avg.	6.2	6.1	6.2	6.1	6.4	6.2	6.2
	Bottom 10 Avg.	4.8	4.8	4.6	4.5	4.8	4.7	4.9
4. Consumer Price Index (for all urban consumers)	**CONSENSUS**	**2.3**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.5**
	Top 10 Avg.	3.0	3.1	3.1	2.9	3.0	3.0	3.0
	Bottom 10 Avg.	1.5	1.6	1.4	1.9	1.9	1.6	2.0
5. Industrial Production (total)	**CONSENSUS**	**4.1**	**4.0**	**3.5**	**3.4**	**3.7**	**3.8**	**3.6**
	Top 10 Avg.	5.5	5.3	4.5	4.3	4.6	4.8	4.3
	Bottom 10 Avg.	2.9	2.9	2.2	2.4	2.9	2.6	3.0
6. Disposable Personal Income (chained, 2000 dollars)	**CONSENSUS**	**3.4**	**3.3**	**3.1**	**3.1**	**3.2**	**3.2**	**3.2**
	Top 10 Avg.	4.2	3.9	3.7	3.7	3.9	3.9	3.6
	Bottom 10 Avg.	2.8	2.8	2.6	2.7	2.7	2.7	2.8
7. Personal Consumption Expenditures (chained, 2000 dollars)	**CONSENSUS**	**3.1**	**3.0**	**3.0**	**3.0**	**3.1**	**3.0**	**3.0**
	Top 10 Avg.	3.6	3.4	3.5	3.4	3.8	3.5	3.4
	Bottom 10 Avg.	2.5	2.5	2.4	2.5	2.5	2.5	2.6
8. Non-Residential Fixed Investment (chained, 2000 dollars)	**CONSENSUS**	**6.8**	**5.9**	**5.5**	**5.1**	**5.6**	**5.8**	**5.2**
	Top 10 Avg.	9.9	7.9	7.9	8.0	7.4	8.2	7.2
	Bottom 10 Avg.	4.7	4.0	2.7	1.7	3.9	3.4	3.6
9. Corporate Profits, Pretax (current dollars)	**CONSENSUS**	**6.5**	**6.0**	**5.3**	**5.4**	**6.6**	**6.0**	**6.1**
	Top 10 Avg.	9.7	8.5	8.4	8.2	9.9	9.0	8.3
	Bottom 10 Avg.	4.3	3.5	1.2	1.3	3.8	2.8	4.2
		Annual Average						
10. Treasury Bills, 3-Month (percent per annum)	**CONSENSUS**	**3.8**	**4.1**	**4.3**	**4.2**	**4.2**	**4.1**	**4.4**
	Top 10 Avg.	4.6	5.0	5.5	5.4	5.1	5.1	5.3
	Bottom 10 Avg.	3.2	3.3	3.4	3.1	3.4	3.3	3.6
11. Treasury Notes, 10-Year (yield per annum)	**CONSENSUS**	**5.5**	**5.6**	**5.6**	**5.6**	**5.6**	**5.6**	**5.7**
	Top 10 Avg.	6.1	6.3	6.4	6.7	6.5	6.4	6.6
	Bottom 10 Avg.	5.0	5.0	4.9	4.8	4.7	4.9	4.8
12. Unemployment Rate (% of civilian labor force)	**CONSENSUS**	**5.1**	**5.1**	**5.1**	**5.1**	**5.1**	**5.1**	**5.0**
	Top 10 Avg.	5.5	5.5	5.5	5.7	5.7	5.6	5.5
	Bottom 10 Avg.	4.7	4.6	4.6	4.5	4.5	4.6	4.5
		Total Units, Millions						
13. Housing Starts (millions of units)	**CONSENSUS**	**1.72**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**
	Top 10 Avg.	1.90	1.90	1.95	1.96	1.94	1.93	1.94
	Bottom 10 Avg.	1.57	1.58	1.51	1.50	1.56	1.54	1.55
14. Total Auto & Truck Sales (millions of units)	**CONSENSUS**	**16.9**	**17.0**	**17.1**	**17.2**	**17.3**	**17.1**	**17.6**
	Top 10 Avg.	17.6	17.7	18.0	18.2	18.3	18.0	18.7
	Bottom 10 Avg.	16.3	16.2	16.1	16.2	16.3	16.2	16.4
		Billions of Chained, 2000 Dollars						
15. Net Exports (billions of chained, 2000 dollars)	**CONSENSUS**	**-535.7**	**-505.2**	**-486.0**	**-464.7**	**-447.6**	**-487.8**	**-424.4**
	Top 10 Avg.	-460.9	-419.2	-386.7	-316.8	-291.1	-374.9	-239.5
	Bottom 10 Avg.	-594.7	-598.5	-610.5	-623.5	-628.3	-611.1	-615.4

Long-Range Consensus U.S. Economic Projections

II. For comparison, this table includes some of the long-range consensus projections found on the preceding page, plus the latest long-range projections from the Bush Administration[1] and the Congressional Budget Office (CBO)[2].

ECONOMIC VARIABLE		YEAR 2006	2007	2008	2009	2010	Five-Year Averages 2006-10	2011-15
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2000 dollars)	**CONSENSUS**	**3.4**	**3.2**	**3.2**	**3.1**	**3.3**	**3.2**	**3.2**
	Bush Admin.[1,3]	3.4	3.3	3.2	3.1	NA	3.3	NA
	CBO[2,3]	3.2	3.1	3.0	2.9	2.7	3.0	2.5
2. GDP Chained Price Index	**CONSENSUS**	**2.0**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.2**
	Bush Admin.[1,3]	2.1	2.1	2.1	2.1	NA	2.1	NA
	CBO[2,3]	1.5	1.6	1.7	1.8	1.8	1.7	1.8
3. Nominal GDP (current dollars)	**CONSENSUS**	**5.5**	**5.4**	**5.4**	**5.3**	**5.5**	**5.4**	**5.5**
	Bush Admin.[1,3]	5.6	5.5	5.4	5.3	NA	5.5	NA
	CBO[2,3]	4.8	4.8	4.8	4.7	4.5	4.7	4.4
4. Consumer Price Index (for all urban consumers)	**CONSENSUS**	**2.3**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.5**
	Bush Admin.[1,3]	2.4	2.4	2.4	2.5	NA	2.4	NA
	CBO[2,3]	2.0	2.2	2.2	2.2	2.2	2.2	2.2
		Annual Average						
5. Treasury Bills, 3-Month (percent per annum)	**CONSENSUS**	**3.8**	**4.1**	**4.3**	**4.2**	**4.2**	**4.1**	**4.4**
	Bush Admin.[1,3]	3.4	3.9	4.3	4.4	NA	4.0	NA
	CBO[2,3]	4.0	4.0	4.6	4.6	4.6	4.4	4.6
6. Treasury Notes, 10-Year (yield per annum)	**CONSENSUS**	**5.5**	**5.6**	**5.6**	**5.6**	**5.6**	**5.6**	**5.7**
	Bush Admin.[1,3]	5.4	5.6	5.7	5.8	NA	5.6	NA
	CBO[2,3]	5.5	5.5	5.5	5.5	5.5	5.5	5.5
7. Unemployment Rate (% of civilian labor force)	**CONSENSUS**	**5.1**	**5.1**	**5.1**	**5.1**	**5.1**	**5.1**	**5.0**
	Bush Admin.[1,3]	5.3	5.1	5.1	5.1	NA	5.2	NA
	CBO[2,3]	5.1	5.2	5.2	5.2	5.2	5.2	5.2

III. In this table, we compare the results of our most recent survey with those of our survey in March 2004[4].

ECONOMIC VARIABLE		YEAR 2006	2007	2008	2009	2010	Five-Year Averages 2006-10	2011-15
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2000 dollars)	**October Consensus**	**3.4**	**3.2**	**3.2**	**3.1**	**3.3**	**3.2**	**3.2**
	March Consensus	3.4	3.2	3.1	3.1	3.2	3.2	3.1
2. GDP Chained Price Index	**October Consensus**	**2.0**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.2**
	March Consensus	1.9	1.9	2.0	2.1	2.2	2.0	2.2
3. Nominal GDP (current dollars)	**October Consensus**	**5.5**	**5.4**	**5.4**	**5.3**	**5.5**	**5.4**	**5.5**
	March Consensus	5.3	5.2	5.2	5.2	5.4	5.3	5.4
4. Consumer Price Index (for all urban consumers)	**October Consensus**	**2.3**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.5**
	March Consensus	2.2	2.3	2.3	2.4	2.4	2.3	2.5
		Annual Average						
5. Treasury Bills, 3-Month (percent per annum)	**October Consensus**	**3.8**	**4.1**	**4.3**	**4.2**	**4.2**	**4.1**	**4.4**
	March Consensus	3.4	3.7	3.9	4.1	4.3	3.9	4.3
6. Treasury Notes, 10-Year (yield per annum)	**October Consensus**	**5.5**	**5.6**	**5.6**	**5.6**	**5.6**	**5.6**	**5.7**
	March Consensus	5.5	5.5	5.4	5.7	5.7	5.6	5.7
7. Unemployment Rate (% of civilian labor force)	**October Consensus**	**5.1**	**5.1**	**5.1**	**5.1**	**5.1**	**5.1**	**5.0**
	March Consensus	5.2	5.2	5.2	5.2	5.2	5.2	5.1

[1]*Mid-Session Review, Budget of the United States Government, Fiscal Year 2005*; Office of Management and Budget, July, 2004. [2]*The Budget and Economic Outlook: An Update;* Congressional Budget Office, September 2004. [3]The Bush Administration's forecast only extends through 2009, so averages for the 2006-2010 period are based on the forecast for the four-year period 2006-2009. CBO's forecast only extends through 2014, so averages for the 2011-2015 period are based on the forecast for the four-year period 2011-2014. [4]*Blue Chip Economic Indicators*, March 10, 2004.

Viewpoints:

A Sampling Of Views On The Economy, Financial Markets And Government Policy Excerpted From Recent Reports Issued By Our Blue Chip Panel Members And Others

Fed Funds Up, Bond Yields Down?

We continue to project higher short- and long-term interest rates. So far, our call on long-term rates has not been realized, with the drop in yields since mid-June reversing the rise in earlier months. Ironically, for the year to date, core inflation and Fed tightening have exceeded our start-of-year expectations somewhat, while real GDP and employment growth have roughly matched our expectations. Apparently, other developments have been offsetting, including the threat to growth from rising oil prices and the stalling in the stock market. While those developments have been cause for concern, we still expect solid growth and gradually rising core inflation through 2005.

The most dramatic moves in the bond market in 2004 have typically been triggered by employment reports. We believe the trend in payroll gains remains solid, consistent with the 180,000 per month average for the year to date, but we expect the September gain was held down by temporary hurricane effects.

In part, low bond yields appear to reflect the expectation that the funds rate will stay exceptionally low for an extended period. Quantifying the amount of tightening being priced into markets is always debatable, with different views on the extent to which futures contracts on short-term rates need to be adjusted for risk premia, particularly beyond the first few months' contracts. In theory, as well as in practice, the risk premium component of interest rates rises with maturity that is why the yield curve is typically upward sloping. Similarly, the implied interest rate on Eurodollar contracts tends to rise with maturity, even if expectations for Fed action are neutral. Based on a Fed economists estimates for risk premia, we believe Eurodollar futures contracts are currently consistent with a funds rate of less than 2.5% by the end of 2005, well below the consensus forecast of economists (3.25% to 3.5%) and even further below our forecast (4.0%).

A roughly flat stock market through a Fed tightening cycle is not unusual. For example, that was the pattern in 1994. We can be fairly confident, however, that bond yields will not keep falling if the Fed keeps tightening. Of course, there are plenty of examples of bond yields peaking before the tightening cycle was complete, including 1994 and 2000. This time, however, bond yields peaked before tightening even began. The implication: either tightening is already almost over, or bond yields will start climbing again.

Ultimately, the direction of the funds rate, as well as bond yields, will be determined by the economic data. On that score, the latest core inflation data have been weaker than expected, but growth has been stronger than expected.

At 1.4%, the latest year-over-year change in core PCE prices is up from a low of 1.0% in 2003, although recent months have been weaker. We still expect the year-over-year change to be to 2.2% by the end of 2005, consistent with the rising trend being signaled by our UBS Leading Indicator of Inflation. Similarly, we expect the year-over-year change in the core CPI, currently 1.7%, to be 2.5% at the end of 2005.

Second quarter real GDP growth was just revised up to 3.3% at an annual rate from 2.8%. Meanwhile, growth appears to have accelerated in the third quarter. We have been forecasting a pickup to a 4.0% pace, although, if anything, the data have been ahead of expectations. Of course, we have yet to see most of the September data, which are likely to be depressed by temporary hurricane effects.

We expect the September employment report to show a 3.1% annual rate of increase in the index of hours worked in the third quarter, up from 2.2% in the second quarter. Allowing for productivity growth, that pace looks more than strong enough to be consistent with our 4.0% estimate for overall real GDP growth. The manufacturing ISM index averaged 59.8 in the third quarter, including the small 0.5 of a point drop to 58.5 just reported for September. That level was down from 62.1 in the second quarter, although the ISM index was unusually high relative to GDP then. Over time, a 59.8 reading is typically consistent with about a 6% pace for real GDP. More specifically, consumer spending appears to have re-accelerated. Through August, real spending was up at a 4.8% annual rate, compared with 1.6% in the second quarter. Meanwhile, despite the hurricanes, auto sales picked up in September. As a result, the pace for the third quarter should easily reach the 4.0% figure we have assumed in our 4.0% estimate for overall real GDP.

Business fixed and residential investment also appears on track to exceed the assumptions in our GDP forecast. We assumed a 9.4% rate of increase in real business fixed investment, yet shipments of nondefense capital goods excluding aircraft, which are used to estimate business fixed investment, were up at a 17% annual rate through August. We assumed a 6.6% rate of decline in residential investment, yet housing starts and construction spending have risen.

One reason for the reacceleration in consumption after its soft spot appears to be a pickup in real wages, thanks to a fading of the drag on spending power from surging gasoline prices as well as a pickup in nominal terms. Real wage income was up at a 3.6% annual rate in the third quarter through August, up from 1.8% in the second quarter. (Total real disposable income was weaker, but mainly because of a one-time adjustment to federal aid to state governments for Medicaid that did not directly affect household spending power.)

Crude oil prices have recently averaged $50 per barrel, up from $46 on average in September and $45 in August. And retail gasoline prices have risen seven cents per gallon over the last two weeks of September. Retail prices are still down from their peak in June, however. Some of the decline reflects normal seasonality, but much of it reflects a reversal of an exaggerated response to the rise in crude oil prices earlier in the year. Of course, a continued up-trend in oil prices would cut into real spending power, so oil prices remain a cause for concern.

A pickup in nominal wage income has been signaled by wage data in the employment report. Along with the acceleration in hours worked, average hourly earnings have picked up to up 3.1% at an annual rate so far in 2004 from up 1.8% in 2003 (December to December). Our wage income proxy, which combines the index of hours worked and average hourly earnings, was up at a 7.2% annual rate in the first two months of the third quarter, up from a 5.0% pace in the second quarter. The pickup in average hourly earnings has received very little attention thus far, perhaps because the year-over-year figure was still only 2.3% in August. A continued up-trend would likely draw attention, however. Frankly, we are not quite sure why earnings have accelerated. We believe the pickup may reflect a combination of: 1) a somewhat tighter labor market, with the unemployment rate down to 5.4%; 2) the impact of the oil-led pickup in inflation on wage demands; and 3) improving job quality, with growth in high-wage jobs starting to rise at almost the same rate as low-wage jobs (previously, growth in low-wage jobs was relatively stronger, pushing down average wages). Of those three, improving job quality should not raise inflation concerns at the Fed. The first two should, however, especially since the rate of increase in unit labor costs is also being boosted by some moderation in the trend in productivity growth.

James O'Sullivan, UBS Warburg, Stamford, CT

Stagflation

The recent renewed run-up in oil prices makes me even firmer in my belief that the world economy is headed for a stagflationary outcome. Just as the 1990s was a period of stronger-than-expected growth and lower-than-expected inflation, the next several years are likely to produce the opposite scenario, in my view: *(continued on next page)*

Viewpoints: A Sampling Of Views On The Economy, Financial Markets And Government Policy Excerpted From Recent Reports Issued By Our Blue Chip Panel Members And Others

slower-than-expected economic growth coupled with higher-than-expected inflation. In many ways, the current macro backdrop resembles that of the 1970s, when the world economy experienced its first serious bout of stagflation. Needless to say, if this scenario came to pass, both equity and bond markets would suffer, as they did in the decade of platform shoes, *Saturday Night Fever* and KISS.

First, as in 1970s, the world economy has to digest a major increase in oil prices. Now as then, oil prices roughly quintupled, from $2.20 in 1971 to $11.50 in 1974, and from around $10 in late 1998 to $50 most recently). True, the oil shock of the 1970s was much bigger because the rise was telescoped into a much shorter period (mostly in 1973) and because production was more oil intensive than it is today. Also, context is important: in my view, this year's oil shock was largely driven by stronger-than-expected physical and speculative demand for oil, while the 1973 oil shock was largely (though not entirely) due to a restriction of supply by the oil producers.

Second, just as in the 1970s, monetary policy has been highly expansionary, with real short-term interest rates in the major countries in negative territory for an extended period of time. In the 1970s, central banks tried to accommodate the oil shock by printing money, in the erroneous belief that there was plenty of 'slack' in the economy to keep inflation low. Most of the 'slack' turned out to be an illusion and inflation rose beyond expectations, thus depressing real interest rates further. The similarities with today are striking: the Fed again seems to believe that the best response to an oil shock is to accommodate the negative effect on demand, which is why markets have revised down significantly the expected path of Fed tightening.

Third, then and now, government budget deficits rose, partly reflecting an expansionary fiscal policy stance to overcome recession and partly reflecting recession-induced tax shortfalls and expenditure overruns. Moreover, the US had to finance an expensive war in Vietnam, just as it is now financing the costly war against terrorism. Meanwhile in Europe, fiscal policy looks unlikely to become more virtuous in coming years either.

Fourth, the established industrialized nations in Europe and North America faced major new competitors in world markets in the 1970s, notably Japan and Korea. Their emergence as equals in many industries led to a major structural crisis especially in heavy industries (shipping, steel) that depressed potential output growth in Europe and America. Today, the new competitors are China, India and Central and Eastern Europe, causing similar dislocations in both the manufacturing and the service sector. Through the sheer size of these competitors, the shock, if anything, is larger than that of the 1970s.

Fifth, and this is probably my most controversial contention, just as worldwide productivity growth slowed in the 1970s from its heady pace of the 1960s, I think we are now at the tail end of the IT-induced productivity growth cycle that started in the mid-1990s. The easy productivity gains deriving from IT and the internet have now been made, especially in the US, and productivity growth should thus slow on trend in the coming years. The story may be slightly different in Europe, where some of the IT-induced productivity gains have not yet arrived. But institutional rigidities and different preferences may mean that these gains will never materialize.

Putting all these ingredients together yields a toxic cocktail of slower growth and higher inflation. Many observers (and, judged by recent price action in equities and bonds, the financial markets) appear to agree on the slower-growth prediction. However, not many agree with my inflation worries. As I see it, central banks (and most notably the Fed) may again overestimate the rate of potential output growth and thus the size of the output gap. The risk thus is that monetary policy stays too expansionary for too long, which should eventually produce higher inflation.

Yet there is a big difference between now and the 1970s: the bargaining power of workers is much lower than it was back then, when unemployment was lower, competition from emerging markets was less intense, and the political climate following the student revolts of the late 1960s was much more conducive to redistribution from capital to labour. While wages are still likely to follow inflation with a lag, aggressive 'autonomous' wage increases as in the 1970s are unlikely. Wage-induced cost-push inflation is thus not on the cards. Still, with monetary policy likely to remain too easy for too long, and with future potential output growth probably lower than most think, demand-induced inflation above the levels that markets currently expect remains my best bet. Put on those plateau shoes, again!

Joachim Fels, Morgan Stanley, London, England

High Oil Prices And High Volatility Are Here for A While

High oil prices remain the single-biggest threat to the global recovery over the next couple of years—more expensive oil has already cut world growth by more than 0.5%. With demand still climbing faster than supply, oil markets are tight as a drum—the floor on oil prices is between $40 and $45 per barrel, and is unlikely to be much lower over the next year. Events that threaten oil supplies (e.g., the standoff between Yukos and the Russian government, hurricanes in the Gulf of Mexico, and rebel activity in the Nigerian oil fields) have periodically spiked oil prices to $50 per barrel, a nominal price not seen until very recently. The most likely scenario is for a continuation of these patterns for at least another couple of quarters—the only relief will come from slowing world growth. There is a significant risk that a serious and protracted disruption in supplies could push oil prices into the $60–70 range.

Oil prices should average around $15 per barrel higher this year and next than what most analysts expected at the start of 2004. As a result, U.S. GDP growth will be about 0.5 of a percentage point lower this year and 0.8 of a point lower next year than previously forecasted. The Eurozone economies will see their growth rates curtailed by about the same amount as the U.S. economy. The U.K. will suffer less than the Eurozone, thanks to higher revenues from North Sea oil. Canada, Mexico, and Russia will enjoy slightly stronger GDP growth due to higher revenues from oil exports. Growth in the Asia-Pacific region will be cut by about twice as much as in the U.S, because of the region's greater dependence on imported oil. Some sectors will be hit particularly hard, including airlines and other transportation services, utilities, chemicals, and heavy manufacturing.

The crisis scenario would likely be triggered by some combination of the following: a terrorist attack on Saudi oil facilities, continued disruption of Iraqi oil supplies, more strikes by Venezuelan oil workers, and worsening rebel activity in Nigeria. Oil prices average $10–$15/barrel higher in this scenario than in our baseline forecast during 2005. Both world and U.S. GDP growth would be reduced by 0.5%–0.7% percentage point next year. Despite their better fuel efficiency, the Eurozone economies would suffer more than the United States because of their greater dependence on oil imports. Germany and Italy could be pushed back into recession. European consumer spending would slow dramatically. Russia's GDP growth would accelerate, lifting the other CIS economies. Asia-Pacific growth would be cut as much as 2 percentage points next year. The chemical and machinery industries of Brazil, China, and South Korea would be hit especially hard. The crisis scenario has about a 20% chance of occurring.

Nariman Behravesh, Global Insight, Eddystone, PA

Calendar Of Upcoming Economic Data Releases

Monday	Tuesday	Wednesday	Thursday	Friday
October 11 **Columbus Day**	**12** Weekly Store Sales	**13**	**14** Trade Balance (Aug) Import/Export Prices (Sep) Weekly Jobless Claims Factors Affecting Monetary Reserves	**15** Retail Sales (Sep) Producer Price Index (Sep) Industrial Production (Sep) Consumer Sentiment (Univ. of Michigan, preliminary) Empire State Mfg. Survey (Oct) Business Inventories (Aug) Consumer Sentiment (preliminary, University of Michigan, Sep)
18 NAHB Survey (Oct) Treasury budget (Sep)	**19** Consumer Price Index (Sep) Housing Starts (Sep) Weekly Store Sales	**20**	**21** Leading Economic Indicators (Sep) Philadelphia Fed Survey (Oct)	**22**
25 Existing Home Sales (Sep)	**26** Consumer Confidence (Conference Board, Oct) Weekly Store Sales	**27** Durable Goods (Sep) New Home Sales (Aug) Fed's Beige Book	**28** Help Wanted Index (Sep) Weekly Jobless Claims Factors Affecting Monetary Reserves	**29** GDP (Q3-advanced) Employment cost Index (Q3) Consumer Sentiment (Oct, University of Michigan, final) CAPM Survey (Oct)
November 1 Personal Income & PCE (Sep) ISM Manufacturing Survey (Oct) Construction spending (Sep)	**2** Weekly Store Sales	**3** Factory Orders (Sep) ISM Non-manufacturing Index (Oct) Motor Vehicle Sales (Oct)	**4** Chain Store Sales (Oct) Productivity and Costs (Q3 – preliminary) Weekly Jobless Claims Factors Affecting Monetary Reserves	**5** Employment (Oct) Consumer Credit (Sep)
8	**9** Wholesale Inventories (Sep) Weekly Store Sales	**10** **FOMC Meeting** Export/Import Prices (Oct) Trade Balance (Sep)	**11** Veteran's Day	**12** Retail Sales (Oct) Business Inventories (Sep) Consumer Sentiment (Nov-preliminary, Univ. of Michigan) FOMC Minutes (Sep 21st Meeting) Weekly Jobless Claims Factors Affecting Monetary Reserves
15 Empire State Mfg. Survey (Nov) Treasury Budget (Oct)	**16** Producer Price Index (Oct) NAHB Survey (Nov) Weekly Store Sales	**17** Consumer Price Index (Oct) Housing Starts (Oct) Industrial Production (Oct)	**18** Leading Indicators (Oct) Philadelphia Fed Survey (Nov) Weekly Jobless Claims Factors Affecting Monetary Reserves	**19**

EXPLANATORY NOTES

For 28 years, ***Blue Chip Economic Indicators'*** monthly survey of leading business economists has provided private and public sector decision-makers timely and accurate forecasts of U.S. economic growth, inflation and a host of other critical indicators of business activity. The newsletter utilizes a standardized format that provides a fast read on the prevailing economic outlook. The survey is conducted over two days, generally beginning on the first working day of each month. Forecasts of U.S. economic activity are collected from more than 50 leading business economists each month. The newsletter is generally finished on the third day following completion of the survey and delivered to subscribers via e-mail or first class mail.

The hallmark of ***Blue Chip Economic Indicators*** is its *consensus forecasts*. Numerous studies have shown that by averaging the opinions of many experts, the resulting consensus forecasts tend to be more accurate over time than those of any single forecaster.

Annual Forecasts On pages 2 and 3 of the newsletter are individual and consensus forecasts of U.S. economic performance for this year and next. The names of the institutions that contribute forecasts to these pages are listed on the left of the page. They are ranked from top to bottom based on how fast they expect the U.S. economy to expand in the current year. Some of these institutions have an asterisk (*) after their names. The asterisk denotes former winners of the Annual Blue Chip Forecasting Award. Two asterisks (**) denotes two-time winners.

Across the top of pages 2 and 3 is a list of the variables for which the individual cooperators have provided forecasts. Definitions and organizations that issue estimates for these variables are found at the bottom of page 3. For columns 1-9, the forecasts are for the year-over-year percent change in each variable. Columns 10-12 represent average percentage levels of the year in question. Column 15 is an inflation-adjusted dollar level, measured in billions of chained 2000 dollars. High and low forecasts from the panel members for each variable are denoted with an "H" or "L".

Immediately below the forecasts of the individual contributors are this month's consensus forecasts. The consensus is derived by averaging our panel members' forecasts for each variable. Below the consensus forecasts are averages of this month's ten highest and ten lowest forecasts for each variable. Below them are last month's consensus forecasts. To put the forecasts in context, we include four years of historical data for each variable at the bottom of page 2. Please note that these figures can change due to government revisions of previously released estimates. Below the historical data are the number of forecasts changed from a month ago for each variable, the median forecast for each variable and a diffusion index. The diffusion index serves as a leading indicator of future changes in the consensus forecast. A reading above 50% hints of future increases in the consensus; a reading below 50% hints of future declines. The diffusion index is calculated by adding to the number of forecasters who raised their forecasts for a particular variable this month, half the number of those who left their forecasts unchanged, then dividing the sum by the total number of those contributing forecasts.

Historical Annual Consensus Forecasts Page 4 contains the forecasts from previous issues for the current and subsequent year so that subscribers can see how the outlook has changed over time. Each issue also includes graphs and analysis focusing on noteworthy changes and trends in the consensus outlook.

Quarterly Forecasts Page 5 contains quarterly historical data and consensus forecasts of the U.S. economy's performance. For columns 1-7, the forecasts are for the quarter-over-quarter, seasonally-adjusted, annualized percent change in each variable. Columns 8-10 represent average percentage levels for the quarter in question. Columns 11 and 12 represent seasonally-adjusted, annualized levels for the quarter, measured in billions of inflation-adjusted dollars. As is the case on pages 2-3, the consensus quarterly forecasts on the top half of page 5 are simple averages of our contributors' forecasts. The high-10 and low-10 forecasts are averages of the 10 highest and 10 lowest forecasts for each variable. At the bottom of page 5 are additional quarterly consensus forecasts for Real GDP, GDP Price Index, Industrial Production and Consumer Price Index. These figures are produced by taking the annualized quarterly consensus forecasts found on the top of page 5 and computing a quarterly dollar value for Real GDP, and average quarterly index levels for the GDP Price Index, Industrial Production and the Consumer Price Index. We then compute a year-over-year percentage change between the relevant quarter and the corresponding quarter of the previous year.

International Forecasts Pages 6-7 contain historical data and consensus forecasts of five key economic variables for 15 of the U.S.'s largest trading partners. A list of the institutions contributing forecasts to these pages can be found at the bottom of page 7. Columns 1 and 2 are forecasts of the year-over-year percent change in inflation-adjusted economic growth and consumer price inflation for this year and next. Column 3 is each nation's estimated current account surplus or deficit, reported in billions of current U.S. dollars. Column 4 is the estimated value of each nation's currency versus the U.S. dollar at the end of this year and next. Column 5 is the estimated level of interest rates on 3-month interest rates in each nation at the end of this year and next. Immediately below this month's consensus and the highest and lowest estimates for each variable are last month's forecasts and a limited amount of historical data. The historical data may change from month-to-month due to government revisions.

Special Questions On page 14, we report on panel members' answers to our special questions. Individuals' responses to the special questions are never displayed, only consensus, top-10 and bottom-10 results. *In March and October, we publish our semi-annual, long-range surveys.* In addition to our usual forecasts for this year and next, the semiannual, long-range survey results provide subscribers with consensus forecasts of all the variables found on pages 2 and 3 for the each of the following five years, plus an average for the five-year period after that.

Blue Chip Econometric Detail With the March, June, September and December issues, subscribers also receive a four-page quarterly supplement entitled *Blue Chip Econometric Detail.* The supplement contains forecasts of an expanded list of economic and financial variables that are derived from the consensus forecasts found in *Blue Chip Economic Indicators.* Macroeconomic Advisers, LLC of St. Louis, Missouri produces this forecast detail based on a simulation of its econometric model of the U.S. economy.

*Should you have questions about the contents, or methods used to produce **Blue Chip Economic Indicators**, please contact Randell Moore at (816) 931-0131 or email him at randell.moore@aspenpublishers.com.*

Record Request DTE-1 (Tr. 1, at 66)

Please provide the date that the Fall Update of the Henwood Forecast will be available.

Response

The 2004 Fall Henwood Forecast will be available on October 29, 2004.

Record Request DTE-2 (Tr. 1, at 69-70)

Please refer to Exhibit DTE-2-23. Please provide a derivation of the number that appears in Cell U-31 of the exhibit.

Response

Cell U31 in Attachment AG-15(a) **CONFIDENTIAL**, worksheet OSP1 and OSP2 is 9.83 percent. This number is the 1995 benchmark return on equity shown on cell F281 on the worksheet OSP1 and worksheet OSP2. It has no effect on Mr. Hevert's valuation in Exhibit NSTAR-RBH-6 **CONFIDENTIAL**.

Record Request DTE-3 (Tr. 1, at 71)

Please refer to Exhibit DTE-2-6 (a). Please explain how the value in cell E2 (2.35 percent) is derived and Mr. Hevert's rationale for choosing the years to average to derive an inflation estimate.

Response

The 2.35% average is based on the approximate average of all remaining contract years (i.e., through 2011) for which Blue Chip provides a consensus forecast. The data and resulting average are presented in the table below:

Consumer Price Index - Blue Chip Indicators- March Consensus						
2006	2007	2008	2009	2010	5-year Average: 2011 2015	Average
2.2	2.3	2.3	2.4	2.4	2.5	2.35

Record Request DTE-5 (Tr. 1, at 105, 108-109)

Please refer to Exhibit DTE-2-14 **CONFIDENTIAL.**

(a) Please perform a numerical analysis which derives: (1) the Company's allocation of its Gas Layoff Credit to OSP 1 and OSP 2; and (2) the projected per-unit Gas Layoff Credit, independently, and as a function of each other.

(b) Please recalculate the average per-unit Gas Layoff Credit using the figures presented in Exhibit AG-1-12 (Supp). To the extent that the average per-unit Gas Layoff Credit changes, please explain the effect of such changes on the Company's analysis of the savings.

Response

REDACTED RESPONSE

a) As noted on Exhibit NSTAR-RBH-6 **(CONFIDENTIAL)**, pages 2 and 3 of 5, the projected 2004 gas layoff credit is **[REDACTED]** for OSP 1 and OSP, respectively (i.e., **[REDACTED]** in aggregate). The projected 2004 total pipeline demand rates and associated cost of unused capacity for the respective OSP 1 and OSP 2 units are as follows:[1]

Unit	Capacity (Mcf/Day)	2004 Demand Rate (Mcf/Day)	Days	Unused Capacity at 70 percent	Total Demand Charges of unused capacity
OSP 1	50,000	**[REDACTED]**	365	35,000	**[REDACTED]**
OSP 2	25,000	**[REDACTED]**	365	17,500	**[REDACTED]**
OSP 2	25,000	**[REDACTED]**	365	17,500	**[REDACTED]**
					[REDACTED]

Since the aggregate 2004 Gas Layoff Credit of **[REDACTED]** represents approximately **[REDACTED]** percent of the cost of unused pipeline capacity (**[REDACTED]**), CEA believes the Layoff Credit assumptions are reasonable.

[1] See Attachment AG-15(a) **(CONFIDENTIAL)** OSP1, row 347 and OSP2, row 347 and 362.

b) Based on Exhibit AG-1-12 (Supp), the three-year average (2001-2003) Gas Layoff Credit associated with Unit 1 is approximately **[REDACTED]**. Even though that amount is lower than the average based on the data in the original Exhibit AG-1-12, based on the calculation provided, CEA did not decrease the projected Gas Layoff Credit (which would have had the effect of increasing projected contract costs).

Record Request DTE-6 (Tr. 1, at 153-154)

Please provide a copy of the Fall Update of the Henwood Forecast when it becomes available. Please re-run the following schedules using the data from the Fall Update: (1) Exhibits NSTAR-BEC-GOL-2 through 8, as necessary; (2) Exhibit NSTAR-RBH-5; and (3) Exhibit NSTAR-RBH-6.

Response

As indicated in the response to Record Request DTE-1, the Fall Henwood Forecast will become available on October 29, 2004. The Companies will supplement this response with a copy of the forecast and the requested schedules as quickly as possible after receipt of the forecast.