Long-Range Consensus U.S. Economic Projections

The table below shows the latest U.S. Blue Chip Consensus[1] projections by years for 2007 through 2011, an average for the five-year period 2007-2011, and an average for the next five-year period 2012-2016. 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 2007	2008	2009	2010	2011	Five-Year Averages 2007-11	2012-16
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2000 dollars)	CONSENSUS	3.2	3.0	3.2	3.4	3.3	3.2	3.2
	Top 10 Avg.	3.6	3.7	3.6	4.3	3.8	3.8	3.5
	Bottom 10 Avg.	2.5	1.8	2.4	3.0	2.9	2.5	2.9
2. GDP Chained Price Index	CONSENSUS	2.1	2.2	2.1	2.1	2.2	2.1	2.2
	Top 10 Avg.	2.6	2.8	2.6	2.7	2.7	2.7	2.8
	Bottom 10 Avg.	1.6	1.6	1.5	1.6	1.6	1.6	1.7
3. Nominal GDP (current dollars)	CONSENSUS	5.3	5.2	5.2	5.4	5.4	5.3	5.3
	Top 10 Avg.	6.1	6.3	6.1	6.5	6.1	6.2	6.0
	Bottom 10 Avg.	4.4	3.5	3.7	4.4	4.4	4.1	4.6
4. Consumer Price Index (for all urban consumers)	CONSENSUS	2.4	2.5	2.4	2.4	2.4	2.4	2.5
	Top 10 Avg.	3.0	3.1	2.9	2.9	3.0	3.0	3.1
	Bottom 10 Avg.	1.8	1.9	1.9	1.8	1.8	1.9	2.0
5. Industrial Production (total)	CONSENSUS	3.7	3.4	3.5	3.9	3.6	3.6	3.5
	Top 10 Avg.	4.6	4.4	4.0	5.3	4.4	4.5	4.0
	Bottom 10 Avg.	2.7	1.3	2.4	2.9	2.9	2.4	3.0
6. Disposable Personal Income (chained, 2000 dollars)	CONSENSUS	3.3	3.1	3.1	3.4	3.2	3.2	3.2
	Top 10 Avg.	4.1	4.2	4.0	4.3	3.9	4.1	3.8
	Bottom 10 Avg.	2.5	1.9	2.4	2.8	2.6	2.4	2.8
7. Personal Consumption Expenditures (chained, 2000 dollars)	CONSENSUS	2.9	2.8	2.9	3.1	3.0	2.9	3.0
	Top 10 Avg.	3.5	3.4	3.4	4.0	3.6	3.6	3.4
	Bottom 10 Avg.	2.2	1.7	2.1	2.4	2.3	2.1	2.4
8. Non-Residential Fixed Investment (chained, 2000 dollars)	CONSENSUS	5.4	4.7	4.7	5.3	5.2	5.1	4.8
	Top 10 Avg.	7.6	7.7	7.4	8.0	7.7	7.7	7.2
	Bottom 10 Avg.	3.0	0.9	1.2	3.4	3.2	2.3	3.4
9. Corporate Profits, Pretax (current dollars)	CONSENSUS	5.5	5.2	5.1	6.4	6.7	5.8	6.3
	Top 10 Avg.	8.6	9.2	8.3	10.9	10.1	9.4	8.3
	Bottom 10 Avg.	2.4	-0.2	0.0	2.3	4.8	1.8	5.1
		Annual Average						
10. Treasury Bills, 3-Month (percent per annum)	CONSENSUS	4.4	4.2	4.1	4.2	4.3	4.2	4.4
	Top 10 Avg.	5.3	5.2	5.2	5.3	5.3	5.2	5.3
	Bottom 10 Avg.	3.6	3.3	2.7	3.3	3.6	3.3	3.6
11. Treasury Notes, 10-Year (yield per annum)	CONSENSUS	5.5	5.5	5.5	5.5	5.6	5.5	5.6
	Top 10 Avg.	6.1	6.3	6.5	6.5	6.5	6.4	6.6
	Bottom 10 Avg.	4.9	4.6	4.3	4.4	4.8	4.6	4.8
12. Unemployment Rate (% of civilian labor force)	CONSENSUS	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	Top 10 Avg.	5.4	5.5	5.8	5.7	5.5	5.6	5.6
	Bottom 10 Avg.	4.5	4.5	4.4	4.5	4.5	4.5	4.4
		Total Units, Millions						
13. Housing Starts (millions of units)	CONSENSUS	1.72	1.69	1.71	1.75	1.74	1.72	1.75
	Top 10 Avg.	1.85	1.87	1.88	1.93	1.91	1.89	1.99
	Bottom 10 Avg.	1.59	1.52	1.56	1.60	1.57	1.57	1.55
14. Total Auto & Truck Sales (millions of units)	CONSENSUS	17.1	17.2	17.4	17.5	17.6	17.4	17.8
	Top 10 Avg.	17.8	18.1	18.3	18.5	18.6	18.3	19.1
	Bottom 10 Avg.	16.2	16.1	16.4	16.5	16.5	16.4	16.5
		Billions of Chained, 2000 Dollars						
15. Net Exports (billions of chained, 2000 dollars)	CONSENSUS	-550.3	-517.6	-485.5	-468.2	-455.7	-495.5	-427.4
	Top 10 Avg.	-469.2	-422.8	-339.2	-303.5	-260.0	-358.9	-201.9
	Bottom 10 Avg.	-648.4	-638.2	-628.3	-635.9	-636.4	-637.4	-639.0

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 2007	2008	2009	2010	2011	Five-Year Averages 2007-11	2012-16
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2000 dollars)	**CONSENSUS**	**3.2**	**3.0**	**3.2**	**3.4**	**3.3**	**3.2**	**3.2**
	Bush Admin.[1,3]	3.3	3.2	3.1	3.1	na	3.2	na
	CBO[2,3]	3.7	3.4	3.1	2.9	2.8	3.2	2.6
2. GDP Chained Price Index	**CONSENSUS**	**2.1**	**2.2**	**2.1**	**2.1**	**2.2**	**2.1**	**2.2**
	Bush Admin.[1,3]	2.1	2.1	2.1	2.1	na	2.1	na
	CBO[2,3]	1.7	1.8	1.8	1.8	1.8	1.8	1.8
3. Nominal GDP (current dollars)	**CONSENSUS**	**5.3**	**5.2**	**5.2**	**5.4**	**5.4**	**5.3**	**5.3**
	Bush Admin.[1,3]	5.5	5.4	5.3	5.3	na	5.4	na
	CBO[2,3]	5.4	5.2	5.0	4.8	4.6	4.5	4.5
4. Consumer Price Index (for all urban consumers)	**CONSENSUS**	**2.4**	**2.5**	**2.4**	**2.4**	**2.4**	**2.4**	**2.5**
	Bush Admin.[1,3]	2.4	2.4	2.4	2.4	na	2.4	na
	CBO[2,3]	2.1	2.2	2.2	2.2	2.2	2.2	2.2
		Annual Average						
5. Treasury Bills, 3-Month (percent per annum)	**CONSENSUS**	**4.4**	**4.2**	**4.1**	**4.2**	**4.3**	**4.2**	**4.4**
	Bush Admin.[1,3]	3.8	4.0	4.1	4.2	na	4.0	na
	CBO[2,3]	4.6	4.6	4.6	4.6	4.6	4.6	4.6
6. Treasury Notes, 10-Year (yield per annum)	**CONSENSUS**	**5.5**	**5.5**	**5.5**	**5.5**	**5.6**	**5.5**	**5.6**
	Bush Admin.[1,3]	5.4	5.5	5.6	5.6	na	5.5	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**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**
	Bush Admin.[1,3]	5.1	5.1	5.1	5.1	na	5.1	na
	CBO[2,3]	5.2	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 October 2004[4].

ECONOMIC VARIABLE		YEAR 2007	2008	2009	2010	2011	Five-Year Averages 2007-11	2012-16
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2000 dollars)	**March Consensus**	**3.2**	**3.0**	**3.2**	**3.4**	**3.3**	**3.2**	**3.2**
	October Consensus	3.2	3.2	3.1	3.3	na	na	na
2. GDP Chained Price Index	**March Consensus**	**2.1**	**2.2**	**2.1**	**2.1**	**2.2**	**2.1**	**2.2**
	October Consensus	2.1	2.1	2.1	2.1	na	na	na
3. Nominal GDP (current dollars)	**March Consensus**	**5.3**	**5.2**	**5.2**	**5.4**	**5.4**	**5.3**	**5.3**
	October Consensus	5.4	5.4	5.3	5.5	na	na	na
4. Consumer Price Index (for all urban consumers)	**March Consensus**	**2.4**	**2.5**	**2.4**	**2.4**	**2.4**	**2.4**	**2.5**
	October Consensus	2.4	2.4	2.4	2.4	na	na	na
		Annual Average						
5. Treasury Bills, 3-Month (percent per annum)	**March Consensus**	**4.4**	**4.2**	**4.1**	**4.2**	**4.3**	**4.2**	**4.4**
	October Consensus	4.1	4.3	4.2	4.2	na	na	na
6. Treasury Notes, 10-Year (yield per annum)	**March Consensus**	**5.5**	**5.5**	**5.5**	**5.5**	**5.6**	**5.5**	**5.6**
	October Consensus	5.6	5.6	5.6	5.6	na	na	na
Unemployment Rate (% of civilian labor force)	**March Consensus**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**
	October Consensus	5.1	5.1	5.1	5.1	na	na	na

[1] *Budget of the United States Government, Fiscal Year 2006,* Office of Management and Budget, February 2005. [2] *The Budget and Economic Outlook: Fiscal Years 2006-2015;* Congressional Budget Office, January 2005. [3] The Bush Administration's forecast only extends through 2010, so averages for the 2007-2011 period are based on the forecast for the four-year period 2007-2010. CBO's forecast only extends through 2015, so averages for the 2012-2016 period are based on the forecast for the four-year period 2012-2015. [4] *Blue Chip Economic Indicators*, October 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

Firing On All Cylinders

In another closely scrutinized appearance on Capitol Hill, Fed Chairman Alan Greenspan assured that the economy "appears to be expanding at a reasonably good pace." Judging from the latest collection of data, Mr. Greenspan's assessment seems apt, if not a bit too modest. Stronger-than-expected reports from nearly every sector in recent weeks has led us to boost our forecast for first quarter GDP growth to 4.4%, from 4% previously. The upgrading of the outlook owes mainly to signs of stronger investment spending, by both businesses in plant and equipment and by households in residential property. Strengthening job market conditions reinforce the judgment that the expansion is now self-sustaining.

In the most important development of the week, a larger-than-expected 262,000 increase in non-farm payrolls proved a welcome corroboration of growing signs of improving labor conditions from a number of less comprehensive labor market indicators. For instance, in his monetary policy report to Congress, Fed Chairman Greenspan called attention to a report showing that new hires accounted for about 3.5% of total employment in the fourth quarter, the highest share since Q2, 2001. More recently, the number of people filing claims for jobless benefits each week moved markedly lower in late January and has remained below 320,000 since then, with the four-week average slipping to 307,000, the lowest since mid-2000 during the waning days of the 1990s boom. A variety of surveys of businesses showed evidence of net new hiring while surveys of consumers provided the confirming evidence that people perceived that job conditions had improved.

The jump in payrolls in February quieted concerns that the slump in job growth in the previous three months had marked a downshift in the hiring trend. After February's increase, payroll growth has averaged 183,000 over the last three months and 182,000 over the last six. This translates into an annual rate of job growth of about 1.7%. If productivity continues to grow at roughly a 2.5% pace, that rate of employment growth would be consistent with real GDP expanding at a 4% to 4.5% clip.

The industry details from the establishment survey show all major industry groupings added workers in February. As further confirmation of the breadth of the overall employment gains, the diffusion index, reflecting net hiring conditions across 278 private sector industries, rose four points to 57.4, the highest since October, which was the last month to generate a substantial increase in total payrolls.

As expected, construction employment rebounded sharply as a 30,000 increase reflected the resumption of more normal building activity after severe weather conditions in January curtailed activity in some regions. Indeed, the 0.7% increase in construction outlays in January revealed an on-going strong pace of activity even if payrolls were not immediately affected. The service-producing industries added 207,000 workers, including 33,000 in the government sector, most of whom were "education workers" employed by state and local governments. Employment in the private services industries rose 174,000. Job growth was evident throughout that sector, corroborating February's record high reading of the Institute for Supply Management's employment index for nonmanufacturing businesses.

While the underlying fundamentals in the construction and services industries suggest the healthy uptrend in employment should continue, the first job gains in the manufacturing sector in five months may prove more ephemeral. Though manufacturing employment rose 20,000, the diffusion index for manufacturing slipped to an anemic 43.5%, and the payrolls data shows the motor vehicle industry accounted for more than half the increase in manufacturing jobs. With vehicle sales at a lackluster 16.3 million annual rate in February after a disappointing 16.2 million rate in January, some manufacturers announced plans to trim production and furlough workers to prevent a further build-up of dealer inventories. Elsewhere, however, demand for manufactured goods appears to be strong. Despite a 1.3% drop in durable goods orders, which was a larger drop than shown in the "advance" report, a broad-based 1.8% jump in orders (and equivalently, shipments) of nondurable goods lifted total orders for manufactured goods 0.2%, the fifth month without a setback. The exceptional productivity in the manufacturing sector, which grew at a stellar 5.8% rate in the fourth quarter, continues to enable manufacturers to fulfil strong growth in demand with limited additional labor inputs.

While data from the establishment survey looked consistent with most other job market indicators, the smaller household survey held a starkly contrasting picture. Tabulations derived from that survey show that total employment fell 97,000 and that the number of non-agricultural wage and salary workers fell 317,000. The unemployment rate, whose 0.2% drop in January seemed somewhat aberrational, bounced back up to 5.4% in February. Differences in coverage and sampling size, however, make the household survey a less reliable short-term measure of job conditions, but the disparity in the two measures in recent months remains a bit unsettling. Nonetheless, the weight of the recent economic evidence seems to vindicate the policy course the Federal Reserve set last June and has followed since. Stronger economic growth does not appear to be generating much inflation pressure, so the Federal Reserve has little reason to deviate from its current plan of "removing accommodation" at a "measured" pace.

David H. Resler, Nomura Economic Research, New York, NY

Will The Commodity Boom Be Long Lasting?

This is the question that everyone is asking. It has gotten so that clients everywhere are asking about my views on Jim Rogers' book, Hot Commodities, where he predicts that the boom in industrial commodities will last a decade more. Even the customs officer at Toronto's airport asked me what I thought of commodities, which is usually the sign of a market top. It has now hit the mainstream media that commodities are a third asset class, joining stocks and bonds, as primary investment vehicles. CNBC still seems to focus on commodity-related stocks, but it won't be long before the financial media give lessons in how to trade physical commodities in the pits and paper commodities in the futures market. A recent front-page article in the Wall Street Journal noted that investment banks in the U.S. were stampeding to follow the lead of Morgan Stanley and Goldman Sachs in earning billions of dollars in trading physical commodities, particularly energy-related ones. The demand for energy analysts has skyrocketed and so have the inflows into commodity-related investment trusts.

It is at this stage of a bull cycle that 'new paradigms' are created to describe and feed the mania—if that is what it is. This time, the new paradigm is the growth surge in developing economies, which is forecast to continue and even expand over the next 10-to-15 years or so. As this new paradigm goes, growth in the industrial world is relatively unimportant. The developing world accounts for nearly 20% of global GDP in nominal terms and it is growing twice as fast as the developed world. What's more, the emerging world uses roughly two times as much raw materials relative to GDP as the OECD countries, and the developing world countries far outnumber those in the G-7.

Take the oil markets as an example—a favourite of Jim Rogers and most other commodity bulls. The inexorable rise in oil prices has been the direct result of China's voracious appetite for the product. Now representing 12% of global supply, China is the second largest consumer of oil—second only to the U.S. A distant second to the U.S., but China is growing far more rapidly. China is also the world's largest consumer of cement, coal, iron ore, steel and aluminum. The oil intensity of China's growth is twice that of the *(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

OECD countries. India, the second fastest growing economy in the world, is three times more oil intensive. India and China combined represent one-third of the world's population and a growing middle class is emerging in both countries, particularly in China where discretionary spending is a very new phenomenon. Investment spending as a percent of GDP in China is now equivalent to the consumption ratio and it is rising much faster. This means that demand for industrial materials will continue to be strong.

The question is for how long can this rapid pace of emerging world growth continue and what are the prospects for supply of commodities? The distribution of oil reserves is highly concentrated in the Middle East (more than 63%), compared to only 5.5% in North America, the bulk of which is in Canada. Event risk in the Middle East is very high and the U.S. is desirous of reducing its dependency on Middle Eastern oil. With oil prices in the $50-plus per barrel range, expensive oil extraction, such as from the Athabasca tar sands, is now profitable. Energy company profitability in Canada and elsewhere is surging and has been doing so for three years now; hence the outperformance in commodity-heavy stock markets like our own.

In response to this situation, developing countries will attempt to boost domestic output, stockpile, widen supply sources, improve efficiency of commodity usage, and buy foreign resource companies. In addition, they will seek to develop alternative energy sources (or substitutes for many other commodities). We have seen all of this beginning in spades. While some estimate that by 2030, India and China will be importing roughly 80% of their oil demand, compared to about 30% for China today, and 60% for India, no one can estimate with certainty how much these colossi will demand relative to global supply.

While China is the largest net importer of steel, for example, they will continue to add to their steel-making capacity over the next three years. Steel sheet prices have fallen for five months in a row and now stand around 18% below last September's peak price. In the past week, copper posted its worst session in the previous eight weeks, although it is still flirting with 16-year highs. The Baltic Dry Index is rolling over yet again, and threatening to take out its 50-day moving average on the down side—all of this by way of commenting that these are very volatile markets and not for the faint of heart.

The CRB futures index is at a 24-year high and soft commodities (such as cocoa, coffee, orange juice and sugar) are skyrocketing in price—although grains and oilseeds have plummeted from last year's highs. And, the Canadian dollar has underperformed in spite of the last bout of commodity price gains. Interestingly, developing country stock markets appear to have had the strongest gains in recent years, at least in a nonweighted aggregate, as G-7 stock markets, including the TSX, remain well below their 2000 peaks.

I cannot refute the rapid rise in China's and India's demand for most commodities. Nor do I suggest that they will not play a crucial role in commodity-price determination over coming decades. What I am uncertain about is the stability of their growth trajectory (remember the 1997-98 Asian Crisis), the development of alternative energy sources, the rise in their domestic production and the supply of commodities worldwide. Nothing delivers increased supply better than a rise in prices that is believed to be sustainable. Many commodity producers don't yet believe that prices will remain high, so excess demand in some sectors might continue for some time yet. Moreover, markets overextend and new paradigms often last far longer than the bears could imagine. In that respect, we might only be in the third or fourth inning of this commodity boom. But the U.S. is still the largest economy in the world, and the number one consumer of oil. U.S. growth has slowed a bit from the average pace of the past two years. With the Fed tightening, a boom-type expansion in the next few years is unlikely. Jim Rogers believes that physical commodities are the place to be, and maybe even the only place. I haven't yet been convinced that he is correct.

Sherry Cooper, BMO Nesbitt Burns, Toronto, Canada

U.S. Pipeline Inflation Pressure Is Brewing

The tame Consumer Price Index report for January was certainly a relief. But, the January trade price and Producer Price Index data reveal considerable pipeline inflation pressure that should remain in place through at least the first half of 2005. The risk is that any upside surprises in the CPI report over the coming months will prompt the Fed to adopt a more aggressive rhetorical tone that will continue to push back talk of a "pause" in the tightening trajectory.

The dollar has fallen steadily over the last three years from the all-time high set in February of 2002. Import prices have trended higher in response. Expected dollar weakness through the second half of 2005 will aggravate the outlook for import price inflation. Fed Chairman Alan Greenspan in recent Congressional testimony indicated that "...although the dollar has been declining since early 2002, exporters to the United States apparently have held dollar prices relatively steady to preserve their market share, effectively choosing to absorb the decline in the dollar by accepting a reduction in their profit margins. However, the recent somewhat quickened pace of increases in U.S. import prices suggests that profit margins of exporters to the United States have contracted to the point where the foreign shippers may exhibit only limited tolerance for additional reductions in margins should the dollar decline further."

Specifically, import prices from Asia have been surprisingly subdued despite the sharp appreciation of currencies in this region. However, the huge gap between the currency and import prices that has evolved over the past three years may indeed have reached their limit.

The January PPI report was significant for several reasons. It marked the sixth straight month that core inflation has been well above its three-year average. The January spike appears to also signal a new willingness of producers to "pass on" price pressures to buyers following several years of limited pricing power. The January data also sustained a strong uptrend in the y/y figures for crude, intermediate, and finish goods prices. The difference between y/y growth in intermediate and finished goods inflation is, shockingly, at the highest rate seen since the 1973-1975 OPEC oil embargo, which is generally viewed as one of the largest "exogenous" cost-push inflation shocks in U.S. history.

Similarly, the January CPI "core" inflation data have also kept a strong y/y uptrend intact that is tracking the strength in wholesale inflation. Note that in both the inflation acceleration in 1994-1995 and in 1998-1999, wholesale inflation generally rose to the pace of retail inflation before subsiding. But, in this cycle, we have seen a much stronger upswing for wholesale inflation with wholesale inflation now well above retail inflation.

Another way of looking at the core PPI and CPI inflation data is to look at the different as a gauge of pipeline pressure. This gap is sitting at its highest level since August of 1978.

In total, inflation pressure in the pipeline, from rising prices for imported goods, to rising wholesale prices and retail prices, is signaling considerable risk for the 2005 inflation outlook. This mounting evidence of upside inflation risk should keep the Fed on alert through at least the first half of 2005. Given this strength and the lags in inflation relative to growth, the Fed may see little opportunity for a pause in tightening in the second half of the year.

Rick MacDonald, Action Economics, Boulder, CO

Calendar Of Upcoming Economic Data Releases

Monday	Tuesday	Wednesday	Thursday	Friday
March 7 Consumer Credit (Jan)	**8** Weekly Store Sales	**9** Fed's Beige Book Mortgage Applications	**10** Wholesale Trade (Jan) Treasury Budget (Feb) Weekly Jobless Claims Factors Affecting Monetary Reserves	**11** U.S. Trade (Jan) Bank Credit (Feb)
14	**15** Retail Sales (Feb) Empire State Index (Mar) Business Inventories (Jan) NAHB Housing Market Index (Mar) Treasury International Capital Flows (Jan) Weekly Store Sales	**16** Housing Starts (Feb) Industrial Production (Feb) Current Account (Q4) Mortgage Applications	**17** Leading Economic Indicators (Feb) Philadelphia Fed Index (Mar) Weekly Jobless Claims Factors Affecting Monetary Reserves	**18** Consumer Sentiment (University of Michigan, Feb, preliminary, Mar) Import Prices (Jan)
21	**22** **FOMC Meeting** Producer Price Index (Feb) Consumer Confidence (Feb) Weekly Store Sales	**23** Consumer Price Index (Feb) Existing Home Sales (Feb) Mortgage Applications	**24** Durable Goods Orders (Feb) New Home Sales (Feb) Weekly Jobless Claims Factors Affecting Monetary Reserves	**25** **Good Friday** **All U.S. Markets Closed**
28	**29** Consumer Confidence (Conference Board, Mar) Weekly Store Sales	**30** GDP (Final, Q4) Corporate Profits (Final, Q4) Agricultural Prices (Mar) Mortgage Applications	**31** Personal Income & Consumption (Feb) Chicago PMI (Mar) Factory Orders (Feb) Weekly Jobless Claims Factors Affecting Monetary Reserves	**April 1** Employment Report (Mar) ISM (Manufacturing, Mar) Construction Spending (Feb) Unit Vehicle Sales (Mar) Sales Consumer Sentiment (University of Michigan, Mar)
4	**5** ISM (Non-Manufacturing, Mar) Challenger (Mar) Weekly Store Sales	**6** Mortgage Applications	**7** Wholesale Trade (Feb) Consumer Credit (Feb) Weekly Jobless Claims Factors Affecting Monetary Reserves	**8**
11	**12** U.S. Trade (Feb) Treasury Budget (Mar) FOMC Minutes for March 22nd meeting Weekly Store Sales	**13** Retail Sales (Mar)	**14** Business Inventories (Feb) Weekly Jobless Claims Factors Affecting Monetary Reserves	**15** Industrial Production (Mar) Trade Prices (Mar) Empire State Index (Apr) Consumer Sentiment (Univ. of Michigan, preliminary, Apr) Bank Credit (Mar)

EXPLANATORY NOTES

For 30 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.

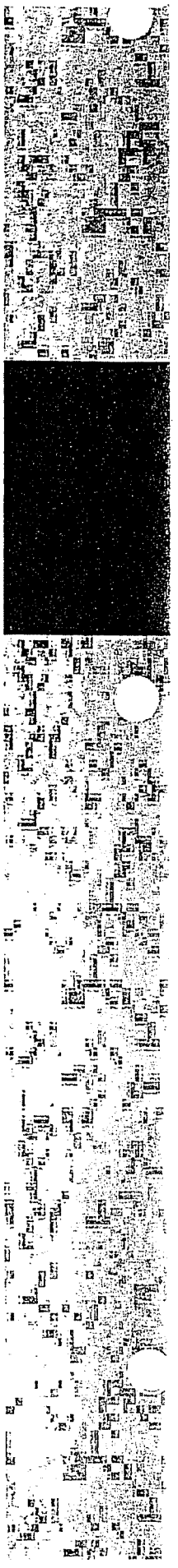
Quarterly Forecasts Page 5 contains quarterly historical data and consensus forecasts of the U.S. economy's performance. For columns 1-7, the forecasts are for the quarter-over-quarter, seasonally-adjusted, annualized percent change in each variable. Columns 8-10 represent average percentage levels for 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.



KENTUCKY POWER COMPANY
American Electric Power
ATTORNEY GENERALS FIRST SET
DATA REQUEST
Case No. 2005-00341

Item No. 218

With reference to page 25, lines 20-23, and Appendix E, please: (a) list all regulatory cases (by name, docket number, and filing date) in which Mr. Moul has provided rate of return testimony and proposed his market value - book value adjustment; (b) indicate all cases (by name, docket number, and date), other than those cited, in which a regulatory commission has adopted Mr. Moul's market value - book value adjustment in arriving at an overall rate of return; and (c) provide copies of the 'Rate of Return' section of the Commission's decisions for all cases in which a regulatory commission has adopted the adjustment.

Response

a) The first testimony that Mr. Moul offered where he compared the financial risk of the market capitalization to the book capitalization was Appalachian Power Company (Case No. PUE960301). He has proposed this adjustment in all subsequent cases where it was warranted. It should be noted that the question mischaracterizes Mr. Moul's adjustment because it is not a "market value-book value" adjustment. As further clarification, Mr. Moul pioneered the recognition of the risk attributes related to the market capitalization and the book capitalization and its impact on the rate of return on common equity. His analysis is based upon standard financial theory that links the required return to the amount of borrowed funds in a firm's capitalization. Comparison of the market capitalization to book capitalization is no different than comparing alternative capital structure using market capitalization from which standard financial risk variations have been developed.

b) and c) Please refer to the attachment to the response to KIUC 1-4.

Witness: Paul R. Moul

KENTUCKY POWER COMPANY
American Electric Power
ATTORNEY GENERALS FIRST SET
DATA REQUEST
Case No. 2005-00341

Item No. 219

With reference to page 30, lines 1-14, and Appendix E, please (a) provide copies of the pages from Modigliani and Miller's original published research that support the formulation used to adjust the DCF equity cost rate; and (b) indicate exactly (by page and line numbers) where in these publications these authors prescribe this market value - book value adjustment for rate of return and rate making purposes.

Response

a) There is no reference to the DCF cost rate in those articles attached to the response. The Miller and Modigliani articles indicates that increases in the level of a firm's debt capital increases its financial risk, necessitating an increase in the cost of equity. Mr. Moul has applied that basic theory to properly account for the fact that the capital structure used for ratesetting purposes has a higher percentage of debt than does the market capitalization of the companies he used to develop his recommended return on equity. It is the variation between the book value and market capitalizations that is important to the cost of capital issue in this case. Hence, the variation in the financial risk associated with alternative capital structures is the issue that was addressed by Mr. Moul. For example, the change in the cost of equity can be calculated with alternative capital structures associated with the market capitalization, without regard to book value. Similarly, if the market capitalization changed in such a way that its capitalization aligned with the book value, then the capital costs could be calculated at various degrees of financial risk associated with the market capitalization. In the circumstances presented in this case, however, the proportion of book value versus market capitalization, and corresponding impact on return can and should be made for the same reasons.

Further, this is a three step process, the first and third steps having multiple parts. In step one, the DCF cost of equity is calculated using the market price of stock and the capital structure ratios are computed from the market capitalization of both the debt and equity of a firm. In step two, a completely unlevered cost of equity is calculated, as if the firm were 100% equity financed. In the third step, a relevered cost of equity is calculated with the capital structure determined from the book value capitalization. Indeed, after the cost of equity has been unlevered

Witness: Paul R. Moul

KENTUCKY POWER COMPANY
American Electric Power
ATTORNEY GENERALS FIRST SET
DATA REQUEST
Case No. 2005-00341

so that the cost of equity relates to a firm with 100% equity, it can be relevered with any proportions of debt and equity in the capital structure. In summary, Mr. Moul employed the theories employed by Miller and Modigliani in the context of substituting book value capitalization (the basis of ratesetting) for the market capitalization, which necessitates an increase in the cost of equity to account for the associated increase in financial risk.

b) It is a mischaracterization of Mr. Moul's testimony to claim that his adjustment is market value-book value adjustment because this infers there is some form of transformation of the DCF return that is involved, which is incorrect.

THE COST OF CAPITAL, CORPORATION FINANCE AND THE THEORY OF INVESTMENT

FRANCO MODIGLIANI AND MERTON H. MILLER[1]

WHAT IS THE "cost of capital" to a firm in a world in which funds are used to acquire assets whose yields are uncertain; and in which capital can be obtained by many different media, ranging from pure debt instruments, representing money-fixed claims, to pure equity issues, giving holders only the right to a pro-rata share in the uncertain venture? This question has vexed at least three classes of economists: (1) the corporation finance specialist concerned with the techniques of financing firms so as to ensure their survival and growth; (2) the managerial economist concerned with capital budgeting; and (3) the economic theorist concerned with explaining investment behavior at both the micro and macro levels.[1]

[1] The authors are, respectively, professor and associate professor of economics in the Graduate School of Industrial Administration, Carnegie Institute of Technology. This article is a revised version of a paper delivered at the anual meeting of the Econometric Society, December 1956. The authors express thanks for the comments and suggestions made at that time by the discussants of the paper, Evsey Domar, Robert Eisner and John Lintner, and subsequently by James Duesenberry. They are also greatly indebted to many of their present and former colleagues and students at Carnegie Tech who served so often and with such remarkable patience as a critical forum for the ideas here presented.

[2] The literature bearing on the cost-of-capital problem is far too extensive for listing here. Numerous references to it will be found throughout the paper though we make no claim to completeness. One phase of the problem which we do not consider explicitly, but which has a considerable literature of its own is the relation between the cost of capital and public utility rates. For a recent summary of the "cost-of-capital theory" of rate regu-

In much of his formal analysis, the economic theorist at least has tended to side-step the essence of this cost-of-capital problem by proceeding as though physical assets—like bonds—could be regarded as yielding known, sure streams. Given this assumption, the theorist has concluded that the cost of capital to the owners of a firm is simply the rate of interest on bonds; and has derived the familiar proposition that the firm, acting rationally, will tend to push investment to the point where the marginal yield on physical assets is equal to the market rate of interest.[2] This proposition can be shown to follow from either of two criteria of rational decision-making which are equivalent under certainty, namely (1) the maximization of profits and (2) the maximization of market value.

According to the first criterion, a physical asset is worth acquiring if it will increase the net profit of the owners of the firm. But net profit will increase only if the expected rate of return, or yield, of the asset exceeds the rate of interest. According to the second criterion, an asset is worth acquiring if it increases the value of the owners' equity, *i.e.*, if it adds more to the market value of the firm than the costs of acquisition. But what the asset adds is given by capitalizing the stream it generates at the market rate of interest, and this

[2] Or, more accurately, to the marginal cost of borrowed funds since it is customary, at least in advanced analysis, to draw the supply curve of borrowed funds to the firm as a rising one. For an

capitalized value will exceed its cost if and only if the yield of the asset exceeds the rate of interest. Note that, under either formulation, the cost of capital is equal to the rate of interest on bonds, regardless of whether the funds are acquired through debt instruments or through new issues of common stock. Indeed, in a world of sure returns, the distinction between debt and equity funds reduces largely to one of terminology.

It must be acknowledged that some attempt is usually made in this type of analysis to allow for the existence of uncertainty. This attempt typically takes the form of superimposing on the results of the certainty analysis the notion of a "risk discount" to be subtracted from the expected yield (or a "risk premium" to be added to the market rate of interest). Investment decisions are then supposed to be based on a comparison of this "risk adjusted" or "certainty equivalent" yield with the market rate of interest.[3] No satisfactory explanation has yet been provided, however, as to what determines the size of the risk discount and how it varies in response to changes in other variables.

Considered as a convenient approximation, the model of the firm constructed via this certainty—or certainty-equivalent — approach has admittedly been useful in dealing with some of the grosser aspects of the processes of capital accumulation and economic fluctuations. Such a model underlies, for example, the familiar Keynesian aggregate investment function in which aggregate investment is written as a function of the rate of interest—the same riskless rate of interest which appears later in the system in the liquidity-preference equation. Yet few would maintain that this approximation is adequate. At the macroeconomic level there are ample grounds for doubting that the rate of interest has as large and as direct an influence on the rate of investment as this analysis would lead us to believe. At the microeconomic level the certainty model has little descriptive value and provides no real guidance to the finance specialist or managerial economist whose main problems cannot be treated in a framework which deals so cavalierly with uncertainty and ignores all forms of financing other than debt issues.[4]

Only recently have economists begun to face up seriously to the problem of the cost of capital *cum* risk. In the process they have found their interests and endeavors merging with those of the finance specialist and the managerial economist who have lived with the problem longer and more intimately. In this joint search to establish the principles which govern rational investment and financial policy in a world of uncertainty two main lines of attack can be discerned. These lines represent, in effect, attempts to extrapolate to the world of uncertainty each of the two criteria—profit maximization and market value maximization—which were seen to have equivalent implications in the special case of certainty. With the recognition of uncertainty this equivalence vanishes. In fact, the profit maxi-

[3] The classic examples of the certainty-equivalent approach are found in J. R. Hicks [11] and O.

[4] Those who have taken a "case-method" course in finance in recent years will recall in this connection the famous Liquigas case of Hunt and Williams, [9, pp. 193-96] a case which is often used to introduce the student to the cost-of-capital problem and to make a bit of fun at the economist's ex-

mization criterion is no longer even well defined. Under uncertainty there corresponds to each decision of the firm not a unique profit outcome, but a plurality of mutually exclusive outcomes which can at best be described by a subjective probability distribution. The profit outcome, in short, has become a random variable and as such its maximization no longer has an operational meaning. Nor can this difficulty generally be disposed of by using the mathematical expectation of profits as the variable to be maximized. For decisions which affect the expected value will also tend to affect the dispersion and other characteristics of the distribution of outcomes. In particular, the use of debt rather than equity funds to finance a given venture may well increase the expected return to the owners, but only at the cost of increased dispersion of the outcomes.

Under these conditions the profit outcomes of alternative investment and financing decisions can be compared and ranked only in terms of a *subjective* "utility function" of the owners which weighs the expected yield against other characteristics of the distribution. Accordingly, the extrapolation of the profit maximization criterion of the certainty model has tended to evolve into utility maximization, sometimes explicitly, more frequently in a qualitative and heuristic form.[3]

The utility approach undoubtedly represents an advance over the certainty or certainty-equivalent approach. It does at least permit us to explore (within limits) some of the implications of different financing arrangements, and it does give some meaning to the "cost" of different types of funds. However, because the cost of capital has become an essentially subjective concept, the utility approach has serious drawbacks for normative as well as analytical purposes. How, for example, is management to ascertain the risk preferences of its stockholders and to compromise among their tastes? And how can the economist build a meaningful investment function in the face of the fact that any given investment opportunity might or might not be worth exploiting depending on precisely who happen to be the owners of the firm at the moment?

Fortunately, these questions do not have to be answered, for the alternative approach, based on market value maximization, can provide the basis for an operational definition of the cost of capital and a workable theory of investment. Under this approach any investment project and its concomitant financing plan must pass only the following test: Will the project, as financed, raise the market value of the firm's shares? If so, it is worth undertaking; if not, its return is less than the marginal cost of capital to the firm. Note that such a test is entirely independent of the tastes of the current owners, since market prices will reflect not only their preferences but those of all potential owners as well. If any current stockholder disagrees with management and the market over the valuation of the project, he is free to sell out and reinvest elsewhere, but will still benefit from the capital appreciation resulting from management's decision.

The potential advantages of the market-value approach have long been appreciated; yet analytical results have been meager. What appears to be keeping this line of development from achieving its promise is largely the lack of an adequate theory of the effect of financial structure on market valuations, and of how these effects can be inferred from objective market data. It is with the development of such a theory and of its implications for the cost-of-capital problem that we shall be concerned in this paper.

Our procedure will be to develop in Section I the basic theory itself and to give some brief account of its empirical relevance. In Section II, we show how the theory can be used to answer the cost-of-capital question and how it permits us to develop a theory of investment of the firm under conditions of uncertainty. Throughout these sections the approach is essentially a partial-equilibrium one focusing on the firm and "industry." Accordingly, the "prices" of certain income streams will be treated as constant and given from outside the model, just as in the standard Marshallian analysis of the firm and industry the prices of all inputs and of all other products are taken as given. We have chosen to focus at this level rather than on the economy as a whole because it is at the level of the firm and the industry that the interests of the various specialists concerned with the cost-of-capital problem come most closely together. Although the emphasis has thus been placed on partial-equilibrium analysis, the results obtained also provide the essential building blocks for a general equilibrium model which shows how those prices which are here taken as given, are themselves determined. For reasons of space, however, and because the material is of interest in its own right, the presentation of the general equilibrium model [illegible] without the analysis must be deferred to a subsequent paper.

I. THE VALUATION OF SECURITIES, LEVERAGE, AND THE COST OF CAPITAL

A. *The Capitalization Rate for Uncertain Streams*

As a starting point, consider an economy in which all physical assets are owned by corporations. For the moment, assume that these corporations can finance their assets by issuing common stock only; the introduction of bond issues, or their equivalent, as a source of corporate funds is postponed until the next part of this section.

The physical assets held by each firm will yield to the owners of the firm—its stockholders—a stream of "profits" over time; but the elements of this series need not be constant and in any event are uncertain. This stream of income, and hence the stream accruing to any share of common stock, will be regarded as extending indefinitely into the future. We assume, however, that the mean value of the stream over time, or average profit per unit of time, is finite and represents a random variable subject to a (subjective) probability distribution. We shall refer to the average value over time of the stream accruing to a given share as the return of that share; and to the mathematical expectation of this average as the expected return of the share.[4] Although

[3] For an attempt at a rigorous explicit development of this line of attack, see F. Modigliani and [illegible]

[4] These propositions can be restated analytically as follows: The assets of the ith firm generate a stream:

$$X_i(1), X_i(2) \cdots X_i(t)$$

whose elements are random variables subject to the joint probability distribution:

$$\phi_i[X_i(1), X_i(2) \cdots X_i(t)].$$

individual investors may have different views as to the shape of the probability distribution of the return of any share, we shall assume for simplicity that they are at least in agreement as to the expected return.[3]

This way of characterizing uncertain streams merits brief comment. Notice first that the stream is a stream of profits, not dividends. As will become clear later, as long as management is presumed to be acting in the best interests of the stockholders, retained earnings can be regarded as equivalent to a fully subscribed, pre-emptive issue of common stock. Hence, for present purposes, the division of the stream between cash dividends and retained earnings in any period is a mere detail. Notice also that the uncertainty attaches to the mean value over time of the stream of profits and should not be confused with variability over time of the successive elements of the stream. That variability and uncertainty are two totally different concepts should be clear from the fact that the elements of a stream can be variable even though known with certainty. It can be shown, furthermore, that whether the elements of a stream are sure or uncertain, the effect of variability per se on the valuation of the stream is at best a second-order one which can safely be neglected for our purposes (and indeed most others too).[4]

The next assumption plays a strategic role in the rest of the analysis. We shall assume that firms can be divided into "equivalent return" classes such that the return on the shares issued by any firm in any given class is proportional to (and hence perfectly correlated with) the return on the shares issued by any other firm in the same class. This assumption implies that the various shares within the same class differ, at most, by a "scale factor." Accordingly, if we adjust for the difference in scale, by taking the *ratio* of the return to the expected return, the probability distribution of that ratio is identical for all shares in the class. It follows that all relevant properties of a share are uniquely characterized by specifying (1) the class to which it belongs and (2) its expected return.

The significance of this assumption is that it permits us to classify firms into groups within which the shares of different firms are "homogeneous," that is, perfect substitutes for one another. We have, thus, an analogue to the familiar concept of the industry in which it is the commodity produced by the firms that is taken as homogeneous. To complete this analogy with Marshallian price theory, we shall assume in the analysis to follow that the shares concerned are traded in perfect markets under conditions of atomistic competition.[5]

$$X_i = \lim_{T\to\infty} \frac{1}{T} \sum_{t=1}^{T} X_i(t).$$

X_i is itself a random variable with a probability distribution $\phi_i(X_i)$ whose form is determined uniquely by x_i. The expected return $\bar{X}_i$ is defined as $\bar{X}_i = E(X_i) = \int_{X_i} X_i \phi_i(X_i) dX_i$. If N_i is the number of shares outstanding, the return of the ith share is $x_i = (1/N_i)X_i$, with probability distribution $\phi_i(x_i)dx_i = \phi_i(N_i x_i)d(N_i x_i)$ and expected value $= \bar{x}_i = (1/N_i)\bar{X}_i$.

[3] To deal adequately with refinements such as differences among investors in estimates of expected returns would require extensive discussion of the theory of portfolio selection. Brief references to these and related topics will be made in the succ...

[4] The reader may convince himself of this by asking how much he would be willing to rebate to his employer for the privilege of receiving his annual salary in equal monthly installments rather than in irregular amounts over the year. See also J. M. Keynes [10, esp. pp. 51-55].

From our definition of homogeneous classes of stock it follows that in equilibrium in a perfect capital market the price per dollar's worth of expected return must be the same for all shares of any given class. Or, equivalently, in any given class the price of every share must be proportional to its expected return. Let us denote this factor of proportionality for any class, say the kth class, by $1/\rho_k$. Then if p_j denotes the price and $\bar{x}_j$ is the expected return per share of the jth firm in class k, we must have:

$$(1) \qquad p_j = \frac{1}{\rho_k}\bar{x}_j,$$

or, equivalently,

$$(2) \qquad \frac{\bar{x}_j}{p_j} = \rho_k \quad \text{for all } j \text{ in class } k,$$

a constant for all firms j in class k.

The constants ρ_k (one for each of the k classes) can be given several economic interpretations: (a) From (2) we see that each ρ_k is the expected rate of return of any share in class k. (b) From (1) $1/\rho_k$ is the price which an investor has to pay for a dollar's worth of expected return in the class k. (c) Again from (1), by analogy with the terminology for perpetual bonds, ρ_k can be regarded as the market rate of capitalization for the expected values of the uncertain streams of the kind generated by the kth class of firms.[10]

[5] Just what our classes of stocks contain and how the different classes can be identified by outside observers are empirical questions to which we shall return later. For the present, it is sufficient to observe: (1) Our concept of a class, while not identical to that of the industry is at least closely related to it. Certainly the basic characteristics of the probability distributions of the returns on assets will depend to a significant extent on the product sold and the technology used. (2) What are the appropriate class boundaries will depend on the particular problem being studied. An economist concerned with general tendencies in the market, for example, might well be prepared to work with far wider classes than would be appropriate for an investor planning his portfolio, or a firm planning its financial strategy.

B. *Debt Financing and Its Effects on Security Prices*

Having developed an apparatus for dealing with uncertain streams we can now approach the heart of the cost-of-capital problem by dropping the assumption that firms cannot issue bonds. The introduction of debt-financing changes the market for shares in a very fundamental way. Because firms may have different proportions of debt in their capital structure, shares of different companies, even in the same class, can give rise to different probability distributions of returns. In the language of finance, the shares will be subject to different degrees of financial risk, or "leverage" and hence they will no longer be perfect substitutes for one another.

To exhibit the mechanism determining the relative prices of shares under these conditions, we make the following two assumptions about the nature of bonds and the bond market, though they are actually stronger than is necessary and will be relaxed later: (1) All bonds (including any debts issued by households for the purpose of carrying shares) are assumed to yield a constant income per unit of time, and this income is regarded as certain by all traders

[10] We cannot, on the basis of the assumptions so far, make any statements about the relations or spread between the various ρ's or capitalization rates. Before we could do so we would have to make further specific assumptions about the way investors believe the probability distributions may vary from class to class, as well as assumptions about investors' preferences as between the characteristics of different distributions.

regardless of the issuer. (2) Bonds, like shares, are traded in a perfect market, where the term perfect is to be taken in its usual sense as implying that any two commodities which are perfect substitutes for each other must sell, in equilibrium, at the same price. It follows from assumption (1) that all bonds are in fact perfect substitutes up to a scale factor. It follows from assumption (2) that they must all sell at the same price per dollar's worth of return, or what amounts to the same thing must yield the same rate of return. This rate of return will be denoted by r and referred to as the rate of interest or, equivalently, as the capitalization rate for sure streams. We now can derive the following two basic propositions with respect to the valuation of securities in companies with different capital structures:

Proposition I. Consider any company j and let $\bar{X}_j$ stand as before for the expected return on the assets owned by the company (that is, its expected profit before deduction of interest). Denote by D_j the market value of the debts of the company; by S_j the market value of its common shares; and by $V_j \equiv S_j + D_j$ the market value of all its securities or, as we shall say, the market value of the firm. Then, our Proposition I asserts that we must have in equilibrium:

$$(3) \qquad V_j \equiv (S_j + D_j) = \bar{X}_j / \rho_k.$$

for any firm j in class k.

That is, the *market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate ρ_k appropriate to its class.*

This proposition can be stated in an equivalent way in terms of the firm's "average cost of capital," $\bar{X}_j/V_j$, which is the ratio of its expected return to the market value of all its securities. Our proposition then is:

$$(4) \qquad \frac{\bar{X}_j}{(S_j + D_j)} \equiv \frac{\bar{X}_j}{V_j} = \rho_k,$$

for any firm j, in class k.

That is, *the average cost of capital to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class.*

To establish Proposition I we will show that as long as the relations (3) or (4) do not hold between any pair of firms in a class, arbitrage will take place and restore the stated equalities. We use the term arbitrage advisedly. For if Proposition I did not hold, an investor could buy and sell stocks and bonds in such a way as to exchange one income stream for another stream, identical in all relevant respects but selling at a lower price. The exchange would therefore be advantageous to the investor quite independently of his attitudes toward risk.[11] As investors exploit these arbitrage opportunities, the value of the overpriced shares will fall and that of the underpriced shares will rise, thereby tending to eliminate the discrepancy between the market values of the firms.

[11] In the language of the theory of choice, the exchanges are movements from inefficient points in the interior to efficient points on the boundary of the investor's opportunity set; and not movements between efficient points along the boundary. Hence for this part of the analysis nothing is involved in the way of specific assumptions about investor attitudes or behavior other than that investors behave consistently and prefer more income to less income, *ceteris paribus*.

By way of proof, consider two firms in the same class and assume for simplicity only, that the expected return, $\bar{X}$, is the same for both firms. Let company 1 be financed entirely with common stock while company 2 has some debt in its capital structure. Suppose first the value of the levered firm, V_2, to be larger than that of the unlevered one, V_1. Consider an investor holding s_2 dollars' worth of the shares of company 2, representing a fraction α of the total outstanding stock, S_2. The return from this portfolio, denoted by Y_2, will be a fraction α of the income available for the stockholders of company 2, which is equal to the total return X_2 less the interest charge, rD_2. Since under our assumption of homogeneity, the anticipated total return of company 2, X_2, is, under all circumstances, the same as the anticipated total return to company 1, X_1, we can hereafter replace X_2 and X_1 by a common symbol X. Hence, the return from the initial portfolio can be written as:

$$(5) \qquad Y_2 = \alpha(X - rD_2).$$

Now suppose the investor sold his αS_2 worth of company 2 shares and acquired instead an amount $s_1 = \alpha(S_2 + D_2)$ of the shares of company 1. He could do so by utilizing the amount αS_2 realized from the sale of his initial holding and borrowing an additional amount αD_2 on his own credit, pledging his new holdings in company 1 as a collateral. He would thus secure for himself a fraction $s_1/S_1 = \alpha(S_2 + D_2)/S_1$ of the shares and earnings of company 1. Making proper allowance for the interest payments on his personal debt αD_2, the return from the new portfolio, Y_1, is given by:

$$(6) \qquad Y_1 = \frac{\alpha(S_2 + D_2)}{S_1} X - r\alpha D_2$$
$$= \alpha \frac{V_2}{V_1} X - r\alpha D_2.$$

Comparing (5) with (6) we see that as long as $V_2 > V_1$ we must have $Y_2 > Y_1$, so that it pays owners of company 2's shares to sell their holdings, thereby depressing S_2 and hence V_2; and to acquire shares of company 1, thereby raising S_1 and thus V_1. We conclude therefore that levered companies cannot command a premium over unlevered companies because investors have the opportunity of putting the equivalent leverage into their portfolio directly by borrowing on personal account.

Consider now the other possibility, namely that the market value of the levered company V_2 is less than V_1. Suppose an investor holds initially an amount s_2 of shares of company 2, representing a fraction α of the total outstanding stock, S_2. His return from this holding is:

$$Y_2 = \frac{s_2}{S_2} X = \alpha X.$$

Suppose he were to exchange this initial holding for another portfolio, also worth s_2, but consisting of s_1 dollars of stock of company 2 and of d dollars of bonds, where s_1 and d are given by:

$$(7) \qquad s_1 = \frac{S_2}{V_2} s_2, \qquad d = \frac{D_2}{V_2} s_2.$$

In other words the new portfolio is to consist of stock of company 2 and of bonds in the proportions S_2/V_2 and D_2/V_2, respectively. The return from the stock in the new portfolio will be a fraction s_1/S_2 of the total return of stockholders of company 2, which is

$X - rD_2$), and the return from the bonds will be rd. Making use of (7), the total return from the portfolio, Y_3, can be expressed as follows:

$$Y_3 = \frac{s_3}{S_3}(X - rD_2) + rd$$
$$= \frac{s_3}{V_3}(X - rD_2) + r\frac{D_3}{V_3}s_3$$
$$= \frac{s_3}{V_3}X = \alpha\frac{S_3}{V_3}X$$

(since $s_3 = \alpha S_3$). Comparing Y_3 with Y_1 we see that, if $V_3 < S_1 \equiv V_1$, then Y_3 will exceed Y_1. Hence it pays the holders of company 1's shares to sell these holdings and replace them with a mixed portfolio containing an appropriate fraction of the shares of company 2.

The acquisition of a mixed portfolio of stock of a levered company j and of bonds in the proportion S_j/V_j and D_j/V_j, respectively, may be regarded as an operation which "undoes" the leverage, giving access to an appropriate fraction of the unlevered return X_j. It is this possibility of undoing leverage which prevents the value of levered firms from being consistently less than those of unlevered firms, or more generally prevents the average cost of capital X_j/V_j from being systematically higher for levered than for unlevered companies in the same class. Since we have already shown that arbitrage will also prevent V_3 from being larger than V_1, we can conclude that in equilibrium we must have $V_3 = V_1$, as stated in Proposition I.

Proposition II. From Proposition I we can derive the following proposition concerning the rate of return on common stock in companies whose capital structure includes some debt: the expected rate of return or yield, i, on the stock of any company j belonging to the kth class is a linear function of leverage as follows:

$$(8)\qquad i_j = \rho_k + (\rho_k - r)\,D_j/S_j.$$

That is, *the expected yield of a share of stock is equal to the appropriate capitalization rate ρ_k for a pure equity stream in the class, plus a premium related to financial risk equal to the debt-to-equity ratio times the spread between ρ_k and r.* Or equivalently, the market price of any share of stock is given by capitalizing its expected return at the continuously variable rate i_j of (8).[12]

A number of writers have stated close equivalents of our Proposition I although by appealing to intuition rather than by attempting a proof and only to insist immediately that the results were not applicable to the actual capital markets.[13] Proposition II, however, so far as we have been able to discover is new.[14] To establish it we first note that, by definition, the expected rate of return, i, is given by:

$$(9)\qquad i_j \equiv \frac{\bar{X}_j - rD_j}{S_j}.$$

From Proposition I, equation (3), we know that:

$$\bar{X}_j = \rho_k(S_j + D_j).$$

Substituting in (9) and simplifying, we obtain equation (8).

C. *Some Qualifications and Extensions of the Basic Propositions*

The methods and results developed so far can be extended in a number of useful directions, of which we shall consider here only three: (1) allowing for a corporate profits tax under which interest payments are deductible; (2) recognizing the existence of a multiplicity of bonds and interest rates; and (3) acknowledging the presence of market imperfections which might interfere with the process of arbitrage. The first two will be examined briefly in this section with some further attention given to the tax problem in Section II. Market imperfections will be discussed in Part D of this section in the course of a comparison of our results with those of received doctrines in the field of finance.

Effects of the Present Method of Taxing Corporations. The deduction of interest in computing taxable corporate profits will prevent the arbitrage process from making the value of all firms in a given class proportional to the expected returns generated by their physical assets. Instead, it can be shown (by the same type of proof used for the original version of Proposition I) that the market values of firms in each class must be proportional in equilibrium to their expected return net of taxes (that is, to the sum of the interest paid and expected net stockholder income). This means we must replace each $\bar{X}_j$ in the original versions of Propositions I and II with a new variable $\bar{X}_j'$ representing the total income net of taxes generated by the firm:

$$(10)\qquad \bar{X}_j' \equiv (\bar{X}_j - rD_j)(1 - \tau) + rD_j$$
$$\equiv \bar{\tau}_j' + rD_j,$$

where $\bar{\tau}_j'$ represents the expected net income accruing to the common stockholders and τ stands for the average rate of corporate income tax.[15]

After making these substitutions, the propositions, when adjusted for taxes, continue to have the same form as their originals. That is, Proposition I becomes:

$$(11)\qquad \frac{\bar{X}_j'}{V_j} = \rho_k', \text{ for any firm in class } k,$$

and Proposition II becomes

$$(12)\qquad i_j \equiv \frac{\bar{\tau}_j'}{S_j} = \rho_k' + (\rho_k' - r)D_j/S_j,$$

where ρ_k' is the capitalization rate for income net of taxes in class k.

Although the form of the propositions is unaffected, certain interpretations must be changed. In particular, the after-tax capitalization rate ρ_k' is in

[12] To illustrate, suppose $\bar{X}=1000$, $D=4000$, $r=5$ per cent and $\rho_k=10$ per cent. These values imply that $V=10{,}000$ and $S=6000$ by virtue of Proposition I. The expected yield or rate of return per share is then:

$$i = \frac{1000 - 200}{6000}$$
$$= .1 + (.1 - .05)\frac{4000}{6000} = 13\frac{1}{3} \text{ per cent.}$$

[13] See, for example, J. B. Williams [21, esp. pp. 72-73]; David Durand [3]; and W. A. Morton [15]. None of these writers describe in any detail the mechanism which is supposed to keep the average cost of capital constant under changes in capital structure. They seem, however, to be visualizing the equilibrating mechanism in terms of switches by investors between stocks and bonds as the yields of each get out of line with their "riskiness." This is an argument quite different from the pure arbitrage mechanism underlying our proof, and the difference is crucial. Regarding Proposition I as resting on investors' attitudes toward risk leads inevitably to a misunderstanding of many factors influencing relative yields such as, for example, limitations on the portfolio composition of financial institutions. See below, esp. Section I.D.

[14] Morton does make reference to a linear yield function but only "...for the sake of simplicity and because the particular function used makes no essential difference in my conclusions" [15, p. 443, note 2].

[15] For simplicity, we shall ignore throughout the tiny element of progression in our present corporate tax and treat τ as a constant independent of $(\bar{X} - rD_j)$.

no longer be identified with the "average cost of capital" which is $\rho_k = X/V$. The difference between ρ_k' and the "true" average cost of capital, as we shall see, is a matter of some relevance in connection with investment planning within the firm (Section II). For the description of market behavior, however, which is our immediate concern here, the distinction is not essential. To simplify presentation, therefore, and to preserve continuity with the terminology in the standard literature we shall continue in this section to refer to ρ_k' as the average cost of capital, though strictly speaking this identification is correct only in the absence of taxes.

Effects of a Plurality of Bonds and Interest Rates. In existing capital markets we find not one, but a whole family of interest rates varying with maturity, with the technical provisions of the loan and, what is most relevant for present purposes, with the financial condition of the borrower.[16] Economic theory and market experience both suggest that the yields demanded by lenders tend to increase with the debt-equity ratio of the borrowing firm (or individual). If so, and if we can assume as a first approximation that this yield curve, $r = r(D/S)$, whatever its precise form, is the same for all borrowers, then we can readily extend our propositions to the case of a rising supply curve for borrowed funds.[17]

Proposition I is actually unaffected in form and interpretation by the fact that the rate of interest may rise with leverage; while the average cost of *borrowed* funds will tend to increase as debt rises, the average cost of funds from *all* sources will still be independent of leverage (apart from the tax effect). This conclusion follows directly from the ability of those who engage in arbitrage to undo the leverage in any financial structure by acquiring an appropriately mixed portfolio of bonds and stocks. Because of this ability, the ratio of earnings (*before* interest charges) to market value—*i.e.*, the average cost of capital from all sources—must be the same for all firms in a given class.[18] In other words, the increased cost of borrowed funds as leverage increases will tend to be offset by a corresponding reduction in the yield of common stock. This seemingly paradoxical result will be examined more closely below in connection with Proposition II.

A significant modification of Proposition I would be required only if the yield curve $r = r(D/S)$ were different for different borrowers, as might happen if creditors had marked preferences for the securities of a particular class of debtors. If, for example, corporations as a class were able to borrow at lower rates than individuals having equivalent personal leverage, then the average cost of capital to corporations might fall slightly, as leverage increased over some range, in reflection of this differential. In evaluating this possibility, however, remember that the relevant interest rate for our arbitrage operators is the rate of brokers' loans and, historically, that rate has not been noticeably higher than representative corporate rates.[19] The operations of holding companies and investment trusts which can borrow on terms comparable to operating companies represent still another force which could be expected to wipe out any marked or prolonged advantages from holding levered stocks.[20]

Although Proposition I remains unaffected as long as the yield curve is the same for all borrowers, the relation between common stock yields and leverage will no longer be the strictly linear one given by the original Proposition II. If r increases with leverage, the yield i will still tend to rise as D/S increases, but at a decreasing rather than a constant rate. Beyond some high level of leverage, depending on the exact form of the interest function, the yield may even start to fall.[21] The relation between i and D/S could conceivably take the form indicated by the curve MD in Figure 2, although in practice the curvature would be much less pronounced. By contrast, with a constant rate of interest, the relation would be linear throughout as shown by line MM', Figure 2.

The downward sloping part of the curve MD perhaps requires some comment since it may be hard to imagine why investors, other than those who

[16] We shall not consider here the extension of the analysis to encompass the time structure of interest rates. Although some of the problems posed by the time structure can be handled within our comparative statics framework, an adequate discussion would require a separate paper.

[17] We can also develop a theory of bond valuation along lines essentially parallel to those followed for the case of shares. We conjecture that the curve of bond yields as a function of leverage will turn out to be a nonlinear one in contrast to the linear function of leverage developed for common shares. However, we would also expect that the rate of increase in the yield on new issues would not be substantial in practice. This relatively slow rise would reflect the fact that interest rate increases by themselves can never be completely satisfactory to creditors as compensation for their increased risk. Such increases may simply serve to raise r so high relative to ρ that they become self-defeating by giving rise to a situation in which even normal fluctuations in earnings may force the company into bankruptcy. The difficulty of borrowing more, therefore, tends to show up in the usual case not so much in higher rates as in the form of increasingly stringent restrictions imposed on the company's management and finances by the creditors; and ultimately in a complete inability to obtain new borrowed funds, at least from the institutional investors who normally set the standards in the market for bonds.

[18] One normally minor qualification might be noted. Once we relax the assumption that all bonds have certain yields, our arbitrage operator faces the danger of something comparable to "gambler's ruin." That is, there is always the possibility that an otherwise sound concern—one whose long-run expected income is greater than its interest liability—might be forced into liquidation as a result of a run of temporary losses. Since reorganization generally involves costs, and because the operation of the firm may be hampered during the period of reorganization with lasting unfavorable effects on earnings prospects, we might perhaps expect heavily levered companies to sell at a slight discount relative to less heavily indebted companies of the same class.

[19] Under normal conditions, moreover, a substantial part of the arbitrage process could be expected to take the form, not of having the arbitrage operators go into debt on personal account to put the required leverage into their portfolios, but simply of having them reduce the amount of corporate bonds they already hold when they acquire underpriced unlevered stock. Margin requirements are also somewhat less of an obstacle to maintaining any desired degree of leverage in a portfolio than might be thought at first glance. Leverage could be largely restored in the face of higher margin requirements by switching to stocks having more leverage at the corporate level.

[20] An extreme form of inequality between borrowing and lending rates occurs, of course, in the case of preferred stocks, which can not be directly issued by individuals on personal account. If we again, however, we would expect that the operations of investment corporations plus the ability of arbitrage operators to sell off their holdings of preferred stocks would act to prevent the emergence of any substantial premiums (for this reason) on capital structures containing preferred stocks. Nor are preferred stocks so far removed from bonds as to make it impossible for arbitrage operators to approximate closely the risk and leverage of a corporate preferred stock by incurring a somewhat smaller debt on personal account.

[21] Since new lenders are unlikely to permit this much leverage (*cf.* note 17), this range of the curve is likely to be occupied by companies whose earnings prospects have fallen substantially since the time when their debts were issued.

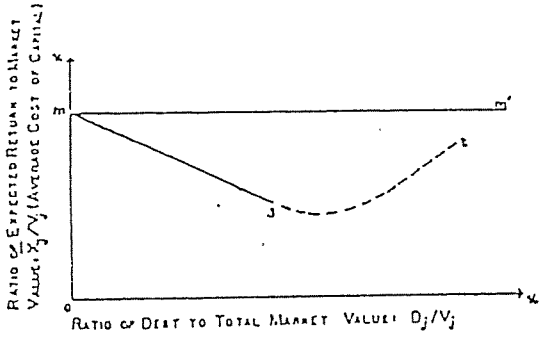


FIGURE 1

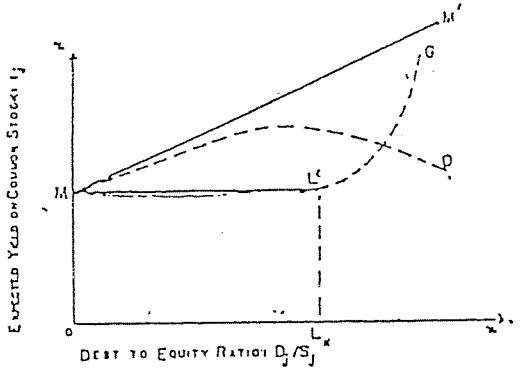


FIGURE 2

like lotteries, would purchase stocks in this range. Remember, however, that the yield curve of Proposition II is a consequence of the more fundamental Proposition I. Should the demand by the risk-lovers prove insufficient to keep the market to the peculiar yield-curve MD, this demand would be reinforced by the action of arbitrage operators. The latter would find it profitable to own a pro-rata share of the firm as a whole by holding its stock *and* bonds, the lower yield of the shares being thus offset by the higher return on bonds

D. *The Relation of Propositions I and II to Current Doctrines*

The propositions we have developed with respect to the valuation of firms and shares appear to be substantially at variance with current doctrines in the field of finance. The main differences between our view and the current view are summarized graphically in Figures 1 and 2. Our Proposition I [equation (4)] asserts that the average cost of capital, $\bar{X}_j/V_j$, is a constant for all firms j in class k, independently of their

financial structure. This implies that, if we were to take a sample of firms in a given class, and if for each firm we were to plot the ratio of expected return to market value against some measure of leverage or financial structure, the points would tend to fall on a horizontal straight line with intercept ρ_k', like the solid line mm' in Figure 1.[22] From Proposition I we derived Proposition II [equation (8)] which, taking the simplest version with r constant, asserts that, for all firms in a class, the relation between the yield on common stock and financial structure, measured by D_j/S_j, will approximate a straight line with slope $(\rho_k' - r)$ and intercept ρ_k'. This relationship is shown as the solid line MM' in Figure 2, to which reference has been made earlier.[23]

By contrast, the conventional view among finance specialists appears to start from the proposition that, other things equal, the earnings-price ratio (or its reciprocal, the times-earnings multiplier) of a firm's common stock will normally be only slightly affected by "moderate" amounts of debt in the firm's capital structure.[24] Translated into our notation, it asserts that for any firm j in the class k,

(13)

$$\frac{\bar{X}_j' - rD_j}{S_j} = \frac{\bar{\pi}_j'}{S_j} = i_k^*, \text{ a constant for } \frac{D_j}{S_j} \leq L_k$$

or, equivalently,

(14) $$S_j = \bar{\pi}_j'/i_k^*.$$

Here i_k^* represents the capitalization rate or earnings-price ratio on the common stock and L_k denotes some amount of leverage regarded as the maximum "reasonable" amount for firms of the class k. This assumed relationship between yield and leverage is the horizontal solid line ML' of Figure 2. Beyond L', the yield will presumably rise sharply as the market discounts "excessive" trading on the equity. This possibility of a rising range for high leverages is indicated by the broken-line segment $L'G$ in the figure.[25]

If the value of shares were really given by (14) then the over-all market value of the firm must be:

(16)

$$V_j = S_j + D_j = \frac{\bar{X}_j' - rD_j}{i_k^*} + D_j$$

$$= \frac{\bar{X}_j'}{i_k^*} + \frac{(i_k^* - r)\,D_j}{i_k^*}.$$

[22] In Figure 1 the measure of leverage used is D_j/V_j (the ratio of debt to market value) rather than D_j/S_j (the ratio of debt to equity), the concept used in the analytical development. The D_j/V_j measure is introduced at this point because it simplifies comparison and contrast of our view with the traditional position.

[23] The line MM' in Figure 2 has been drawn with a positive slope on the assumption that $\rho_k' > r$, a condition which will normally obtain. Our Proposition II as given in equation (8) would continue to be valid, of course, even in the unlikely event that $\rho_k' < r$, but the slope of MM' would be negative.

[24] See, *e.g.*, Graham and Dodd [6, pp. 464-66]. Without doing violence to this position, we can bring out its implications more sharply by ignoring the qualification and treating the yield as a virtual constant over the relevant range. See in this connection [7] of what he calls the "net income method" of valuation.

[25] To make it easier to see some of the implications of this hypothesis as well as to prepare the ground for later statistical testing, it will be helpful to assume that the notion of a critical limit or leverage beyond which yields rise rapidly, can be epitomized by a quadratic relation of the form:

(15)

That is, for any given level of expected total returns after taxes ($\bar{X}_t$) and assuming, as seems natural, that $i_t^* > r$, the value of the firm must tend to *rise* with debt,[26] whereas our Proposition I asserts that the value of the firm is completely independent of the capital structure. Another way of contrasting our position with the traditional one is in terms of the cost of capital. Solving (16) for $\bar{X}_t/V_t$ yields:

(17)

$$\bar{X}_t/V_t = i_t^* - (i_t^* - r)\, D_t/V_t.$$

According to this equation, the average cost of capital is not independent of capital structure as we have argued, but should tend to *fall* with increasing leverage, at least within the relevant range of moderate debt ratios, as shown by the line *ms* in Figure 1. Or to put it in more familiar terms, debt-financing should be "cheaper" than equity-financing if not carried too far.

When we also allow for the possibility of a rising range of stock yields for large values of leverage, we obtain a U-shaped curve like *mst* in Figure 1.[27] That a yield-curve for stocks of the form *ML'G* in Figure 2 implies a U-shaped cost-of-capital curve has, of course, been recognized by many writers. A natural further step has been to suggest that the capital structure corresponding to the trough of the U is an "optimal capital structure" towards which management ought to strive in the best interests of the stockholders.[28] According to our model, by contrast, no such optimal structure exists—all structures being equivalent from the point of view of the cost of capital.

Although the falling, or at least U-shaped, cost-of-capital function is in one form or another the dominant view in the literature, the ultimate rationale of that view is by no means clear. The crucial element in the position—that the expected earnings-price ratio of the stock is largely unaffected by leverage up to some conventional limit—is rarely even regarded as something which requires explanation. It is usually simply taken for granted or it is merely asserted that this is the way the market behaves.[29] To the extent that the constant earnings-price ratio has a rationale at all we suspect that it reflects in most cases the feeling that moderate amounts of debt in "sound" corporations do not really add very much to the "riskiness" of the stock. Since the extra risk is slight, it seems natural to suppose that firms will not have to pay noticeably higher yields in order to induce investors to hold the stock.[30]

A more sophisticated line of argument has been advanced by David Durand [3, pp. 231-33]. He suggests that because insurance companies and certain other important institutional investors are restricted to debt securities, nonfinancial corporations are able to borrow from them at interest rates which are lower than would be required to compensate creditors in a free market. Thus, while he would presumably agree with our conclusions that stockholders could not gain from leverage in an unconstrained market, he concludes that they can gain under present institutional arrangements. This gain would arise by virtue of the "safety superpremium" which lenders are willing to pay corporations for the privilege of lending.[31]

The defective link in both the traditional and the Durand version of the argument lies in the confusion between investors' subjective risk preferences and their objective market opportunities. Our Propositions I and II, as noted earlier, do not depend for their validity on any assumption about individual risk preferences. Nor do they involve any assertion as to what is an adequate compensation to investors for assuming a given degree of risk. They rely merely on the fact that a given commodity cannot consistently sell at more than one price in the market; or more precisely that the price of a commodity representing a "bundle" of two other commodities cannot be consistently different from the weighted average of the prices of the two components (the weights being equal to the proportion of the two commodities in the bundle).

An analogy may be helpful at this point. The relations between $1/\rho_k$, the price per dollar of an unlevered stream in class k; $1/r$, the price per dollar of a sure stream, and $1/i_j$, the price per dollar of a levered stream j, in the kth class, are essentially the same as those between, respectively, the price of whole milk, the price of butter fat, and the price of milk which has been thinned out by skimming off some of the butter fat. Our Proposition I states that a firm cannot reduce the cost of capital—*i.e.*, increase the market value of the stream it generates—by securing part of its capital through the sale of bonds, even though debt money appears to be cheaper. This assertion is equivalent to the proposition that, under perfect markets, a dairy farmer cannot in general earn more for the milk he produces by skimming some of the butter fat and selling it separately, even though butter fat per unit weight sells for more than whole milk. The advantage from skimming the milk

[26] For a typical discussion of how a promoter can, supposedly, increase the market value of a firm by recourse to debt issues, see W. J. Eiteman [4, esp. pp. 11-13].

[27] The U-shaped nature of the cost-of-capital curve can be exhibited explicitly if the yield curve for shares as a function of leverage can be approximated by equation (15) of footnote 25. From that equation, multiplying both sides by S_t we obtain: $\bar{X}_t - \bar{X}_t^r = rD_t - i_t^* S_t + \tfrac{1}{2}D_t + \alpha D_t^2/S_t$ or, adding and subtracting $i_t^* D_t$ from the right-hand side and collecting terms,

(18)

$$\bar{X}_t^r - i_t^*(S_t + D_t) + (\tfrac{1}{2} + r - i_t^*)D_t + \alpha D_t^2/S_t.$$

Dividing (18) by V_t gives an expression for the cost of capital:

(19) $$\bar{X}_t^r/V_t - i_t^* - (i_t^* - r - \tfrac{1}{2})D_t/V_t + \alpha D_t^2/S_t V_t - i_t^* - (i_t^* - r - \tfrac{1}{2})D_t/V_t + \alpha (D_t/V_t)^2/(1 - D_t/V_t)$$

which is clearly U-shaped since α is supposed to be positive.

[28] For a typical statement see S. M. Robbins [16, p. 307]. See also Graham and Dodd [6, pp. 483-74].

[29] See *e.g.*, Graham and Dodd [6, p. 466].

[30] A typical statement is the following by Guthmann and Dougall [7, p. 245]: "Theoretically it might be argued that the increased hazard from using bonds and preferred stocks would counterbalance this additional income and so prevent the common stock from being more attractive than when it had a lower return but fewer prior obligations. In practice, the extra earnings from 'trading on the equity' are often regarded by investors as more than sufficient to serve as a 'premium for risk' when the proportions of the several securities are judiciously mixed."

[31] Like Durand, Morton [15] contends "that the actual market deviates from [Proposition I] by giving a changing over-all cost of money at different points of the [leverage] scale" (p. 443, note 2, inserts ours), but the basis for this contention is nowhere clearly stated. Judging by the great emphasis given to the lack of mobility of investment funds between stocks and bonds and to the psychological and institutional pressures toward debt portfolios (see pp. 444-51 and especially his discussion of the optimal capital structure on p. 453) he would seem to be taking a position very similar to that of Durand above

rather than selling whole milk would be purely illusory: for what would be gained from selling the high-priced butter fat would be lost in selling the low-priced residue of thinned milk. Similarly our Proposition II—that the price per dollar of a levered stream falls as leverage increases—is an exact analogue of the statement that the price per gallon of thinned milk falls continuously as more butter fat is skimmed off.[32]

It is clear that this last assertion is true as long as butter fat is worth more per unit weight than whole milk, and it holds even if, for many consumers, taking a little cream out of the milk (adding a little leverage to the stock) does not detract noticeably from the taste (does not add noticeably to the risk). Furthermore the argument remains valid even in the face of institutional limitations of the type envisaged by Durand. For suppose that a large fraction of the population habitually dines in restaurants which are required by law to serve only cream in lieu of milk (entrust their savings to institutional investors who can only buy bonds). To be sure the price of butter fat will then tend to be higher in relation to that of skimmed milk than in the absence such restrictions (the rate of interest will tend to be lower), and this will benefit people who eat at home and who like skim milk (who manage their own portfolio and are able and willing to take risk). But it will still be the case that a farmer cannot gain by skimming some of the butter fat and selling it separately (firm cannot reduce the cost of capital by recourse to borrowed funds).[33]

Our propositions can be regarded as the extension of the classical theory of markets to the particular case of the capital markets. Those who hold the current view—whether they realize it or not—must assume not merely that there are lags and frictions in the equilibrating process—a feeling we certainly share,[34] claiming for our propositions

[32] Let M denote the quantity of whole milk, B/M the proportion of butter fat in the whole milk, and let p_M, p_B and p_s denote, respectively, the price per unit weight of whole milk, butter fat and thinned milk from which a fraction α of the butter fat has been skimmed off. We then have the fundamental perfect market relation:

(a) $\quad p_s(M - \alpha B) + p_B \alpha B = p_M M, \quad 0 \leq \alpha \leq 1,$

stating that total receipts will be the same amount $p_M M$, independently of the amount αB of butter fat that may have been sold separately. Since p_M corresponds to $1/\rho_s$, p_B to $1/r$, p_s to $1/i$, M to $\bar{X}$ and αB to rD, (a) is equivalent to Proposition I, $S + D - \bar{X}/\rho_s$. From (a) we derive:

(b) $\quad p_s = p_M \dfrac{M}{M - \alpha B} - p_B \dfrac{\alpha B}{M - \alpha B}$

which gives the price of thinned milk as an explicit function of the proportion of butter fat skimmed off; the function decreasing as long as $p_B > p_M$. From (a) also follows:

(c) $\quad 1/p_s = 1/p_M + (1/p_M - 1/p_B)\dfrac{p_B \alpha B}{p_M(M - \alpha B)}$

which is the exact analogue of Proposition II, as given by (2).

[33] The reader who likes parables will find that the analogy with interrelated commodity markets can be pushed a good deal farther than we have done in the text. For instance, the effect of changes in the market rate of interest on the over-all cost of capital is the same as the effect of a change in the price of butter on the price of whole milk. Similarly, just as the relation between the prices of skim milk and butter fat influences the kind of cows that will be reared, so the relation between i and r influences the kind of ventures that will be undertaken. If people like butter we shall have Guernseys; if they are willing to pay a high price for safety, this will encourage ventures which promise smaller but less uncertain streams per dollar of physical assets.

[34] Several specific examples of the failure of the arbitrage mechanism can be found in Graham and Dodd [6, *e.g.*, pp. 646-48]. The price discrepancy described on pp. 646-47 is particularly curious since it persists even today despite the fact that a whole generation of security analysts has been brought up on this book!

only that they describe the central tendency around which observations will scatter—but also that there are large and *systematic* imperfections in the market which permanently bias the outcome. This is an assumption that economists, at any rate, will instinctively eye with some skepticism.

In any event, whether such prolonged, systematic departures from equilibrium really exist or whether our propositions are better descriptions of long-run market behavior can be settled only by empirical research. Before going on to the theory of investment it may be helpful, therefore, to look at the evidence.

E. *Some Preliminary Evidence on the Basic Propositions*

Unfortunately the evidence which has been assembled so far is amazingly skimpy. Indeed, we have been able to locate only two recent studies—and these of rather limited scope—which were designed to throw light on the issue. Pending the results of more comprehensive tests which we hope will soon be available, we shall review briefly such evidence as is provided by the two studies in question: (1) an analysis of the relation between security yields and financial structure for some 43 large electric utilities by F. B. Allen [1], and (2) a parallel (unpublished) study by Robert Smith [19], for 42 oil companies designed to test whether Allen's rather striking results would be found in an industry with very different characteristics.[35] The Allen study is based on average figures for the years 1947 and 1948, while the Smith study relates to the single year 1953.

The Effect of Leverage on the Cost of Capital. According to the received view, as shown in equation (17) the average cost of capital, $\bar{X}'/V$ should decline linearly with leverage as measured by the ratio D/V, at least through most of the relevant range.[36] According to Proposition I, the average cost of capital within a given class k should tend to have the same value ρ_k' independently of the degree of leverage. A simple test of the merits of the two alternative hypotheses can thus be carried out by correlating $\bar{X}'/V$ with D/V. If the traditional view is correct, the correlation should be significantly negative; if our view represents a better approximation to reality, then the correlation should not be significantly different from zero.

Both studies provide information about the average value of D—the market value of bonds and preferred stock—and of V—the market value of all securities.[37] From these data we can

[35] We wish to express our thanks to both writers for making available to us some of their original worksheets. In addition to these recent studies there is a frequently cited (but apparently seldom read) study by the Federal Communications Commission in 1938 [22] which purports to show the existence of an optimal capital structure or range of structures (in the sense defined above) for public utilities in the 1930's. By current standards for statistical investigations, however, this study cannot be regarded as having any real evidential value for the problem at hand.

[36] We shall simplify our notation in this section by dropping the subscript j used to denote a particular firm wherever this will not lead to confusion.

[37] Note that for purposes of this test preferred stocks, since they represent an *expected* fixed obligation, are properly classified with bonds even though the tax status of preferred dividends is different from that of interest payments and even though preferred dividends are really fixed only as to their maximum in any year. Some difficulty of classification does arise in the case of convertible

readily compute the ratio D/V and this ratio (expressed as a percentage) is represented by the symbol d in the regression equations below. The measurement of the variable $\bar{X}^r/V$, however, presents serious difficulties. Strictly speaking, the numerator should measure the expected returns net of taxes, but this is a variable on which no direct information is available. As an approximation, we have followed both authors and used (1) the average value of actual net returns in 1947 and 1948 for Allen's utilities; and (2) actual net returns in 1953 for Smith's oil companies. Net return is defined in both cases as the sum of interest, preferred dividends and stockholders' income net of corporate income taxes. Although this approximation to expected returns is undoubtedly very crude, there is no reason to believe that it will systematically bias the test in so far as the sign of the regression coefficient is concerned. The roughness of the approximation, however, will tend to make for a wide scatter. Also contributing to the scatter is the crudeness of the industrial classification, since especially within the sample of oil companies, the assumption that all the firms belong to the same class in our sense, is at best only approximately valid.

Denoting by x our approximation to $\bar{X}^r/V$ (expressed, like d, as a percentage), the results of the tests are as follows:

Electric Utilities $x = 5.3 + .006d$ $(\pm .008)$, $r = .12$

Oil Companies $x = 8.5 + .006d$ $(\pm .024)$, $r = .04$.

The data underlying these equations are also shown in scatter diagram form in Figures 3 and 4.

The results of these tests are clearly favorable to our hypothesis. Both correlation coefficients are very close to zero and not statistically significant. Furthermore, the implications of the traditional view fail to be supported even with respect to the sign of the correlation. The data in short provide no evidence of any tendency for the cost of capital to fall as the debt ratio increases.[11]

[11] It may be argued that a test of the kind used is biased against the traditional view. The fact that both sides of the regression equation are divided by the variable V which may be subject to random variation might tend to impart a positive bias to the correlation. As a check on the results presented in the text, we have, therefore, carried out a supplementary test based on equation (16). This equation shows that, if the traditional view is correct, the market value of a company should, for given $\bar{X}^r$, increase with debt through most of the relevant range; according to our model the market value should be uncorrelated with D, given $\bar{X}^r$. Because of wide variations in the size of the firms included in our samples, all variables must be divided by a suitable scale factor in order to avoid spurious results in carrying out a test of equation (16). The factor we have used is the book value of the firm denoted by A. The hypothesis tested thus takes the specific form:

$$V/A = a + b(\bar{X}^r/A) + c(D/A)$$

and the numerator of the ratio $\bar{X}^r/A$ is again approximated by actual net returns. The partial correlation between V/A and D/A should now be positive according to the traditional view and zero according to our model. Although division by A should, if anything, bias the results in favor of the traditional hypothesis, the partial correlation turns out to be only .03 for the oil companies and —.28 for the electric utilities. Neither of these coefficients

preferred stocks (and convertible bonds) selling at a substantial premium, but fortunately very few such issues were involved for the companies included in the two studies. Smith included bank loans and certain other short-term obligations (at book values) in his data on oil company debts and this treatment is perhaps open to some question. However, the amounts involved were relatively small and check computations showed that their

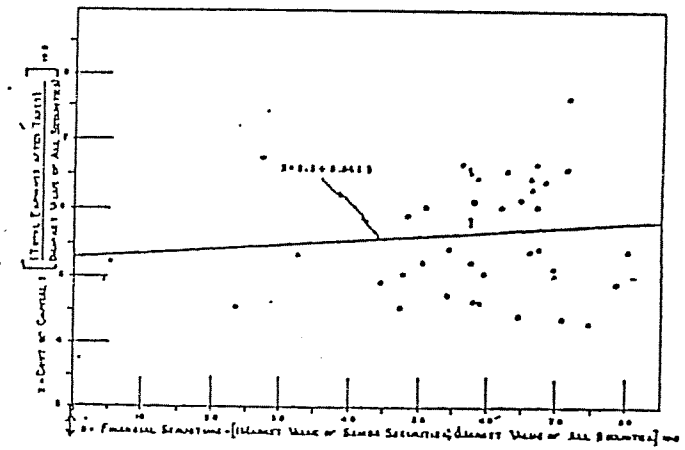


FIGURE 3. COST OF CAPITAL IN RELATION TO FINANCIAL STRUCTURE FOR 43 ELECTRIC UTILITIES, 1947–48

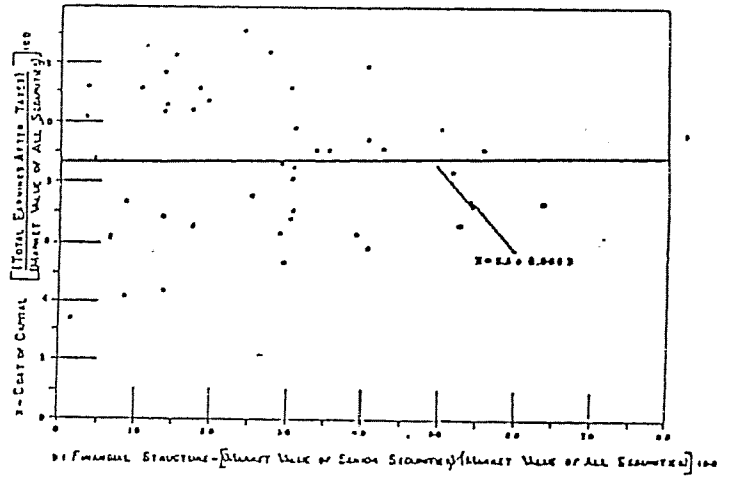


FIGURE 4. COST OF CAPITAL IN RELATION TO FINANCIAL STRUCTURE FOR 42 OIL COMPANIES, 1953

It should also be apparent from the scatter diagrams that there is no hint of a curvilinear, U-shaped, relation of the kind which is widely believed to hold between the cost of capital and leverage. This graphical impression was confirmed by statistical tests which showed that for both industries the curvature was not significantly different from zero, its sign actually being opposite to that hypothesized.[39]

Note also that according to our model, the constant terms of the regression equations are measures of $\rho_k{}^r$, the capitalization rates for unlevered streams and hence the average cost of capital in the classes in question. The estimates of 8.5 per cent for the oil companies as against 5.3 per cent for electric utilities appear to accord well with a priori expectations, both in absolute value and relative spread.

The Effect of Leverage on Common Stock Yields. According to our Proposition II—see equation 12 and Figure 2—the expected yield on common stock, $\bar{Y}^r/S$ in any given class, should tend to increase with leverage as measured by the ratio D/S. The relation should tend to be linear and with positive slope through most of the relevant range (as in the curve MM' of Figure 2), though it might tend to flatten out if we move far enough to the right (as in the curve MD'), to the extent that high leverage tends to drive up the cost of senior capital. According to the conventional view, the yield curve as a function of leverage should be a horizontal straight line (like ML') through most of the relevant range; far enough to the right, the yield may tend to rise at an increasing rate. Here again, a straight-forward correlation—in this case between $\bar{Y}^r/S$ and D/S—can provide a test of the two positions. If our view is correct, the correlation should be significantly positive; if the traditional view is correct, the correlation should be negligible.

Subject to the same qualifications noted above in connection with $\bar{X}^r$, we can approximate $\bar{Y}^r$ by actual stockholder net income.[40] Letting z denote in each case the approximation to $\bar{Y}^r/S$ (expressed as a percentage) and letting h denote the ratio D/S (also in percentage terms) the following results are obtained:

Electric Utilities $z=6.6+.017h$ $(\pm.004)$

$r=.53$

Oil Companies $z=8.9+.051h$ $(\pm.012)$

$r=.53.$

These results are shown in scatter diagram form in Figures 5 and 6.

[39] The tests consisted of fitting to the data the equation (19) of footnote 27. As shown there, it follows from the U-shaped hypothesis that the coefficient a of the variable $(D/V)^2/(1-D/V)$, denoted hereafter by d^*, should be significant and positive. The following regression equations and partials were obtained:

Electric Utilities $x = 5.0 + .017J - .003J^*$;
$r_{xJ^*.J} = -.15$

Oil Companies $x = 8.0 + .05J - .03J^*$;
$r_{xJ^*.J} = -.11.$

[40] As indicated earlier, Smith's data were for the single year 1953. Since the use of a single year's profits as a measure of expected profits might be open to objection we collected profit data for 1952 for the same companies and based the computation of $\bar{Y}^r/S$ on the average of the two years. The value of $\bar{Y}^r/S$ was obtained from the formula:

$$\left(\text{net earnings in 1952} \cdot \frac{\text{assets in '53}}{\text{assets in '52}} + \text{net earnings in 1953} \right) \Big/ 2$$

$\div$ (average market value of common stock in '53).

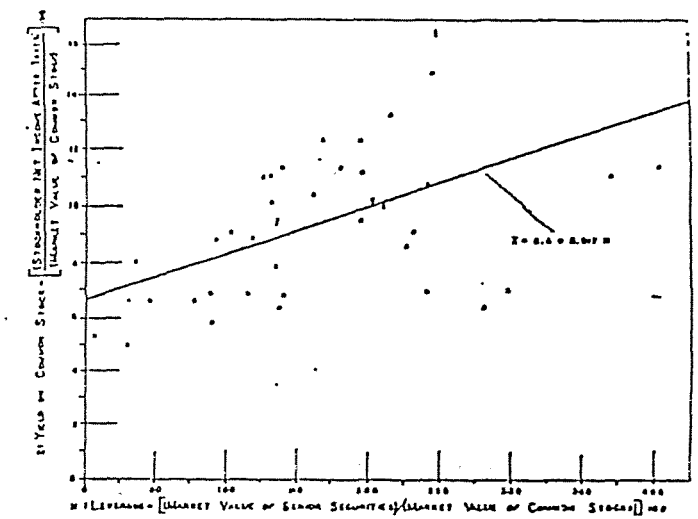


FIGURE 5. YIELD ON COMMON STOCK IN RELATION TO LEVERAGE FOR 43 ELECTRIC UTILITIES, 1947–48

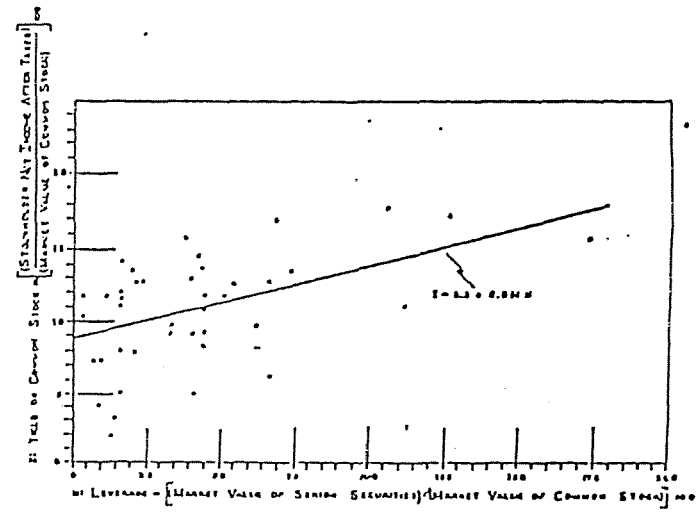


FIGURE 6. YIELD ON COMMON STOCK IN RELATION TO LEVERAGE FOR 42 OIL COMPANIES, 1952–53

Here again the implications of our analysis seem to be borne out by the data. Both correlation coefficients are positive and highly significant when account is taken of the substantial sample size. Furthermore, the estimates of the coefficients of the equations seem to accord reasonably well with our hypothesis. According to equation (12) the constant term should be the value of ρ_i^* for the given class while the slope should be (ρ_i^*-r). From the test of Proposition I we have seen that for the oil companies the mean value of ρ_i^* could be estimated at around 8.7. Since the average yield of senior capital during the period covered was in the order of 3½ per cent, we should expect a constant term of about 8.7 per cent and a slope of just over 5 per cent. These values closely approximate the regression estimates of 8.9 per cent and 5.1 per cent respectively. For the electric utilities, the yield of senior capital was also on the order of 3½ per cent during the test years, but since the estimate of the mean value of ρ_i^* from the test of Proposition I was 5.6 per cent, the slope should be just above 2 per cent. The actual regression estimate for the slope of 1.7 per cent is thus somewhat low, but still within one standard error of its theoretical value. Because of this underestimate of the slope and because of the large mean value of leverage ($\bar{h}$ = 160 per cent) the regression estimate of the constant term, 6.6 per cent, is somewhat high, although not significantly different from the value of 5.6 per cent obtained in the test of Proposition I.

When we add a square term to the above equations to test for the presence and direction of curvature we obtain the following estimates:

Electric Utilities $z = 4.6 + .004h - .007h^2$

Oil Companies $z = 8.5 + .072h - .016h^2$.

For both cases the curvature is negative. In fact, for the electric utilities, where the observations cover a wider range of leverage ratios, the negative coefficient of the square term is actually significant at the 5 per cent level. Negative curvature, as we have seen, runs directly counter to the traditional hypothesis, whereas it can be readily accounted for by our model in terms of rising cost of borrowed funds.[41]

In summary, the empirical evidence we have reviewed seems to be broadly consistent with our model and largely inconsistent with traditional views. Needless to say much more extensive testing will be required before we can firmly conclude that our theory describes market behavior. Caution is indicated especially with regard to our test of Proposition II, partly because of possible statistical pitfalls[42] and partly because not all the factors that might have a systematic effect on stock yields have been considered. In particular, no attempt was made to test the possible influence of the dividend pay-out ratio whose role has tended to receive a great deal of attention in current research and thinking. There are two reasons for this omission. First, our main objective has been to assess the prima facie tenability of *our* model, and in this model, based as it is on rational behavior by investors, dividends per se play no role. Second, in a world in which the policy of dividend stabilization is widespread, there is no simple way of disentangling the true effect of dividend payments on stock prices from their apparent effect, the latter reflecting only the role of dividends as a proxy measure of long-term earning anticipations.[43] The difficulties just mentioned are further compounded by possible interrelations between dividend policy and leverage.[44]

The asset adjustment was introduced as rough allowance for the effects of possible growth in the size of the firm. It might be added that the correlation computed with $\bar{x}^r$ *IS* based on net profits in 1953 alone was found to be only slightly smaller, namely .50.

[41] That the yield of senior capital tended to rise for utilities as leverage increased is clearly shown in several of the scatter diagrams presented in the published version of Allen's study. This significant negative curvature between stock yields and leverage for utilities may be partly responsible for the fact, previously noted, that the constant in the linear regression is somewhat higher and the slope somewhat lower than implied by equation (12). Note also in connection with the estimate of ρ_i^* that the introduction of the quadratic term reduces the constant considerably, pushing it in fact below the a priori expectation of 5.6, though the difference is again not statistically significant.

[42] In our test, *e.g.*, the two variables z and h are both ratios with S appearing in the denominator, which may tend to impart a positive bias to the correlation (*cf.* note 38). Attempts were made to develop alternative tests, but although various possibilities were explored, we have so far been unable to find satisfactory alternatives.

[43] We suggest that failure to appreciate this difficulty is responsible for many fallacious, or at least unwarranted, conclusions about the role of dividends.

[44] In the sample of electric utilities, there is a substantial negative correlation between yields and pay-out ratios, but also between pay-out ratios and leverage, suggesting that either the association of yields and leverage or of yields and pay-out ratios may be (at least partly) spurious. These difficulties however do not arise in the case of the oil industry sample. A preliminary analysis indicates that there is here no significant relation between leverage and pay-out ratios and also no significant correlation (either gross or partial) between yields and pay-out ratios.

II. IMPLICATIONS OF THE ANALYSIS FOR THE THEORY OF INVESTMENT

A. *Capital Structure and Investment Policy*

On the basis of our propositions with respect to cost of capital and financial structure (and for the moment neglecting taxes), we can derive the following simple rule for optimal investment policy by the firm:

Proposition III. If a firm in class k is acting in the best interest of the stockholders at the time of the decision, it will exploit an investment opportunity if and only if the rate of return on the investment, say ρ^*, is as large as or larger than ρ_k. That is, *the cut-off point for investment in the firm will in all cases be ρ_k and will be completely unaffected by the type of security used to finance the investment.* Equivalently, we may say that regardless of the financing used, the marginal cost of capital to a firm is equal to the average cost of capital, which is in turn equal to the capitalization rate for an unlevered stream in the class to which the firm belongs.[45]

To establish this result we will consider the three major financing alternatives open to the firm—bonds, retained earnings, and common stock issues—and show that in each case an investment is worth undertaking if, and only if, $\rho^* \geq \rho_k$.[46]

[45] The analysis developed in this paper is essentially a comparative-statics, not a dynamic analysis. This note of caution applies with special force to Proposition III. Such problems as those posed by expected changes in r and ρ_k over time will not be treated here. Although they are in principle amenable to analysis within the general framework we have laid out, such an undertaking is sufficiently complex to deserve separate treatment. *Cf.* note 17.

[46] The extension of the proof to other types of

Consider first the case of an investment financed by the sale of bonds. We know from Proposition I that the market value of the firm before the investment was undertaken was:[47]

$$V_t = \bar{X}_t/\rho_t \tag{20}$$

and that the value of the common stock was:

$$S_t = V_t - D_t. \tag{21}$$

If now the firm borrows I dollars to finance an investment yielding ρ^* its market value will become:

$$V_t = \frac{\bar{X}_t + \rho^* I}{\rho_t} = V_t + \frac{\rho^* I}{\rho_t} \tag{22}$$

and the value of its common stock will be:

$$S_t = V_t - (D_t + I) = V_t + \frac{\rho^* I}{\rho_t} - D_t - I \tag{23}$$

or using equation 21,

$$S_t = S_t + \frac{\rho^* I}{\rho_t} - I. \tag{24}$$

Hence $S_t \gtrless S_t$ as $\rho^* \gtrless \rho_t$.[48]

To illustrate, suppose the capitalization rate for uncertain streams in the kth class is 10 per cent and the rate of interest is 4 per cent. Then if a given company had an expected income of 1,000 and if it were financed entirely by common stock we know from Proposition I that the market value of its stock would be 10,000. Assume now that the managers of the firm discover an investment opportunity which will require an outlay of 100 and which is expected to yield 8 per cent. At first sight this might appear to be a profitable opportunity since the expected return is double the interest cost. If, however, the management borrows the necessary 100 at 4 per cent, the total expected income of the company rises to 1,008 and the market value of the firm to 10,080. But the firm now will have 100 of bonds in its capital structure so that, paradoxically, the market value of the stock must actually be reduced from 10,000 to 9,980 as a consequence of this apparently profitable investment. Or, to put it another way, the gains from being able to tap cheap, borrowed funds are more than offset for the stockholders by the market's discounting of the stock for the added leverage assumed.

Consider next the case of retained earnings. Suppose that in the course of its operations the firm acquired I dollars of cash (without impairing the earning power of its assets). If the cash is distributed as a dividend to the stockholders their wealth W_0, after the distribution will be:

$$W_t = S_t + I = \frac{\bar{X}_t}{\rho_t} - D_t + I \tag{25}$$

where $\bar{X}_t$ represents the expected return from the assets exclusive of the amount I in question. If however the funds are retained by the company and used to finance new assets whose expected rate of return is ρ^*, then the stockholders' wealth would become:

$$W_t = S_t = \frac{\bar{X}_t + \rho^* I}{\rho_t} - D_t = S_t + \frac{\rho^* I}{\rho_t}. \tag{26}$$

Clearly $W_t \gtrless W_0$ as $\rho^* \gtrless \rho_t$ so that an investment financed by retained earnings raises the net worth of the owners if and only if $\rho^* > \rho_t$.[49]

Consider finally, the case of common-stock financing. Let P_0 denote the current market price per share of stock and assume, for simplicity, that this price reflects currently expected earnings only, that is, it does not reflect any future increase in earnings as a result of the investment under consideration.[50] Then if N is the original number of shares, the price per share is:

$$P_t = S_t/N \tag{27}$$

and the number of new shares, M, needed to finance an investment of I dollars is given by:

$$M = \frac{I}{P_t}. \tag{28}$$

As a result of the investment the market value of the stock becomes:

$$S_t = \frac{\bar{X}_t + \rho^* I}{\rho_t} - D_t = S_t + \frac{\rho^* I}{\rho_t} = NP_t + \frac{\rho^* I}{\rho_t}$$

and the price per share:

$$P_t = \frac{S_t}{N + M} = \frac{1}{N + M}\left[NP_t + \frac{\rho^* I}{\rho_t}\right]. \tag{29}$$

Since by equation (28), $I = MP_t$, we can add MP_t and subtract I from the quantity in bracket, obtaining:

$$P_t = \frac{1}{N + M}\left[(N + M)P_t + \frac{\rho^* - \rho_t}{\rho_t} I\right] = P_t + \frac{1}{N + M}\frac{\rho^* - \rho_t}{\rho_t} I > P_t \text{ if,} \tag{30}$$

and only if, $\rho^* > \rho_t$.

Thus an investment financed by common stock is advantageous to the current stockholders if and only if its yield exceeds the capitalization rate ρ_t.

Once again a numerical example may help to illustrate the result and make it clear why the relevant cut-off rate is ρ_t and not the current yield on common stock, i. Suppose that ρ_t is 10 per cent, r is 4 per cent, that the original expected income of our company is 1,000 and that management has the oppor-

[47] Since no confusion is likely to arise, we have again, for simplicity, eliminated the subscripts identifying the firm in the equations to follow. Except for ρ_t, the subscripts now refer to time periods.

[48] In the case of bond-financing the rate of interest on bonds does not enter explicitly into the decision (assuming the firm borrows at the market rate of interest). This is true, moreover, given the conditions outlined in Section I.C, even though interest rates may be an increasing function of debt outstanding. To the extent that the firm borrowed at a rate other than the market rate the two I's in equation (24) would no longer be identical and an additional gain or loss, as the case might be, would accrue to the shareholders. It might also be noted in passing that permitting the two I's in (24) to take on different values provides a simple method for introducing underwriting expenses into the analysis.

[49] The conclusion that ρ_t is the cut-off point for investments financed from internal funds applies not only to undistributed net profits, but to depreciation allowances (and even to the funds represented by the current sale value of any asset or collection of assets). Since the owners can earn ρ_t by investing funds elsewhere in the class, partial or total liquidating distributions should be made whenever the firm cannot achieve a marginal internal rate of return equal to ρ_t.

[50] If we assumed that the market price of the stock did reflect the expected higher future earnings (as would be the case if our original set of assumptions above were strictly followed) the analysis would differ slightly in detail, but not in essentials. The cut-off point for new investment would still be ρ_t, but where $\rho^* > \rho_t$ the gain to the original owners would be larger than if the stock price were based on the pre-investment expectations only.

rather of investing 100 having an expected yield of 12 per cent.[51] the original capital structure is 50 per cent debt and 50 per cent equity, and 1,000 shares of stock are initially outstanding. then, by Proposition I, the market value of the common stock must be 5,000 or 5 per share. Furthermore, since the interest bill is .04 × 5,000 = 200, the yield on common stock is 500/5,000 = 16 per cent. It may then appear that financing the additional investment of 100 by issuing 20 shares to outsiders at 5 per share would dilute the equity of the original owners since the 100 promises to yield 12 per cent whereas the common stock is currently yielding 16 per cent. Actually, however, the income of the company would rise to 1,012; the value of the firm to 10,120; and the value of the common stock to 5,120. Since there are now 1,020 shares, each would be worth 5.02 and the wealth of the original stockholders would thus have been increased. What has happened is that the dilution in expected earnings per share (from .80 to .7961) has been more than offset, in its effect upon the market price of the shares, by the decrease in leverage.

Our conclusion is, once again, at variance with conventional views,[51] so much so as to be easily misinterpreted. Read hastily, Proposition III seems to imply that the capital structure of a firm is a matter of indifference; and that, consequently, one of the core problems of corporate finance—the problem of the optimal capital structure for a firm—is no problem at all. It may be helpful, therefore, to clear up such possible misunderstandings.

B. *Proposition III and Financial Planning by Firms*

Misinterpretation of the scope of Proposition III can be avoided by remembering that this Proposition tells us only that the type of instrument used to finance an investment is irrelevant to the question of whether or not the investment is worth while. This does not mean that the owners (or the managers) have no grounds whatever for preferring one financing plan to another; or that there are no other policy or technical issues in finance at the level of the firm.

That grounds for preferring one type of financial structure to another will still exist within the framework of our model can readily be seen for the case of common-stock financing. In general, except for something like a widely publicized oil-strike, we would expect the market to place very heavy weight on current and recent past earnings in forming expectations as to future returns. Hence, if the owners of a firm discovered a major investment opportunity which they felt would yield much more than ρ_k, they might well prefer not to finance it via common stock at the then ruling price, because this price may fail to capitalize the new venture. A better course would be a pre-emptive issue of stock (and in this connection it should be remembered that stockholders are free to borrow and buy). Another possibility would be to finance the project initially with debt. Once the project had reflected itself in increased actual earnings, the debt could be retired either with an equity issue at much better prices or through retained earnings. Still another possibility along the same lines might be to combine the two steps by means of a convertible debenture or preferred stock, perhaps with a progressively declining conversion rate. Even such a double-stage financing plan may possibly be regarded as yielding too large a share to outsiders since the new stockholders are, in effect, being given an interest in any similar opportunities the firm may discover in the future. If there is a reasonable prospect that even larger opportunities may arise in the near future and if there is some danger that borrowing now would preclude more borrowing later, the owners might find their interests best protected by splitting off the current opportunity into a separate subsidiary with independent financing. Clearly the problems involved in making the crucial estimates and in planning the optimal financial strategy are by no means trivial, even though they should have no bearing on the basic decision to invest (as long as $\rho^* \geq \rho_k$).[52]

Another reason why the alternatives in financial plans may not be a matter of indifference arises from the fact that managers are concerned with more than simply furthering the interest of the owners. Such other objectives of the management—which need not be necessarily in conflict with those of the owners—are much more likely to be served by some types of financing arrangements than others. In many forms of borrowing agreements, for example, creditors are able to stipulate terms which the current management may regard as infringing on its prerogatives or restricting its freedom to maneuver. The creditors might even be able to insist on having a direct voice in the formation of policy.[53] To the extent, therefore, that financial policies have these implications for the management of the firm, something like the utility approach described in the introductory section becomes relevant to financial (as opposed to investment) decision-making. It is, however, the utility functions of the managers per se and not of the owners that are now involved.[54]

In summary, many of the specific considerations which bulk so large in traditional discussions of corporate finance can readily be superimposed on our simple framework without forcing any drastic (and certainly no systematic) alteration of the conclusion which is our principal concern, namely that for investment decisions, the mar-

[51] In the matter of investment policy under uncertainty there is no single position which represents "accepted" doctrine. For a sample of current formulations, all very different from ours, see Jean Tirole [2, esp. Ch. 3], M. Gordon and E. Shapiro [5], and Harry Roberts [17].

[52] Nor can we rule out the possibility that the existing owners, if unable to use a financing plan which protects their interest, may actually prefer to pass up an otherwise profitable venture rather than give outsiders an "excessive" share of the business. It is presumably in situations of this kind that we could justifiably speak of a shortage of "equity capital," though this kind of market imperfection is likely to be of significance only for small or new firms.

[53] Similar considerations are involved in the matter of dividend policy. Even though the stockholders may be indifferent as to payout policy as long as investment policy is optimal, the management need not be so. Retained earnings involve far fewer threats to control than any of the alternative sources of funds and, of course, involve no underwriting expense or risk. But against these advantages management must balance the fact that sharp changes in dividend rates, which heavy reliance on retained earnings might imply, may give the impression that a firm's finances are being poorly managed, with consequent threats to the control and professional standing of the management.

[54] In principle, at least, this introduction of management's risk preferences with respect to financing methods would do much to reconcile the apparent conflict between Proposition III and such empirical findings as those of Modigliani and Zeman [14] on the close relation between interest rates and the ratio of new debt to new equity issues; or of John Lintner [12] on the considerable stability in target and actual dividend-payout ratios.

ginal cost of capital is ρ_1.

C. The Effect of the Corporate Income Tax on Investment Decisions

In Section I it was shown that when an unintegrated corporate income tax is introduced, the original version of our Proposition I,

$$\bar{X}/V = \rho_1 = \text{a constant},$$

must be rewritten as:

(31)

$$\frac{(\bar{X} - rD)(1 - \tau) + rD}{V} = \frac{\bar{X}^r}{V} = \rho_1{}^r = \text{a constant}.$$

Throughout Section I we found it convenient to refer to $\bar{X}/V$ as the cost of capital. The appropriate measure of the cost of capital relevant to investment decisions, however, is the ratio of the expected return *before* taxes to the market value, *i.e.*, X/V. From (11) above we find:

$$\frac{\bar{X}}{V} = \frac{\rho_1{}^r - \tau_r(D/V)}{1 - \tau} = \frac{\rho_1{}^r}{1 - \tau}\left[1 - \frac{\tau r D}{\rho_1{}^r V}\right], \tag{31}$$

which shows that the cost of capital now depends on the debt ratio, decreasing, as D/V rises, at the constant rate $\tau r/(1-\tau)$.[32] Thus, with a corporate income tax under which interest is a deductible expense, gains can accrue to stockholders from having debt in the capital structure, even when capital markets are perfect. The gains however are small, as can be seen from (31), and as will be shown more explicitly below.

From (31) we can develop the tax-adjusted counterpart of Proposition III by interpreting the term D/V in that equation as the proportion of debt used in any additional financing of V dollars. For example, in the case where the financing is entirely by new common stock, $D = 0$ and the required rate of return $\rho_1{}^s$ on a venture so financed becomes:

$$\rho_1{}^s = \frac{\rho_1{}^r}{1 - \tau}, \tag{32}$$

For the other extreme of pure debt financing $D = V$ and the required rate of return, $\rho_1{}^D$, becomes:

(33)

$$\rho_1{}^D = \frac{\rho_1{}^r}{1 - \tau}\left[1 - \tau\frac{r}{\rho_1{}^r}\right] = \rho_1{}^s\left[1 - \tau\frac{r}{\rho_1{}^r}\right] = \rho_1{}^s - \frac{\tau}{1 - \tau}r.$$[33]

[32] Equation (31) is amenable, in principle, to statistical tests similar to those described in Section I.E. However we have not made any systematic attempt to carry out such tests so far, because neither the Allen nor the Smith study provides the required information. Actually, Smith's data included a very crude estimate of tax liability, and, using this estimate, we did in fact obtain a negative relation between $\bar{X}/V$ and D/V. However, the correlation (—.23) turned out to be significant only at about the 10 per cent level. While this result is not conclusive, it should be remembered that, according to our theory, the slope of the regression equation should be in any event quite small. In fact, with a value of τ in the order of .5, and values of $\rho_1{}^r$ and r in the order of 8.5 and 3.5 per cent respectively (*cf.* Section I.E.) an increase in D/V from 0 to 60 per cent (which is, approximately, the range of variation of this variable in the sample) should tend to reduce the average cost of capital only from about 17 to about 15 per cent.

[33] This conclusion does not extend to preferred stocks even though they have been classed with debt issues previously. Since preferred dividends except for a portion of those of public utilities are not in general deductible from the corporate tax, the cut-off point for new financing via preferred stock is exactly the same as that for common stock.

For investments financed out of retained earnings, the problem of defining the required rate of return is more difficult since it involves a comparison of the tax consequences to the individual stockholder of receiving a dividend versus having a capital gain. Depending on the time of realization, a capital gain produced by retained earnings may be taxed either at ordinary income tax rates, 50 per cent of these rates, 25 per cent, or zero, if held till death. The rate on any dividends received in the event of a distribution will also be a variable depending on the amount of other income received by the stockholder, and with the added complications introduced by the current dividend-credit provisions. If we assume that the managers proceed on the basis of reasonable estimates as to the average values of the relevant tax rates for the owners, then the required return for retained earnings $\rho_1{}^R$ can be shown to be:

(34)

$$\rho_1{}^R = \rho_1{}^r\frac{1}{1 - \tau}\frac{1 - \tau_d}{1 - \tau_g} = \frac{1 - \tau_d}{1 - \tau_g}\rho_1{}^s$$

where τ_d is the assumed rate of personal income tax on dividends and τ_g is the assumed rate of tax on capital gains.

A numerical illustration may perhaps be helpful in clarifying the relationship between these required rates of return. If we take the following round numbers as representative order-of-magnitude values under present conditions: an after-tax capitalization rate $\rho_1{}^r$ of 10 per cent, a rate of interest on bonds of 4 per cent, a corporate tax rate of 50 per cent, a marginal personal income tax rate on dividends of 40 per cent (corresponding to an income of about $25,000 on a joint return), and a capital gains rate of 20 per cent (one-half the marginal rate on dividends), then the required rates of return would be: (1) 20 per cent for investments financed entirely by issuance of new common shares; (2) 16 per cent for investments financed entirely by new debt; and (3) 15 per cent for investments financed wholly from internal funds.

These results would seem to have considerable significance for current discussions of the effect of the corporate income tax on financial policy and on investment. Although we cannot explore the implications of the results in any detail here, we should at least like to call attention to the remarkably small difference between the "cost" of equity funds and debt funds. With the numerical values assumed, equity money turned out to be only 25 per cent more expensive than debt money, rather than something on the order of 5 times as expensive as is commonly supposed to be the case.[34] The reason

[34] See *e.g.*, D. T. Smith [18]. It should also be pointed out that our tax system acts in other ways to reduce the gains from debt financing. Heavy reliance on debt in the capital structure, for example, commits a company to paying out a substantial proportion of its income in the form of interest payments taxable to the owners under the personal income tax. A debt-free company, by contrast, can reinvest in the business all of its (smaller) net income and to this extent subject the owners only to the low capital gains rate (or possibly no tax at all by virtue of the loophole at death). Thus, we should expect a high degree of leverage to be of value to the owners, even in the case of closely held corporations, primarily in cases where their firm was not expected to have much need for additional funds to expand assets and earnings in the future. To the extent that opportunities for growth were available, as they presumably would be for most successful corporations, the interest of the stockholders would tend to be better served by a structure which permitted maximum use of retained earnings.

for the wide difference is that the traditional view starts from the position that debt funds are several times cheaper than equity funds even in the absence of taxes, with taxes serving simply to magnify the cost ratio in proportion to the corporate rate. By contrast, in our model in which the repercussions of debt financing on the value of shares are taken into account, the *only* difference in cost is that due to the tax effect, and its magnitude is simply the tax on the "grossed up" interest payment. Not only is this magnitude likely to be small but our analysis yields the further paradoxical implication that the stockholders' gain from, and hence incentive to use, debt financing is actually smaller the lower the rate of interest. In the extreme case where the firm could borrow for practically nothing, the advantage of debt financing would also be practically nothing.

III. CONCLUSION

With the development of Proposition III the main objectives we outlined in our introductory discussion have been reached. We have in our Propositions I and II at least the foundations of a theory of the valuation of firms and shares in a world of uncertainty. We have shown, moreover, how this theory can lead to an operational definition of the cost of capital and how that concept can be used in turn as a basis for rational investment decision-making within the firm. Needless to say, however, much remains to be done before the cost of capital can be put away on the shelf among the solved problems. Our approach has been that of static, partial equilibrium analysis. It has assumed among other things a state of atomistic competition in the capital markets and an ease of access to those markets which only a relatively small (though important) group of firms even come close to possessing. These and other drastic simplifications have been necessary in order to come to grips with the problem at all. Having served their purpose they can now be relaxed in the direction of greater realism and relevance, a task in which we hope others interested in this area will wish to share.

REFERENCES

1. F. B. ALLEN, "Does Going Into Debt Lower the 'Cost of Capital'?" *Analysts Jour.*, Aug. 1954, *10*, 57–61.
2. J. DEAN, *Capital Budgeting*. New York 1951.
3. D. DURAND, "Costs of Debt and Equity Funds for Business: Trends and Problems of Measurement" in Nat. Bur. Econ. Research, *Conference on Research in Business Finance*. New York 1952, pp. 215–47.
4. W. J. EITEMAN, "Financial Aspects of Promotion," in *Essays on Business Finance* by M. W. Waterford and W. J. Eiteman. Ann Arbor, Mich. 1952, pp. 1–17.
5. M. J. GORDON and E. SHAPIRO, "Capital Equipment Analysis: The Required Rate of Profit," *Manag. Sci.*, Oct. 1956, *3*, 102–10.
6. B. GRAHAM and L. DODD, *Security Analysis*, 3rd ed. New York 1951.
7. G. GUTHMANN and H. E. DOUGALL, *Corporate Financial Policy*, 3rd ed. New York 1955.
8. J. R. HICKS, *Value and Capital*, 2nd ed. Oxford 1946.
9. P. HUNT and M. WILLIAMS, *Case Problems in Finance*, rev. ed. Homewood, Ill. 1954.
10. J. M. KEYNES, *The General Theory of Employment, Interest and Money*. New York 1936.
11. O. LANGE, *Price Flexibility and Employment*. Bloomington, Ind. 1944.
12. J. LINTNER, "Distribution of Incomes of Corporations among Dividends, Retained Earnings and Taxes," *Am. Econ. Rev.*, May 1956, *46*, 97–113.
13. F. LUTZ and V. LUTZ, *The Theory of Investment of the Firm*. Princeton 1951.
14. F. MODIGLIANI and M. ZESSAN, "The Effect of the Availability of Funds, and the Terms Thereof, on Business Investment" in Nat. Bur. Econ. Research, *Conference on Research in Business Finance*. New York 1952, pp. 263–309.
15. W. A. MORTON, "The Structure of the Capital Market and the Price of Money," *Am. Econ. Rev.*, May 1952, *42*, 452–61.

16. S. M. ROBBINS, *Managing Securities*. Boston 1954.
17. H. V. ROBERTS, "Current Problems in the Economics of Capital Budgeting," *Jour. Bus.*, 1957, *30* (1), 12–16.
18. D. T. SMITH, *Effects of Taxation on Corporate Financial Policy*. Boston 1952.
19. R. SMITH, "Cost of Capital in the Oil Industry," (hectograph). Pittsburgh: Carnegie Inst. Tech. 1955.
20. H. M. SOMERS, "'Cost of Money' as the Determinant of Public Utility Rates," *Buffalo Law Rev.*, Spring 1955, *4*, 1–13.
21. J. B. WILLIAMS, *The Theory of Investment Value*. Cambridge, Mass. 1938.
22. U. S. Federal Communications Commission, *The Problem of the "Rate of Return" in Public Utility Regulation*. Washington 1938.

the firm can find sufficient investment opportunities so that it is profitable to raise funds in the open market.[36]

Our conclusion is, therefore, that the net cash flow is the relevant earnings stream to use in capital budgeting because this is the earnings stream which influences stockholders' wealth. The rate at which this stream should be discounted and the effect of the financing decisions on this discount rate are the most important problems that need to be solved.

[36] Once we introduce personal taxes and flotation costs, all internal funds should be exhausted before any borrowing is done.

CORPORATE INCOME TAXES AND THE COST OF CAPITAL*

By Franco Modigliani† and Merton H. Miller‡

THE PURPOSE of this communication is to correct an error in our paper "The Cost of Capital, Corporation Finance and the Theory of Investment" (this *Review*, June 1958). In our discussion of the effects of the present method of taxing corporations on the valuation of firms, we said (p. 272):

> The deduction of interest in computing taxable corporate profits will prevent the arbitrage process from making the value of all firms in a given class proportional to the expected returns generated by their physical assets. Instead, it can be shown (by the same type of proof used for the original version of Proposition I) that *the market values of firms in each class must be proportional to equilibrium to their expected returns net of taxes (that is, to the sum of the interest paid and expected net stockholder income).* (Italics added.)

The statement in italics, unfortunately, is wrong. For even though one firm may have an *expected* return after taxes (our $\bar{X}'$) twice that of another firm in the same risk-equivalent class, it will not be the case that the *actual* return after taxes (our X') of the first firm will always be twice that of the second, if the two firms have different degrees of leverage.[1] And since the distribution of returns after taxes of the two firms will not be proportional, there can be no "arbitrage" process which forces their values to be proportional to their expected after-tax returns.[2] In fact, it can be shown—and this time it really will be shown—that "arbitrage" will make values within any class a function not only of expected after-tax returns, but of the tax rate and the degree of lever-

* Reprinted by permission from *The American Economic Review*, 53 (June 1963), pp. 433–43.

† Professor of Industrial Management, Massachusetts Institute of Technology.

‡ Edward Eagle Brown Professor of Finance and Economics, University of Chicago.

[1] With some exceptions, which will be noted when they occur, we shall preserve here both the notation and the terminology of the original paper. A working knowledge of both on the part of the reader will be presumed.

[2] Barring, of course, the trivial case of universal linear utility functions. Note that in reference to Professor Durand (see his Comment on our paper and our reply, this *Review*, [illegible] 1959, pp. 639-69) we here and throughout use quotation marks when referring to [illegible]

age. This means, among other things, that the tax advantages of debt here are somewhat greater than we originally suggested and, to this extent, the quantitative difference between the valuations implied by our position and by the traditional view is narrowed. It still remains true, however, that under our analysis the tax advantages of debt are the *only* permanent advantages so that the gulf between the two views in matters of interpretation and policy is as wide as ever.

I. TAXES, LEVERAGE, AND THE PROBABILITY DISTRIBUTION OF AFTER-TAX RETURNS

To see how the distribution of after-tax earnings is affected by leverage, let us again denote by the random variable X the (long-run average) earnings before interest and taxes generated by the currently owned assets of a given firm in some stated risk class, k.[1] From our definition of a risk class it follows that X can be expressed in the form $\bar{X}Z$, where $\bar{X}$ is the expected value of X, and the random variable $Z = X/\bar{X}$, having the same value for all firms in class k, is a drawing from a distribution, say $f_k(Z)$. Hence the random variable X', measuring the after-tax return, can be expressed as:

$$X' = (1 - r)(X - R) + R = (1 - r)X + rR = (1 - r)\bar{X}Z + rR \qquad (1)$$

where r is the marginal corporate income tax rate (assumed equal to the average), and R is the interest bill. Since $E(X') = \bar{X}' = (1 - r)\bar{X} + rR$ we can substitute $\bar{X}' - rR$ for $(1 - r)\bar{X}$ in (1) to obtain:

$$X' = (\bar{X}' - rR)Z + rR = \bar{X}'\left(1 - \frac{rR}{\bar{X}'}\right)Z + rR. \qquad (2)$$

Thus, if the tax rate is other than zero, the shape of the distribution of X' will depend not only on the "scale" of the stream $\bar{X}'$ and on the distribution of Z, but also on the tax rate and the degree of leverage (one measure of which is $R/\bar{X}'$). For example, if $\mathrm{Var}\,(Z) = \sigma^2$, we have:

$$\mathrm{Var}\,(X') = r^2(\bar{X}')^2\left(1 - r\,\frac{R}{\bar{X}'}\right)^2$$

[1] Thus our X corresponds essentially to the familiar EBIT concept of the finance literature. The use of EBIT and related "income" concepts as the basis of valuation is strictly valid only when the underlying real assets are assumed to have perpetual lives. In such a case, of course, EBIT and "cash flow" are one and the same. This was, in effect, the interpretation of X we used in the original paper and we shall retain it here both to preserve continuity and for the considerable simplification it permits in the exposition. We should point out, however, that the perpetuity interpretation is much less restrictive than might appear at first glance. Before-tax cash flow and EBIT can also safely be equated even where assets have finite lives as soon as these assets attain a steady state set distribution in which annual replacements equal annual depreciation. The subject of finite lives of assets will be further discussed in connection with the problem of the cut-off rate for investment decisions.

which that for given $\bar{X}'$ the variance of after-tax returns is smaller, the lower r and the degree of leverage.[2]

II. THE VALUATION OF AFTER-TAX RETURNS

Note from equation (1) that, from the investor's point of view, the long-run average stream of after-tax returns appears as a sum of two components: (1) an uncertain stream $(1 - r)\bar{X}Z$; and (2) a sure stream rR.[3] This suggests that the equilibrium market value of the combined stream can be found by capitalizing each component separately. More precisely, let ρ' be the rate at which the market capitalizes the expected returns net of tax of an unlevered company of size $\bar{X}$ in class k, i.e.,

$$\rho' = \frac{(1 - r)\bar{X}}{V_U} \quad \text{or} \quad V_U = \frac{(1 - r)\bar{X}}{\rho'},^4$$

and let r be the rate at which the market capitalizes the sure streams generated by debts. For simplicity, assume this rate of interest is a constant independent of the size of the debt so that

$$r = \frac{R}{D} \quad \text{or} \quad D = \frac{R}{r}.^5$$

Then we would expect the value of a levered firm of size $\bar{X}$, with a permanent level of debt D_L in its capital structure, to be given by:

[2] It may seem paradoxical at first to say that leverage *reduces* the variability of outcomes, but remember we are here discussing the variability of total returns, interest plus net profits. The variability of stockholder net profits will, of course, be greater in the presence than in the absence of leverage, though relatively less so than in an otherwise comparable world of no taxes. The reasons for this will become clearer after the discussion in the next section.

[3] The statement that rR—the tax saving per period on the interest payment—is a sure stream is subject to two qualifications. First, it must be the case that firms can always obtain the tax benefit of their interest deductions either by offsetting them directly against other taxable income in the year incurred; or, in the event no such income is available in any given year, by carrying them backward or forward against past or future taxable earnings; or, in the extreme case, by merger of the firm with (or its sale to) another firm that can utilize the deduction. Second, it must be assumed that the tax rate will remain the same. To the extent that neither of these conditions holds exactly there some uncertainty attaches even to the tax savings, though, of course, it is of a different kind and order from that attaching to the stream generated by the assets. For simplicity, however, we shall here ignore these possible elements of delay or of uncertainty in the tax saving; but it should be kept in mind that this neglect means that the subsequent valuation formulas overstate, if anything, the value of the tax saving for any given permanent level of debt.

[4] Note that here, as in our original paper, we neglect dividend policy and "growth" in the sense of opportunities to invest at a rate of return greater than the market rate of return. These subjects are treated extensively in our paper, "Dividend Policy, Growth and the Valuation of Shares," *Jour. Bus.*, Univ. Chicago, Oct. 1961, 411–33.

[5] Here and throughout, the corresponding formulas when the rate of interest rises with leverage can be obtained merely by substituting $r(L)$ for r, where L is some suitable measure of leverage.

$$V_L = \frac{(1-\tau)\bar{X}}{\rho'} + \frac{\tau R}{r} = V_U + \tau D_L.^{*} \tag{3}$$

In our original paper we asserted instead that, within a risk class, market value would be proportional to expected after-tax return $\bar{X}'$ (cf. our original equation [11]), which would imply:

$$V_L = \frac{\bar{X}'}{\rho'} = \frac{(1-\tau)\bar{X}}{\rho'} + \frac{\tau R}{\rho'} = V_U + \frac{r}{\rho'}\tau D_L. \tag{4}$$

We will now show that if (3) does not hold, investors can secure a more efficient portfolio by switching from relatively overvalued to relatively undervalued firms. Suppose first that unlevered firms are overvalued or that

$$V_L - \tau D_L < V_U.$$

An investor holding m dollars of stock in the unlevered company has a right to the fraction m/V_U of the eventual outcome, i.e., has the uncertain income

$$Y_U = \left(\frac{m}{V_U}\right)(1-\tau)\bar{X}Z.$$

Consider now an alternative portfolio obtained by investing m dollars as follows: (1) the portion,

$$m\left(\frac{S_L}{S_L + (1-\tau)D_L}\right),$$

is invested in the stock of the levered firm, S_L; and (2) the remaining portion,

$$m\left(\frac{(1-\tau)D_L}{S_L + (1-\tau)D_L}\right),$$

is invested in its bonds. The stock component entitles the holder to a fraction,

$$\frac{m}{S_L + (1-\tau)D_L},$$

of the net profits of the levered company or

$$\left(\frac{m}{S_L + (1-\tau)D_L}\right)[(1-\tau)(\bar{X}Z - R_L)].$$

The holding of bonds yields

$$\left(\frac{m}{S_L + (1-\tau)D_L}\right)[(1-\tau)R_L].$$

Hence the total outcome is

$$Y_L = \left(\frac{m}{(S_L + (1-\tau)D_L)}\right)[(1-\tau)\bar{X}Z]$$

*The assumption that the debt is permanent is not necessary for the analysis [illegible] employed here [illegible] to maintain continuity with the original model and because [illegible] on the value of the tax saving. See in this connection footnote 5 [illegible]

and this will dominate the uncertain income Y_U if (and only if)

$$S_L + (1-\tau)D_L = S_L + D_L - \tau D_L = V_L - \tau D_L < V_U.$$

Thus, in equilibrium, V_U cannot exceed $V_L - \tau D_L$, for if it did investors would have an incentive to sell shares in the unlevered company and purchase the shares (and bonds) of the levered company.

Suppose now that $V_L - \tau D_L > V_U$. An investment of m dollars in the stock of the levered firm entitles the holder to the outcome

$$\begin{aligned} Y_L &= (m/S_L)[(1-\tau)(\bar{X}Z - R_L)] \\ &= (m/S_L)(1-\tau)\bar{X}Z - (m/S_L)(1-\tau)R_L. \end{aligned}$$

Consider the following alternative portfolio: (1) borrow an amount $(m/S_L)(1-\tau)D_L$ for which the interest cost will be $(m/S_L)(1-\tau)R_L$ (assuming, of course, that individuals and corporations can borrow at the same rate, r); and (2) invest m plus the amount borrowed, i.e.,

$$m + \frac{m(1-\tau)D_L}{S_L} = m\frac{S_L + (1-\tau)D_L}{S_L} = (m/S_L)[V_L - \tau D_L]$$

in the stock of the unlevered firm. The outcome so secured will be

$$(m/S_L)\left(\frac{V_L - \tau D_L}{V_U}\right)(1-\tau)\bar{X}Z.$$

Subtracting the interest charges on the borrowed funds leaves an income of

$$Y_U = (m/S_L)\left(\frac{V_L - \tau D_L}{V_U}\right)(1-\tau)\bar{X}Z - (m/S_L)(1-\tau)R_L$$

which will dominate Y_L if (and only if) $V_L - \tau D_L > V_U$. Thus, in equilibrium, both $V_L - \tau D_L > V_U$ and $V_L - \tau D_L < V_U$ are ruled out and (3) must hold.

III. SOME IMPLICATIONS OF FORMULA (3)

To see what is involved in replacing (4) with (3) as the rule of valuation, note first that both expressions make the value of the firm a function of leverage and the tax rate. The difference between them is a matter of the size and source of the tax advantages of debt financing. Under our original formulation, values within a class were strictly proportional to expected earnings after taxes. Hence the tax advantage of debt was due solely to the fact that the deductibility of interest payments implied a higher level of after-tax income for any given level of before-tax earnings (i.e., higher by the amount τR since $(1-\tau)\bar{X} + \tau R$). Under the corrected rule (3), however, there is an additional gain due to the fact that the extra after-tax earnings, τR, represent [illegible] in contrast to the [illegible]

capitalized at the more favorable certainty rate, $1/r$, rather than at the rate for uncertain streams, $1/\rho^*$.

Since the difference between (3) and (4) is solely a matter of the rate at which the tax savings on interest payments are capitalized, the required changes in all formulas and expressions derived *from* (4) are reasonably straightforward. Consider, first, the before-tax earnings yield, i.e., the ratio of expected earnings before interest and taxes to the value of the firm.[10] Dividing both sides of (3) by V and by $(1 - \tau)$ and simplifying we obtain:

$$\frac{\bar{X}}{V} = \frac{\rho^*}{1-\tau}\left[1 - \tau\frac{D}{V}\right] \tag{31.c}$$

which replaces our original equation (31) (p. 294). The new relation differs from the old in that the coefficient of D/V in the original (31) was smaller by a factor of τ/ρ^*.

Consider next the after-tax earnings yield, i.e., the ratio of interest payments plus profits after taxes to total market value.[11] This concept was discussed extensively in our paper because it helps to bring out more clearly the differences between our position and the traditional view, and because it facilitates the construction of empirical tests of the two hypotheses about the valuation process. To see what the new equation (3) implies for this yield we need merely substitute $\bar{X}^* - \tau R$ for $(1 - \tau)\ \bar{X}$ in (3) obtaining:

$$V = \frac{\bar{X}^* - \tau R}{\rho^*} + \tau D = \frac{\bar{X}^*}{\rho^*} + \tau\frac{\rho^* - r}{\rho^*}D, \tag{5}$$

from which it follows that the after-tax earnings yield must be:

$$\frac{\bar{X}^*}{V} = \rho^* - \tau(\rho^* - r)D/V. \tag{11.c}$$

This replaces our original equation (11) (p. 272) in which we had simply $\bar{X}^*/V = \rho^*$. Thus, in contrast to our earlier result, the corrected version (11.c) implies that even the after-tax yield is affected by leverage. The predicted rate of decrease of $\bar{X}^*/V$ with D/V, however, is still considerably smaller than under the naive traditional view, which, as we showed, implied essentially $\bar{X}^*/V = \rho^* - (\rho^* - r)D/V$. See our equation (17) and the discussion immediately preceding it (p. 277).[12] And, of course, (11.c) implies that the effect of leverage on $\bar{X}^*/V$ is *solely* a matter of the deductibility of interest payments whereas, under the traditional view, going into debt would lower the cost of capital regardless of the method of taxing corporate earnings.

Finally, we have the matter of the after-tax yield on *equity* capital, i.e., the ratio of net profits after taxes to the value of the shares.[13] By subtracting D from both sides of (5) and breaking $\bar{X}^*$ into its two components—expected net profits after taxes, $\bar{\pi}^*$, and interest payments, $R = rD$—we obtain after simplifying:

$$S = V - D = \frac{\bar{\pi}^*}{\rho^*} - (1 - \tau)\left(\frac{\rho^* - r}{\rho^*}\right)D. \tag{6}$$

From (6) it follows that the after-tax yield on equity capital must be:

$$\frac{\bar{\pi}^*}{S} = \rho^* + (1 - \tau)(\rho^* - r)D/S \tag{12.c}$$

which replaces our original equation (12), $\bar{\pi}^*/S = \rho^* + (\rho^* - r)\,D/S$ (p. 272). The new (12.c) implies an increase in the after-tax yield on equity capital as leverage increases which is smaller than that of our original (12) by a factor of $(1 - \tau)$. But again, the linear increasing relation of the corrected (12.c) is still fundamentally different from the naive traditional view which asserts the cost of equity capital to be completely independent of leverage (at least as long as leverage remains within "conventional" industry limits).

IV. TAXES AND THE COST OF CAPITAL

From these corrected valuation formulas we can readily derive corrected measures of the cost of capital in the capital budgeting sense of the minimum prospective yield an investment project must offer to be just worth undertaking from the standpoint of the present stockholders. If we interpret earnings streams as perpetuities, as we did in the original paper, then we actually have two equally good ways of defining this minimum yield: either by the required increase in before-tax earnings, dX, or by the required increase in earnings net of taxes, $dX(1 - \tau)$.[14] To conserve space, however, as well as to

[10] Remember, however, that in one sense formula (3) gives only an upper bound on the value of the firm since $\tau R/r = \tau D$ is an exact *measure* of the value of the tax saving only where both the tax rate and the level of debt are assumed to be fixed forever (and where the firm is certain to be able to use its interest deduction to reduce taxable income either directly or via transfer of the loss to another firm). Alternative versions of (3) can readily be developed for cases in which the debt is not assumed to be permanent, but rather to be outstanding only for some specified finite length of time. For reasons of space, we shall not pursue this line of inquiry here beyond observing that the shorter the debt period considered, the closer does this valuation formula approach our original (4). Hence, the latter is perhaps still of some interest if only as a lower bound.

[11] Following usage common in the field of finance we referred to this yield as the "average cost of capital." We feel now, however, that the term "before-tax earnings yield" would be preferable both because it is more immediately descriptive and because it releases the term "cost of capital" for use in discussions of optimal investment policy (in accord with standard usage in the capital budgeting literature).

[12] We referred to this yield as the "after-tax cost of capital." Cf. the previous footnote.

[12] The i_j^* of (17) is the same as ρ^* in the present context, each measuring the ratio of net profits to the value of the shares (and hence of the whole firm) in an unlevered company of the class.

[13] We referred to this yield as the "after-tax cost of equity capital." Cf. footnote 9.

[14] Note that we use the term "earnings net of taxes" rather than "earnings after taxes." We feel that to avoid confusion the latter term should be reserved to describe what will actually appear in the firm's accounting statements, namely the net cash flow including the tax savings on the interest (our $\bar{X}^*$). Since financing sources cannot in general be allocated to particular investments (see below), the after-tax or accounting concept is not useful for capital budgeting purposes, although it can be extremely useful for valuation purposes.

maintain continuity with the original paper, we shall concentrate here on the before-tax case with only brief footnote references to the net-of-tax concept.

Analytically, the derivation of the cost of capital in the above sense amounts to finding the minimum value of $d\bar{X}/dI$ for which $dV = dI$, where I denotes the level of new investment.[13] By differentiating (3) we see that:

$$\frac{dV}{dI} = \frac{1-r}{\rho'}\frac{d\bar{X}}{dI} + r\frac{dD}{dI} \geq 1 \quad \text{if} \quad \frac{d\bar{X}}{dI} \geq \frac{1-r\dfrac{dD}{dI}}{1-r}\rho'. \tag{7}$$

Hence the before tax required rate of return cannot be defined without reference to financial policy. In particular, for an investment considered as being financed entirely by new equity capital $dD/dI = 0$ and the required rate of return or marginal cost of equity financing (neglecting flotation costs) would be:

$$\rho^s = \frac{\rho'}{1-r}.$$

This result is the same as that in the original paper (see equation (32), p. 291) and is applicable to any other sources of financing where the remuneration to the suppliers of capital is not deductible for tax purposes. It applies, therefore, to preferred stock (except for certain partially deductible issues of public utilities) and would apply also to retained earnings were it not for the favorable tax treatment of capital gains under the personal income tax.

For investments considered as being financed entirely by new debt capital $dI = dD$ and we find from (7) that:

$$\rho^D = \rho' \tag{33.c}$$

which replaces our original equation (33) in which we had:

$$\rho^D = \rho' - \frac{r}{1-r}R. \tag{33}$$

Thus for borrowed funds (or any other tax-deductible source of capital) the marginal cost or before-tax required rate of return is simply the market rate of capitalization for net of tax unlevered streams and is thus independent of both the tax rate and the interest rate. This required rate is lower than that implied by our original (33), but still considerably higher than that implied by the traditional view (see esp. pp. 276–77 of our paper) under which the before-tax cost of borrowed funds is simply the interest rate, r.

Having derived the above expressions for the marginal costs of debt and equity financing it may be well to warn readers at this point that these expressions represent at best only the hypothetical extremes insofar as costs are

[13] Remember that when we speak of the minimum required yield on an investment we are referring in principle only to investments which increase the *scale* of the firm. That is, the new assets must be in the same "class" as the old. See in this connection, J. Hirshleifer, "Investment Decision under Uncertainty: Applications of the State-Preference Approach," *Qu. Jour. Econ.*, May 1966, 80, 11; [illegible] and Investment Decisions," *Am. Econ. Rev.*, May 1961, 51, 11;

concerned and that neither is directly usable as a cut-off criterion for investment planning. In particular, care must be taken to avoid falling into the famous "Liquigas" fallacy of concluding that if a firm intends to float a bond issue in some given year then its cut-off rate should be set that year at ρ^s; while, if the next issue is to be an equity one, the cut-off is ρ^s. The point is, of course, that no investment can meaningfully be regarded as 100 per cent equity financed if the firm makes any use of debt capital—and *most* firms do, *not* only for the tax savings, but for many other reasons having nothing to do with "cost" in the present static sense (*cf.* our original paper pp. 292–93). And no investment can meaningfully be regarded as 100 per cent debt financed when lenders impose strict limitations on the maximum amount a firm can borrow relative to its equity (and when most firms actually plan on normally borrowing less than this external maximum so as to leave themselves with an emergency reserve of unused borrowing power). Since the firm's long-run capital structure will thus contain both debt and equity capital, investment planning must recognize that, over the long pull, *all* of the firm's assets are really financed by a mixture of debt and equity capital even though only one kind of capital may be raised in any particular year. More precisely, if L^* denotes the firm's long-run "target" debt ratio (around which its actual debt ratio will fluctuate as it "alternately" floats debt issues and retires them with internal or external equity) then the firm can assume, to a first approximation at least, that for any particular investment $dD/dI = L^*$. Hence, the relevant marginal cost of capital for investment planning, which we shall here denote by ρ^*, is:

$$\rho^* = \frac{1-rL^*}{1-r}\rho' = \rho^s - \frac{r}{1-r}\rho^D L^* = \rho^s(1-L^*) + \rho^D L^*.$$

That is, the appropriate cost of capital for (repetitive) investment decisions over time is, to a first approximation, a weighted average of the costs of debt and equity financing, the weights being the proportions of each in the "target" capital structure.[14]

[14] From the formulas in the text one can readily derive corresponding expressions for the required net-of-tax yield, or net-of-tax cost of capital for any given financing policy. Specifically, let $\bar{\rho}(L)$ denote the required net-of-tax yield for investment financed with a proportion of debt $L = dD/dI$. (More generally L denotes the proportion financed with tax deductible sources of capital.) Then from (7) we find:

$$\bar{\rho}(L) = (1-r)\frac{d\bar{X}}{dI} = (1-Lr)\rho' \tag{8}$$

and the various costs can be found by substituting the appropriate value for L. In particular, if we substitute in this formula the "target" leverage ratio, L^*, we obtain:

$$\bar{\rho}^* = \bar{\rho}(L^*) = (1-rL^*)\rho'$$

and $\bar{\rho}^*$ measures the average net-of-tax cost of capital in the sense described above.

Although the before-tax and the net-of-tax approaches to the cost of capital provide equally good criteria for investment decisions when assets are assumed to generate perpetual (i.e., non-depreciating) streams, such is not the case when [illegible]

KENTUCKY POWER COMPANY
American Electric Power
ATTORNEY GENERALS FIRST SET
DATA REQUEST
Case No. 2005-00341

Item No. 220

With reference to page 32, lines 14-23, please (a) provide copies of the FERC Opinion No. 445 (92FERC61,070) and FERC Opinion 456 (98FERC61,333); (b) indicate the prescribed methodology in the FERC Opinions; (c) demonstrate how Mr. Moul's approach differs from the FERC procedure; and (d) indicate all cases before regulatory commissions (as indicated by company name, the docket number, the filing date) over the 2003-2005 period in which Mr. Moul has employed this alternative DCF approach in estimating an equity cost rate for a utility.

Response

a) Copies of FERC Opinion 445 and 456 are attached to the response to item 48 of the Second Data Request of the Commission Staff.

b) The FERC orders describe the prescribed methodology.

c) Mr. Moul's approach does not differ from the FERC procedure.

d) The electric cases are:

Company	Jurisdiction	Docket No.
AEP-FERC	FERC	Docket No. ER05-751-000
Kentucky Power	P. S. C. of KY	Case No. 2005-00341
Appalachian Power	Public Service Commission of WV	No. 05-1278-E-PC-PW-42T
Georgia Power Co.	Georgia Public Service Commission	Docket No. 18300-U
Savannah Electric Co.	Georgia Public Service Commission	Docket No. 19758-U

In addition to the cases listed above, Mr. Moul has frequently employed this type of analysis in rebuttal testimony.

Witness: Paul R. Moul

KENTUCKY POWER COMPANY
American Electric Power
ATTORNEY GENERALS FIRST SET
DATA REQUEST
Case No. 2005-00341

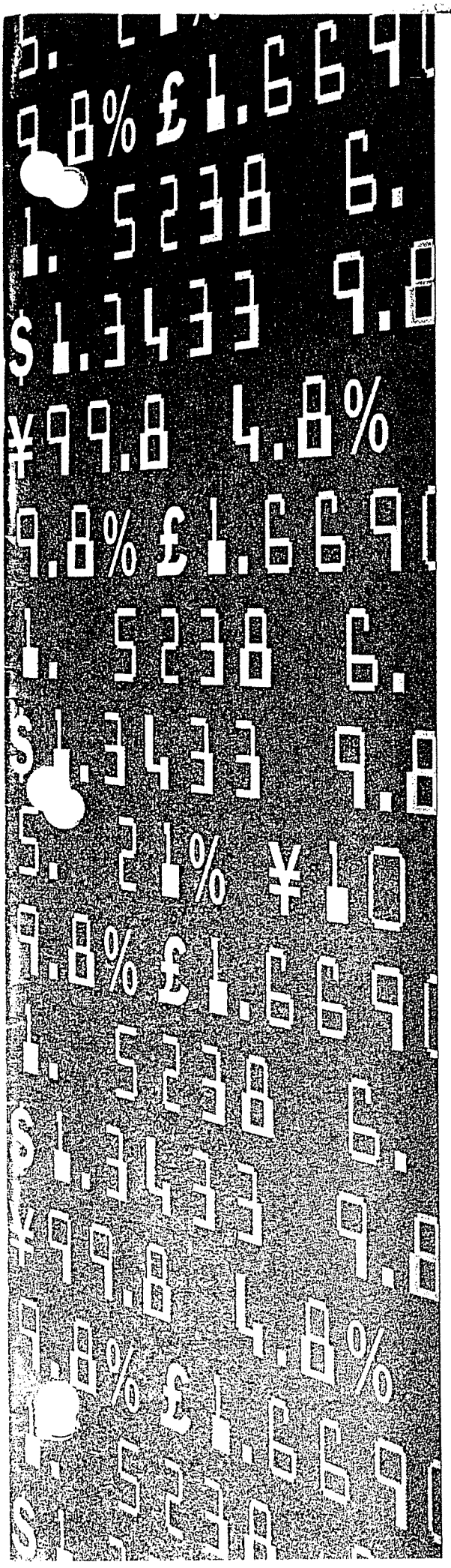
Item No. 221

With reference to page 37, lines 1-10, please provide copies of the source documents for the interest rate forecasts.

Response

A copy of the source documents are attached.

Witness: Paul R. Moul



BLUE CHIP FINANCIAL FORECASTS

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them.

Vol. 24, No. 7
July 1, 2005

ASPEN
PUBLISHERS

BLUE CHIP FINANCIAL FORECASTS

EXECUTIVE EDITOR:
RANDELL E. MOORE
3663 Madison Ave.
Kansas City, MO 64111
Phone (816) 931-0131
Fax (816) 931-0430
E-mail: randell.moore@aspenpubl.com

Publisher: Paul Gibson
V.P., Circulation: Gerry Centrowitz
Marketing Manager: Dom Cervi

Blue Chip Financial Forecasts (ISSN: 0741-8345) is published monthly by Aspen Publishers, 1185 Avenue of the Americas, New York, NY 10036. All rights reserved. Printed in the U.S.A.

Subscriptions: $695 per year for print or e-mail delivery of 12 monthly issues. $825 per year for both print and e-mail delivery of 12 monthly issues. For multiple-copy rates and site-license agreements call Terry Watkins toll free at 866-873-9156, or contact her at terry.watkins@aspenpublishers.com

Customer Service: 1-800-234-1660
To Order: 1-800-638-8437
Customer Service Fax: 1-800-901-9075
E-mail: customer.service@aspenpubl.com
Web Sites:www.aspenpublishers.com
www.bluechippubs.com

TABLE OF CONTENTS

Speculation Heats Up About When Fed Will Halt Its Tightening Cycle

Domestic Commentary A variety of factors contributed to a further run-up in long-term Treasury prices over the past month. While the Federal Open Market Committee (FOMC) is universally expected to raise its Federal funds rate target by 25 basis points to 3.25% at the conclusion of its June 29th-30th meeting, market speculation has increased that the FOMC might call a sooner-than-expected end to its tightening campaign. Prices of longer-dated Treasuries are also being buoyed by concern among some that high energy costs will inevitably slow economic growth both here and abroad and cap the rise in core inflation. Bringing a further bid to Treasuries are low European bond yields, a continued rise in the value of the U.S. dollar and talk that the Bank of England and the European Central Bank might actually cut rates by year's end. The gains have pushed longer-term Treasury yields to near their lowest levels in about two years.

Kicking off increased talk this month of a sooner-than-expected end to the Fed's tightening cycle was Dallas Fed president Richard Fisher's comment during a June 1st interview on CNBC that tightening was in the "8th inning with the 9th inning coming up in late June." In a subsequent *Wall Street Journal* article, Fisher attempted to clarify his remarks by saying, "the next meeting in June is the 9th inning. We'll take a look after that. We may go into extra innings in the contest against inflation. ...The economy is still strong. It's inflation that's still a risk." Despite these caveats, many market participants interpreted his comments to mean that the FOMC would tighten at its June 29th-30th meeting and call its quits.

Subsequent remarks by Fed Chairman Alan Greenspan, as well as other FOMC members, however, seemed specifically designed to downplay Fisher's comments. For example, in testimony before the Congress's Joint Economic Committee on June 9th, Greenspan said the economy seems to be on a reasonably firm footing, that underlying inflation remains contained, and reiterated his mantra that "policy accommodation can be removed at a pace that is likely to be measured." When he was asked during the Q&A if "policy neutrality" might exist around the 3.5% level for the federal funds rate, he hedged and said it was difficult to predict but that "we'll know it when we get there." In a recent hometown speech, Kansas City Fed President Tom Hoenig noted that "inflation is not a concern to him but it is still a fact that it has ticked higher" and required Fed vigilance. He added that policy is "still accommodative" and that the "Fed wants to get to a neutral rate range (3.5%-4.5% according to most analysts) sooner rather than later." Richmond Fed President Jeffrey Lacker also has expressed support for additional rate hikes, noting that policy remains "fairly accommodative at these rates" and that "it is too early to say when we're going to stop."

The Beige Book prepared for the FOMC's late-June meeting seemed to underscore most policymakers' belief that the economy continues to perform reasonably well. Business activity in all 12 districts was reported to be expanding, retail activity was mixed, but some of the disappointment in sales was laid at the feet of unseasonably cool weather. Labor markets were reported to have improved in most districts. Price pressures were said to be moderate, but several districts reported some concern over high fuel, transportation and building material costs. There was nothing in the report to suggest any deviation from the Fed's policy course of "measured" rate hikes.

As a result, most analysts appear not to expect major changes in the FOMC's June 29th-30th policy statement. It is likely to retain the key phrase that policy remains "accommodative" and that policymakers believe they can continue to tighten at a "measured pace." However, we could see policymakers at least acknowledge that the degree of policy accommodation has been reduced over the past year and that future policy changes will be more data dependent that in the past. We might also see a somewhat improved assessment of economic growth now that earlier evidence of a "soft patch" has dissipated. The assessment of the outlook for inflation will likely remain benign.

Upcoming data for June is likely to support Fed policymakers' contention that the U.S. economy continues to grow at a healthy pace. Nonfarm payrolls are expected to rise by 175,000 or so following the disappointing 78,000 increase in May. Retail sales in June will likely post a substantial improvement over the 0.5% decline in May. Vehicle sales appear to be running at a strong rate, boosted by new sales incentives. Moreover, the return of more seasonable weather is reported to be producing a rebound in sales of summer apparel and most likely building supplies. Watched for closely will be any signs of a further improvement in the manufacturing sector. While the Institute of Supply Management's (ISM) May index of activity in the factory sector slipped to a two-year low of 51.4, the Fed reported that manufacturing production during the month scored a nice gain of 0.6% following declines in the prior two months. Moreover, housing starts and home sales likely remained robust during June as mortgage rates fell. Inflation figures for June may not be as encouraging to the bond market as those for May when the Consumer Price Index fell 0.1% -- the first drop since last July -- and the y/y change in the core CPI slipped back to 2.2%.

Based on our June 20th-21st survey, the consensus predict that following a quarter-point move on June 30th, the FOMC will enact two additional quarter-point rate hikes by the end of this year, bringing its target for the federal funds rate to 3.75%. As of the June 22nd close, the Federal funds rate futures contract remained fully priced for a 25 basis point rate hike at the FOMC's June meeting, as well as one at the FOMC's August 9th meeting. However, the futures market was only pricing in about 44% chance of a quarter-point hike in the funds rate to 3.75% at the September 20th meeting. While a 3.75% funds rate was fully priced in by year's end, the futures market now puts the odds of a 4.0% funds rate target by year's end at just 20%. The markets have generally priced out any additional tightening in 2006 while the consensus still sees perhaps an additional 50 basis points of rate hikes from the FOMC.

Most of our panelists remain perplexed - and so far wrong - about the direction of longer-dated Treasury yields. The decline in long-term yields over the past year as the Fed raised short-term rates by 200 basis points has been unprecedented. While a handful of our panelists have embraced the idea that low long-term yields are here to stay for a while, a large majority remain skeptical that current levels are sustainable. As a result, the consensus continues to predict a rebound in longer-term yields over the forecasts horizon. While still labeling low bond yields a "conundrum" the semi-official explanation from the Fed is that a glut of global savings have pushed bond yields lower. Other possible explanations include Asian central bank purchases; an aging population in much of the industrialized world that desires increasing, dependable streams of income; increased pension fund demand in order to better match long-term liabilities with long-term assets; and the possibility of a sharper than expected slowdown in global economic growth. The truth is no one knows.

Consensus Forecasts The consensus predicts real GDP growth of 3.3% in Q2 and a second half 2005 growth rate of about 3.5%. Inventories are expected to be a significant drag on growth in the current quarter. Growth next year is put at a trend-like 3.3%. Consumer price inflation of about 2.5% is predicted over the forecast horizon *(see page 2 for summary of this month's U.S. consensus forecasts).*

Special Questions About 86% of the panelists believe the FOMC's June 29-30th policy statement will state that policy accommodation can continued to be removed at a "measured pace." The consensus predicts the core CPI will increase 2.4% on a y/y basis in 2005 and 2.5% in 2006 *(see page 14 for details).*

Consensus Forecasts Of U.S. Interest Rates And Key

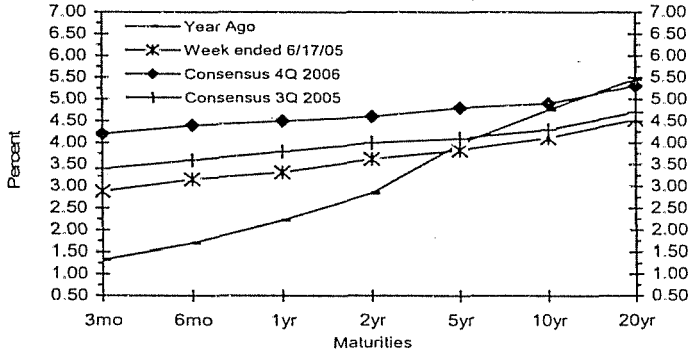
	History				History			Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q*	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	June 17	June 10	June 3	May 27	May	Apr.	Mar.	2Q 2005	2005	2005	2006	2006	2006	2006
Federal Funds Rate	3.02	2.98	3.02	3.01	3.00	2.79	2.63	*2.93*	3.4	3.7	3.9	4.1	4.2	4.3
Prime Rate	4.00	4.00	4.00	4.00	3.98	3.75	5.58	*3.91*	6.4	6.7	6.9	7.1	7.2	7.3
LIBOR, 3-mo.	3.43	3.38	3.35	3.31	3.27	3.15	3.02	*3.27*	3.7	4.0	4.2	4.3	4.4	4.5
Commercial Paper, 1-mo.	3.11	3.03	3.00	2.98	2.97	2.84	2.67	*2.95*	3.5	3.8	4.0	4.2	4.3	4.4
Treasury bill, 3-mo.	3.00	3.01	2.99	2.95	2.90	2.84	2.80	*2.91*	3.4	3.7	3.9	4.1	4.2	4.2
Treasury bill, 6-mo.	3.22	3.14	3.14	3.16	3.17	3.14	3.09	*3.16*	3.6	3.9	4.1	4.2	4.3	4.4
Treasury bill, 1 yr.	3.39	3.30	3.28	3.32	3.33	3.32	3.30	*3.32*	3.8	4.0	4.2	4.3	4.4	4.5
Treasury note, 2 yr.	3.71	3.62	3.55	3.63	3.64	3.65	3.73	*3.64*	4.0	4.2	4.4	4.5	4.6	4.6
Treasury note, 5 yr.	3.88	3.75	3.69	3.81	3.85	4.00	4.17	*3.87*	4.1	4.4	4.5	4.7	4.7	4.8
Treasury note, 10 yr.	4.10	3.97	3.95	4.07	4.14	4.34	4.50	*4.16*	4.3	4.6	4.7	4.8	4.9	4.9
Treasury note, 20 yr.	4.46	4.31	4.33	4.47	4.56	4.75	4.89	*4.56*	4.7	4.9	5.1	5.2	5.3	5.3
Corporate Aaa bond	5.06	4.92	4.95	5.08	5.15	5.33	5.40	*5.15*	5.4	5.7	5.9	6.0	6.1	6.1
Corporate Baa bond	5.96	5.80	5.83	5.98	6.01	6.05	6.06	*5.97*	6.2	6.5	6.7	6.8	6.9	7.0
State & Local bonds	4.31	4.21	4.18	4.24	4.31	4.46	4.57	*4.33*	4.5	4.7	4.8	5.0	5.0	5.1
Home mortgage rate	5.63	5.56	5.62	5.65	5.72	5.86	5.93	*5.73*	5.9	6.1	6.3	6.4	6.5	6.5

	History								Consensus Forecasts-Quarterly Avg.					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q*	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2003	2003	2004	2004	2004	2004	2005	2005	2005	2005	2006	2006	2006	2006
Major Currency Index	90.7	87.8	85.3	88.0	86.5	81.9	81.3	*83.5*	83.4	82.9	82.6	82.4	82.1	81.7
Real GDP	7.4	4.2	4.5	3.3	4.0	3.8	3.5	*3.3*	3.5	3.4	3.3	3.3	3.3	3.3
GDP Price Index	1.4	1.6	2.8	3.2	1.4	2.3	3.2	*3.8*	2.1	2.2	2.3	2.2	2.1	2.2
Consumer Price Index	2.2	0.9	4.0	4.4	1.7	3.4	2.5	*2.8*	2.4	2.5	2.5	2.5	2.4	2.5

[1]Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Definitions reported here are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for the U.S. Federal Reserve Board's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). ***Interest rate data for 2Q 2005 based on historical data through the week ended June 17. .Data for 2Q 2005 Major Currency Index also is based on data through week ended June 17. Figures shown for 2Q 2005 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question survey this month of the panel members.***

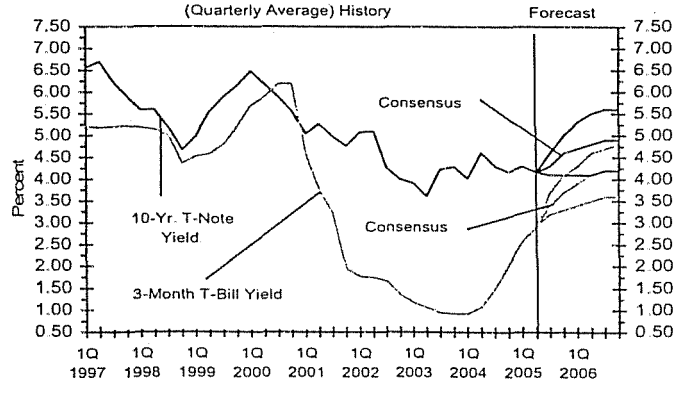
U.S. Treasury Yield Curve

Week ended June 17, 2005 and Year Ago vs.
3Q 2005 and 4Q 2006 Consensus forecasts



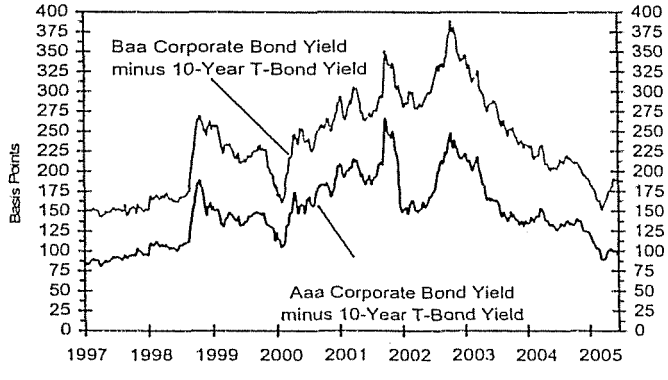
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield

(Quarterly Average) History Forecast



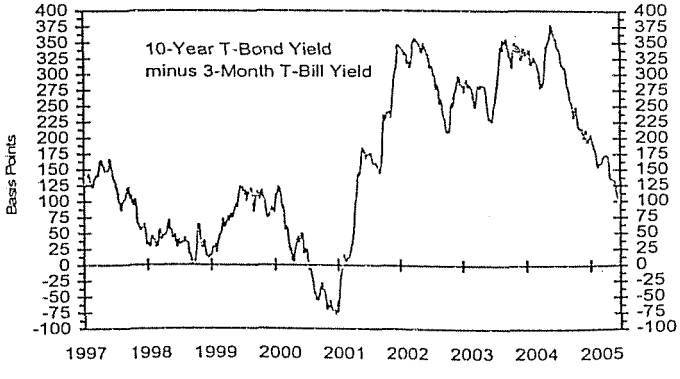
Corporate Bond Spreads

As of week ended June 17, 2005



U.S. Treasury Yield Curve

As of week ended June 17, 2005



----------3-Month Interest Rates[1]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	3.47	3.31	1.59	**3.83**	**4.07**	**4.24**
Japan	0.06	0.06	-0.03	**0.10**	**0.11**	**0.19**
U.K.	4.84	4.84	4.88	**4.76**	**4.68**	**4.56**
Switzerland	0.75	0.75	0.46	**0.76**	**0.89**	**1.16**
Canada	2.63	2.63	2.19	**2.73**	**2.86**	**2.98**
Australia	5.62	5.63	5.43	**5.73**	**5.76**	**5.66**
Eurozone	2.16	2.16	2.13	**2.11**	**2.14**	**2.37**

----------10-Yr. Government Bond Yields[1]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	4.06	4.05	4.69	**4.31**	**4.59**	**4.84**
Germany	3.22	3.30	4.33	**3.40**	**3.54**	**3.81**
Japan	1.30	1.27	1.85	**1.42**	**1.58**	**1.79**
U.K.	4.35	4.33	5.16	**4.57**	**4.70**	**4.72**
France	3.23	3.31	4.36	**3.41**	**3.55**	**3.83**
Italy	3.41	3.50	4.51	**3.60**	**3.74**	**4.04**
Switzerland	2.02	2.00	2.84	**2.18**	**2.36**	**2.30**
Canada	3.85	4.05	4.97	**4.23**	**4.44**	**4.55**
Australia	5.29	5.27	5.81	**5.53**	**5.64**	**5.48**
Spain	3.20	3.30	4.36	**3.44**	**3.60**	**3.88**
Eurozone	3.36	3.35	4.41	**3.38**	**3.51**	**3.69**

----------Foreign Exchange Rates[1]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	84.56	83.99	87.61	**85.7**	**83.4**	**81.5**
Japan	108.52	107.46	108.8	**106.8**	**103.8**	**99.6**
U.K.	1.8240	1.8288	1.8313	**1.77**	**1.82**	**1.87**
Switzerland	1.2702	1.2293	1.2460	**1.25**	**1.19**	**1.13**
Canada	1.2310	1.2612	1.3643	**1.23**	**1.22**	**1.20**
Australia	0.7783	0.7623	0.6907	**0.76**	**0.80**	**0.81**
Euro	1.2134	1.2588	1.2140	**1.22**	**1.27**	**1.31**

	Consensus 3-Month Rates vs. U.S. Rate			Consensus 10-Year Gov't Yields vs. U.S. Yield	
	Now	In 12 Mo.		Now	In 12 Mo.
Japan	-3.41	**-4.05**	Germany	-0.84	**-1.03**
U.K.	1.37	**0.32**	Japan	-2.76	**-3.05**
Switzerland	-2.72	**-3.07**	U.K.	0.29	**-0.12**
Canada	-0.84	**-1.25**	France	-0.83	**-1.02**
Australia	2.15	**1.43**	Italy	-0.65	**-0.80**
Eurozone	-1.31	**-1.87**	Switzerland	-2.04	**-2.54**
			Canada	-0.21	**-0.29**
			Australia	1.23	**0.64**
			Spain	-0.86	**-0.97**
			Eurozone	-0.70	**-1.15**

Forecasts of individual panel members are on pages 10 and 11. Definitions of variables are as follows: [1]Three month currency interest rates. Government bonds are yields to maturity. Foreign exchange rate forecasts are currency per U.S. dollar except for U.K., Australia and the Euro, which are U.S. dollar equivalents. For the U.S dollar, forecasts are of the U.S. Federal Reserve Board's Major Currency Index.

International Commentary Is the global monetary tightening cycle coming to an end, replaced sooner than most everyone imagined by a renewed easing of policy? With the exception of the US Federal Reserve, other major central banks have been notably absent from the tightening game for some time. Since cutting interest rates to a record low of 2.0% two years ago, the European Central Bank (ECB) has left policy unchanged. ECB officials have been reluctant to cut rates further due to fear it would damage the bank's credibility in light of high energy prices and possible housing bubbles in Ireland, Spain and France. However, the persistence of sluggish economic growth and benign core inflation has substantially increased pressure this year on the ECB to cut rates once again. Recent interest rate reductions by central banks in Sweden and Hungary have further fueled speculation that ECB policymakers will relent and cut rates by year's end. Australia's Reserve Bank (RBA) raised rates by a quarter point in March, but that was the first increase since December 2003 and further increases are not expected the vast majority of analysts. Canada's central bank (BoC) last hiked rates in October, but despite a tightening bias has been on hold ever since. The Bank of England's (BoE) Monetary Policy Committee last raised rates in August 2004. Until recently many analysts suspected the BoE's next move would be another rate hike. However, at its most recent meeting two of its nine members actually voted in favor of a quarter-point rate reduction. Here in the US, most analysts still expect the Fed to hike rates by a quarter point on June 30th, August 9th, and most likely once more before year's end. However, talk of "two and through" by the Fed is escalating.

Concern about decelerating global economic growth is at the heart of speculation that the monetary tightening cycle is in its last throes and at least partially responsible for the continued decline in sovereign bond yields this year. While China's economy remains strong and America's continues to grow at a reasonably healthy clip, growth in the Eurozone has remained remarkably sluggish, especially in Germany, Italy and the Netherlands. What little growth there has been over the past year has largely resulted from the exports. Domestic demand in the Eurozone has remained tepid, hurt by poor growth in hiring and high levels of unemployment. Moreover, the recent rejection of the EU constitution by voters in France and the Netherlands, coupled with an increasingly nasty row among EU nations over the budget, are also likely to weigh on consumer spending and business investment over coming months. Growth in the U.K has remained much more resilient that on the continent, but even there the pace of activity has slowed from a year earlier as a slowdown in the previously red-hot housing market produces a pull-back in consumer spending. Economic growth in Canada and Australia has also moderated over the past year. Canada's vital export sector has been slowed by the appreciation of the loonie while growth in Australia has slipped as activity in the housing sector slowed. Japan's economy in Q1 grew at its fastest pace in a year. But the pop in growth followed two quarters of contraction and the outlook remains clouded by the inability of domestic demand to mount a self-sustaining advance. Elsewhere in Asia, economic growth in Singapore, Hong Kong, Taiwan and South Korea this year will fall short of that in 2004, in some cases by a substantial degree.

Obviously aggravating concern about the pace of global growth going forward is the persistence of high energy costs. Energy prices have been elevated for more than two years now and crude oil recently bounced to new highs. Get a sharp pull back in oil prices and analysts' predictions of global economic growth will improve. On the other hand, a supply disruption (e.g. strike by Norway oil workers, civil unrest in Nigeria, hurricane damage in the U.S.) would almost certainly send oil prices higher and forecasts of economic growth lower *(see 10 and 11 for individual panel members' forecasts).*

Third Quarter 2005

Interest Rate Forecasts

Key Assumption

Blue Chip Financial Forecasts Panel Members	Percent Per Annum – Average For Quarter															Avg. For Qtr.	(Q-Q % Change) (SAAR)		
	Short-Term							Intermediate-Term				Long-Term							
	1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR Rate 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Notes 20-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Major Currency $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index
JPMorgan Asset Mgt.	3.8 H	6.8 H	4.2 H	4.0 H	3.8	4.0	4.2 H	4.5	4.7 H	4.7	5.0	5.6	6.5	4.8	6.2	85.9	3.8	2.0	3.2
Deutsche Bank Securities, Inc.	3.8 H	6.8 H	3.8	na	3.9 H	na	na	4.3	4.5	4.5	4.8	na	na	na	na	na	3.9	2.2	2.3
Action Economics	3.8 H	6.8 H	na	3.8	3.7	3.9	4.2 H	4.2	4.3	4.5	5.2	5.3	6.3	4.6	5.9	83.5	4.0	1.8	2.2
UBS Warburg	3.5	6.5	3.9	na	3.8	na	na	4.1	4.3	4.5	na	na	na	na	na	na	3.5	1.7	0.6 L
Goldman Sachs	3.5	6.5	3.8	na	3.6	na	4.0	3.9	4.2	4.5	na	6.1	na	na	5.9	na	3.5	2.3	1.8
Cycledata Corp.	3.5	6.5	3.8	3.6	3.4	3.6	3.8	3.9	4.0	4.2	4.6	5.2	6.0	4.3	5.8	81.0	2.9	2.5	3.1
Trusco Capital Management	3.5	6.5	3.8	3.6	3.5	3.7	3.9	4.3	4.6	4.8 H	5.4 H	5.9	6.5	5.0	6.4	84.0	3.6	3.5 H	2.8
Merrill Lynch Economics	3.5	6.5	3.7	na	3.6	na	na	3.8	3.9	4.0	na	na	na	na	na	na	2.7	1.5	2.0
Kellner Economic Advisers	3.5	6.5	3.7	3.6	3.2	3.5	3.7	3.8	4.0	4.1	4.2	5.8	6.2	4.8	5.7	83.0	2.8	2.0	2.2
Classicalprinciples.com	3.5	6.5	3.7	na	3.6	3.8	4.2	4.5	4.5	4.5	5.1	5.6	6.4	na	6.0	na	3.2	2.3	2.5
Wachovia	3.5	6.5	3.7	3.6	3.4	3.6	3.8	3.9	4.0	4.3	4.7	5.3	6.1	4.4	5.8	85.5	3.0	2.5	2.8
Swiss Re	3.5	6.5	3.6	3.6	3.6	3.7	3.8	4.0	4.1	4.4	4.7	5.3	6.1	na	5.9	na	3.3	0.4 L	1.2
Moody's Investors Service	3.4	6.4	3.8	3.6	3.4	3.6	3.8	4.0	4.2	4.4	4.8	5.3	6.4	4.6	6.0	85.0	3.9	2.0	2.1
U.S. Trust Company	3.4	6.4	3.8	3.5	3.6	3.7	3.9	4.1	4.1	4.2	4.5	5.1	5.9	4.4	5.7	85.0	3.9	1.5	2.2
Bank of Toyko-Mitsubishi	3.4	6.4	3.7	3.8	3.4	3.6	3.8	3.7	3.9	4.1	4.5	4.7 L	5.5	4.3	5.6 L	82.0	3.6	2.9	2.9
Comerica Bank	3.4	6.4	3.6	3.5	3.3	3.6	3.7	4.2	4.4	4.7	5.1	5.8	6.7	4.7	6.2	80.0	3.4	2.1	2.6
Barclays Capital	3.4	6.4	4.1	3.8	3.8	4.1 H	na	4.5	4.7	4.8	na	6.4 H	7.4 H	5.1 H	6.6 H	na	4.0	2.1	2.1
BMO Nesbitt Burns	3.4	6.4	3.8	3.7	3.5	3.5	3.6	3.6 L	3.7 L	3.8 L	4.1 L	na	na	na	na	na	2.5 L	1.8	1.9
RBS Greenwich Capital Econ.	3.4	6.4	3.7	3.5	3.5	3.7	3.9	4.1	4.3	4.5	4.9	5.6	6.4	4.7	6.1	86.0	4.2	2.0	2.2
Citigroup Asset Management	3.4	6.4	3.7	3.6	3.5	3.6	3.8	4.0	4.2	4.4	4.7	5.5	6.2	na	5.9	na	3.5	2.9	2.8
DePrince & Associates	3.4	6.4	3.7	3.5	3.4	3.7	3.9	4.1	4.2	4.4	4.7	5.5	6.6	4.5	6.0	84.8	3.7	2.0	2.8
Perna Associates	3.4	6.4	3.7	3.4	3.3	3.5	3.7	3.9	4.1	4.3	4.7	5.4	6.4	4.5	5.8	85.0	3.2	1.9	2.4
Independent Economic Advisory	3.4	6.4	3.7	3.5	3.4	3.6	3.8	4.1	4.2	4.4	4.8	5.3	6.2	4.6	6.2	85.8	4.0	2.1	1.8
National City Corporation	3.4	6.4	3.6	3.4	3.3	3.4	3.6	3.9	4.1	4.3	4.7	5.4	6.3	4.5	5.9	83.6	4.3 H	1.6	2.0
Chmura Economics & Analytics	3.4	6.4	3.6	3.5	3.5	3.6	3.7	4.1	4.3	4.6	5.0	5.7	na	na	6.0	78.9 L	3.5	2.3	2.1
SunTrust Banks	3.4	6.4	3.6	3.4	3.3	3.5	3.6	3.8	4.0	4.2	4.7	5.8	6.7	4.4	6.1	82.1	3.1	2.6	2.1
Prudential Equity Group LLC	3.4	6.4	3.9	3.7	3.5	3.7	3.9	4.2	4.3	4.4	4.8	5.6	6.2	4.7	6.0	83.0	4.0	2.0	2.0
Bear Stearns & Co.	3.4	6.4	3.8	3.6	3.5	3.7	3.9	4.1	4.3	4.6	na	5.7	6.6	4.7	6.2	82.8	3.8	2.7	2.6
Naroff Economic Advisors	3.4	6.4	3.8	3.8	3.6	3.8	4.0	4.1	4.3	4.5	4.8	5.3	6.0	4.4	5.9	85.0	3.1	2.4	2.7
Wells Capital Management	3.4	6.4	3.8	3.5	3.3	3.5	3.7	3.9	4.0	4.2	4.6	5.2	5.1 L	4.5	5.8	na	3.5	2.4	3.1
Banc of America Securities	3.4	6.4	3.7	na	3.5	3.7	3.9	4.0	4.1	4.3	4.7	5.3	6.2	na	5.9	na	3.5	2.0	2.0
Loomis, Sayles & Company	3.4	6.4	3.7	3.4	3.4	3.6	4.0	4.9 H	4.0	4.3	4.7	5.3	6.0	4.4	5.8	83.5	3.6	1.5	2.2
Briefing.com	3.4	6.4	3.7	3.4	3.4	3.7	3.9	4.1	4.3	4.5	4.9	5.7	6.5	4.6	6.1	na	3.7	2.1	2.3
ING Investment Mgt.	3.4	6.4	3.7	3.5	3.4	3.6	na	3.8	4.2	4.4	4.7	5.5	6.2	4.5	6.0	81.0	4.0	2.1	2.7
Thredgold Economic Assoc.	3.4	6.4	3.6	3.4	3.4	3.6	3.8	4.0	4.2	4.4	4.7	5.4	6.1	4.4	5.9	83.0	3.4	2.2	2.8
Woodworth Holdings	3.4	6.4	3.5	3.5	3.5	3.6	3.8	4.0	4.2	4.3	4.7	5.7	6.6	4.4	5.8	82.0	3.5	3.0	4.0
Georgia State University	3.4	6.4	na	na	3.4	3.5	3.7	4.0	4.2	4.4	na	5.4	6.3	na	6.2	na	2.7	1.9	2.5
Fannie Mae	3.4	6.4	na	3.4	3.4	3.6	3.5	3.8	4.0	4.2	na	5.4	6.0	4.4	5.6 L	na	3.7	1.6	2.1
Nomura Securities Inc.	3.4	6.4	3.7	3.4	3.3	3.4	3.6	4.0	4.1	4.3	4.5	5.2	6.1	na	5.9	85.5	3.8	2.2	1.9
ClearView Economics	3.4	6.4	3.7	3.4	3.3	3.5	3.6	3.9	4.0	4.2	4.6	5.2	6.1	4.3	5.8	86.0 H	2.8	1.6	2.8
J.W. Coons Advisors LLC	3.4	6.4	3.6	3.3	3.3	3.4	3.5	3.7	3.9	4.1	4.5	5.2	6.1	na	5.6 L	81.1	3.2	2.6	2.5
J.P. Morgan Chase	3.4	6.4	3.7	na	3.4	na	na	4.0	4.2	4.4	na	na	na	na	na	na	4.0	1.9	1.7
Mesirow Financial	3.4	6.4	3.3 L	na	3.0 L	3.3	3.5	3.6	3.9	4.0	5.2	5.0	na	na	5.8	83.0	3.6	2.1	1.9
PNC Financial Services Corp.	3.3	6.3	3.6	3.4	3.3	3.5	3.7	3.8	4.0	4.2	4.4	5.2	6.2	4.4	5.8	85.0	3.3	2.6	4.2 H
LaSalle Nat'l Bank	3.3	6.3	3.5	3.7	3.4	3.5	3.6	3.8	4.2	4.5	4.8	5.6	6.4	4.9	6.1	83.5	3.3	1.7	1.2
Nat'l Assn. of Realtors	3.3	6.3	3.5	3.3	3.3	3.5	3.7	4.0	4.2	4.3	4.6	5.2	6.1	4.4	6.0	na	3.4	2.1	2.9
Standard & Poor's Corp.	3.3	6.3	3.6	3.4	3.2	3.3	3.5	3.9	4.2	4.4	na	5.5	6.4	4.6	5.9	82.2	3.8	1.7	1.2
The Northern Trust Company	3.3	6.3	3.4	na	3.1	na	3.3 L	3.7	3.9	4.0	na	5.0	na	4.2 L	5.6 L	na	3.2	1.4	2.3
Scotiabank	3.3	6.3	3.4	3.3	3.2	3.5	3.7	3.7	4.0	4.2	4.3	5.2	6.0	4.2 L	5.7	83.6	2.7	2.2	2.4
Wayne Hummer & Co.	3.0 L	6.0 L	3.3 L	3.1 L	3.0 L	3.2 L	3.5	3.7	3.9	4.2	4.6	5.2	5.9	4.2 L	5.6 L	82.5	3.8	2.3	2.6
July Consensus	**3.4**	**6.4**	**3.7**	**3.5**	**3.4**	**3.6**	**3.8**	**4.0**	**4.1**	**4.3**	**4.7**	**5.4**	**6.2**	**4.5**	**5.9**	**83.4**	**3.5**	**2.1**	**2.4**
Top 10 Avg.	3.6	6.6	3.9	3.7	3.7	3.8	4.0	4.4	4.4	4.6	5.0	5.9	6.6	4.8	6.2	85.5	4.0	2.8	3.2
Bottom 10 Avg.	3.3	6.3	3.5	3.3	3.2	3.4	3.5	3.7	3.9	4.1	4.4	5.1	5.8	4.3	5.7	81.3	2.8	1.5	1.5
June Consensus	3.4	6.4	3.7	3.5	3.4	3.7	3.8	4.1	4.3	4.6	5.0	5.6	6.4	4.7	6.1	82.2	3.4	2.1	2.4
Number of Forecasts Changed From A Month Ago:																			
Down	8	9	13	8	17	22	23	27	40	40	33	34	30	22	31	3	15	16	15
Same	35	34	19	15	18	13	12	13	7	8	4	5	3	6	7	6	19	21	18
Up	7	7	15	17	15	9	8	10	3	2	3	6	7	6	7	24	16	13	17
Diffusion Index	49 %	48 %	52 %	61 %	48 %	35 %	33 %	33 %	13 %	12 %	13 %	19 %	21 %	26 %	23 %	82 %	51 %	47 %	52 %

JULY 1, 2005 ■ BL

Fourth Quarter 2005

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter															Avg. For	(Q-Q % Change) (SAAR)		
	Short-Term							Intermediate-Term				Long-Term				Qtr.			
	1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR Rate 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Notes 20-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Major Currency $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index
Bear Stearns & Co.	4.0 H	7.0 H	4.5 H	4.3 H	4.2 H	4.4 H	4.7 H	4.6	4.8	5.0	na	6.3	7.2	4.9	6.6	83.7	3.6	2.8	2.8
JPMorgan Asset Mgt.	4.0 H	7.0 H	4.4	4.2	4.1	4.3	4.4	4.8	4.9 H	4.9	5.2	5.9	6.8	5.0	6.5	86.0	3.6	2.1	2.9
J.P. MorganChase	4.0 H	7.0 H	4.2	na	4.0	na	na	4.5	4.7	4.9	na	na	na	na	na	na	3.5	2.2	1.8 L
Classicalprinciples.com	4.0 H	7.0 H	4.2	na	4.1	4.3	4.7 H	5.0 H	4.9 H	4.9	5.5	6.0	6.8	na	6.4	na	2.7	2.2	2.4
Deutsche Bank Securities, Inc.	4.0 H	7.0 H	4.1	na	4.1	na	na	4.5	4.8	5.0	5.3	na	na	na	na	na	3.8	2.2	2.3
Action Economics	4.0 H	7.0 H	na	4.0	3.9	4.1	4.6	4.7	4.7	4.8	5.5	5.6	6.3	4.8	6.0	82.0	4.1 H	2.7	2.7
RBS Greenwich Capital Econ.	4.0 H	7.0 H	4.2	4.0	4.0	4.2	4.4	4.5	4.7	4.9	5.3	6.0	6.8	5.0	6.8 H	87.0	4.0	2.0	2.4
Citigroup Asset Management	4.0 H	7.0 H	4.2	4.1	4.0	4.2	4.3	4.4	4.6	4.9	5.2	6.0	6.7	na	6.4	na	3.5	2.9	2.8
National City Corporation	3.9	6.9	4.0	3.9	3.7	3.8	4.0	4.4	4.6	4.8	5.2	6.0	6.9	4.8	6.4	80.4	3.7	1.7	2.3
Moody's Investors Service	3.9	6.9	4.3	4.1	3.9	4.1	4.3	4.5	4.7	4.8	5.1	5.6	6.7	5.0	6.4	85.5	4.0	2.4	3.1
U.S. Trust Company	3.9	6.9	4.3	4.0	4.1	4.2	4.2	4.0	4.0	4.0	4.4	5.0 L	5.8 L	4.2 L	5.5 L	85.0	4.0	1.8	1.9
Trusco Capital Management	3.9	6.9	4.2	4.0	3.9	4.1	4.3	4.7	4.9 H	5.2 H	5.8 H	6.4	7.0	5.3 H	6.8 H	81.0	3.5	3.0	3.7
Swiss Re	3.9	6.9	4.0	4.1	4.0	4.1	4.3	4.3	4.4	4.7	5.1	5.8	6.5	na	6.1	na	3.5	1.4 L	2.2
Georgia State University	3.9	6.9	na	na	3.9	4.0	4.2	4.6	4.5	4.7	na	5.7	6.5	na	6.2	na	3.0	2.0	2.3
UBS Warburg	3.9	6.9	4.3	na	4.2	na	na	4.3	4.7	5.0	na	na	na	na	na	na	3.2	1.8	1.9
Barclays Capital	3.9	6.9	4.3	4.0	4.0	4.3	na	4.6	4.8	4.9	na	6.5 H	7.5 H	5.2	6.7	na	3.5	2.2	2.1
Goldman Sachs	3.9	6.9	4.2	na	3.9	na	4.3	4.1	4.5	4.8	na	6.5 H	na	na	6.4	na	3.0	2.6	2.0
Loomis, Sayles & Company	3.9	6.9	4.1	3.9	3.8	3.9	4.0	4.1	4.4	4.6	4.9	5.7	6.4	4.6	6.1	83.3	3.6	2.1	1.9
Standard & Poor's Corp.	3.9	6.9	4.1	3.9	3.7	3.8	4.0	4.3	4.6	4.8	na	6.0	6.8	5.1	6.2	79.2	2.9	1.9	2.2
Naroff Economic Advisors	3.8	6.8	4.4	4.3 H	4.0	4.2	4.4	4.6	4.8	5.2 H	5.5	6.1	6.9	4.7	6.3	82.5	3.8	2.1	2.5
Wells Capital Management	3.8	6.8	4.1	3.9	3.7	3.8	4.0	4.1	4.2	4.4	4.7	5.4	6.3	4.8	6.0	na	3.3	2.2	3.1
Perna Associates	3.8	6.8	4.0	3.8	3.7	3.9	4.1	4.2	4.4	4.6	4.9	5.8	6.8	4.6	6.1	85.0	3.1	2.3	2.8
Briefing.com	3.8	6.8	4.0	3.7	3.8	3.9	4.1	4.3	4.5	4.7	5.1	5.9	6.7	4.8	6.3	na	3.8	2.2	2.4
Independent Economic Advisory	3.8	6.8	4.0	3.9	3.8	3.9	4.1	4.4	4.7	4.8	5.3	5.8	6.7	5.0	6.4	86.0	3.3	2.0	2.3
omerica Bank	3.8	6.8	4.0	3.8	3.6	3.8	4.0	4.2	4.4	4.7	5.1	5.8	6.7	4.7	6.2	80.0	3.4	2.1	2.6
k of Toyko-Mitsubishi	3.8	6.8	4.0	4.1	3.8	4.0	4.2	4.0	4.2	4.4	4.8	5.0	5.8	4.6	5.9	84.0	3.5	2.5	2.7
achovia	3.8	6.8	3.9	3.8	3.7	3.9	4.1	4.1	4.2	4.5	4.9	5.4	6.2	4.5	6.0	86.4	3.0	2.7	2.6
Chmura Economics & Analytics	3.8	6.7	4.0	3.8	3.8	3.9	4.0	4.4	4.5	4.8	5.1	5.9	na	na	6.2	77.3 L	3.3	2.5	2.8
ING Investment Mgt.	3.7	6.7	4.0	3.8	3.7	3.8	na	4.0	4.5	4.7	5.0	5.8	6.6	4.7	6.2	80.0	4.0	2.1	2.8
Nat'l Assn. of Realtors	3.7	6.7	3.9	3.7	3.7	3.8	4.0	4.2	4.4	4.5	4.8	5.4	6.2	4.5	6.1	na	3.7	1.7	2.3
Thredgold Economic Assoc.	3.7	6.7	3.9	3.7	3.7	3.9	4.1	4.3	4.5	4.7	5.0	5.7	6.4	4.6	6.2	83.0	3.4	2.2	2.6
Banc of Amercia Securities	3.7	6.7	3.7	na	3.5	3.7	3.9	4.0	4.1	4.3	4.7	5.3	6.2	na	5.9	na	3.5	2.0	2.0
Fannie Mae	3.7	6.7	na	3.7	3.7	3.9	3.5	3.8	4.1	4.2	na	5.4	6.0	4.4	5.6	na	3.8	1.9	2.0
DePrince & Associates	3.7	6.7	4.0	3.7	3.7	3.9	4.1	4.4	4.4	4.6	4.8	5.8	6.9	4.7	6.3	85.4	3.4	1.9	2.7
Mesirow Financial	3.7	6.7	3.6	na	3.3	3.6	3.8	3.8	4.1	4.2	5.5	5.2	na	na	5.9	83.1	3.7	1.8	1.8
Woodworth Holdings	3.7	6.7	3.8	3.7	3.7	3.9	4.0	4.3	4.5	4.6	5.0	6.0	6.8	4.5	6.1	80.0	3.5	3.0 H	3.8 H
SunTrust Banks	3.6	6.6	3.9	3.6	3.5	3.7	3.7	3.8	4.1	4.2	4.7	5.7	6.6	4.3	6.4	82.4	2.3	2.4	2.7
Prudential Equity Group LLC	3.5	6.5	4.0	3.7	3.5	3.8	4.0	4.2	4.4	4.6	5.1	5.8	6.4	4.9	6.2	81.0	4.1 H	1.8	2.0
J.W. Coons Advisors LLC	3.5	6.5	3.9	3.5	3.3	3.4	3.6	3.8	3.9	4.2	4.5	5.4	6.3	na	5.8	81.5	2.7	2.4	2.6
BMO Nesbitt Burns	3.5	6.5	3.8	3.8	3.5	3.5	3.6	3.6	3.7	3.7 L	4.0 L	na	na	na	na	na	2.7	2.1	2.2
Keller Economic Advisers	3.5	6.5	3.8	3.7	3.3	3.6	3.8	3.9	4.1	4.1	4.2	5.9	6.3	4.9	5.8	84.0	2.2 L	2.1	2.3
PNC Financial Services	3.5	6.5	3.8	3.6	3.5	3.7	3.8	4.0	4.2	4.4	4.6	5.4	6.4	4.6	6.0	86.0	3.2	1.8	2.5
Cycledata Corp.	3.5	6.5	3.8	3.6	3.5	3.7	3.9	4.0	4.1	4.3	4.7	5.3	6.1	4.3	5.8	80.0	2.7	2.5	3.0
ClearView Economics	3.5	6.5	3.8	3.5	3.4	3.6	3.7	4.0	4.1	4.3	4.6	5.2	6.1	4.4	5.9	87.0 H	4.0	1.7	2.8
Nomura Securities Inc.	3.5	6.5	3.8	3.6	3.4	3.4 L	3.7	4.2	4.3	4.5	4.6	5.4	6.3	na	6.1	86.5	3.7	1.8	2.1
LaSalle Nat'l Bank	3.5	6.5	3.7	3.9	3.5	3.6	3.7	3.9	4.2	4.5	4.8	5.6	6.4	4.9	6.0	81.2	2.8	1.9	2.2
Merrill Lynch Economics	3.5	6.5	3.5	na	3.5	na	na	3.5 L	3.7 L	3.8	na	na	na	na	na	na	3.0	1.6	1.6 L
Wayne Hummer & Co.	3.4	6.4	3.7	3.5	3.4	3.6	3.9	4.1	4.3	4.6	5.0	5.6	6.3	4.7	6.0	83.0	3.7	2.3	2.6
Scotiabank	3.3 L	6.3 L	3.4 L	3.3 L	3.2	3.5	3.7	3.8	4.0	4.4	4.5	5.5	6.3	4.5	5.9	78.3	3.0	2.0	2.0
The Northern Trust Company	3.3 L	6.3 L	3.4 L	na	3.0 L	na	3.3 L	3.9	4.1	4.1	na	5.1	na	4.3	5.7	na	3.5	2.3	2.4
July Consensus	**3.7**	**6.7**	**4.0**	**3.8**	**3.7**	**3.9**	**4.0**	**4.2**	**4.4**	**4.6**	**4.9**	**5.7**	**6.5**	**4.7**	**6.1**	**82.9**	**3.4**	**2.2**	**2.5**
Top 10 Avg.	4.0	7.0	4.3	4.1	4.1	4.2	4.4	4.7	4.8	5.0	5.4	6.2	6.9	5.0	6.5	86.1	4.0	2.7	3.1
Bottom 10 Avg.	3.4	6.4	3.6	3.6	3.3	3.5	3.6	3.8	4.0	4.1	4.5	5.2	6.1	4.4	5.8	79.7	2.7	1.7	1.9
June Consensus	3.7	6.7	4.0	3.8	3.7	4.0	4.1	4.3	4.6	4.8	5.2	5.9	6.7	4.9	6.3	81.5	3.4	2.2	2.5
Number of Forecasts Changed From A Month Ago:																			
Down	8	8	16	10	17	19	22	26	38	39	31	33	31	22	30	4	18	12	16
Same	37	36	18	16	21	17	15	17	8	7	5	6	3	7	6	5	20	25	25
Up	5	6	13	14	12	8	6	7	4	4	4	6	6	5	9	23	12	13	9
Diffusion Index	47 %	48 %	47 %	55 %	45 %	38 %	31 %	31 %	16 %	15 %	16 %	20 %	19 %	25 %	27 %	80 %	44 %	51 %	43 %

First Quarter 2006

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum – Average For Quarter															Avg. For Qtr.	(Q-Q % Change) (SAAR)		
	Short-Term							Intermediate-Term				Long-Term							
	1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR Rate 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Notes 20-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Major Currency $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index
Bear Steams & Co.	4.5 H	7.5 H	4.9 H	4.7 H	4.6 H	4.8 H	5.0 H	5.0	5.2	5.4	na	6.8 H	7.8 H	5.1	7.0 H	85.0	3.5	2.9	3.0
RBS Greenwich Capital Econ.	4.5 H	7.5 H	4.7	4.5	4.5	4.7	4.8	4.9	5.0	5.3	5.6	6.4	7.2	5.3	7.0 H	88.3 H	4.0 H	3.0	2.5
National City Corporation	4.4	7.4	4.4	4.3	4.1	4.2	4.4	4.8	5.0	5.1	5.5	6.3	7.2	5.0	6.7	78.6	3.7	2.0	2.4
Citigroup Asset Management	4.4	7.4	4.6	4.5	4.4	4.4	4.6	4.8	5.0	5.2	5.4	6.3	7.0	na	6.7	na	3.6	2.5	2.9
J.P. Morgan Chase	4.4	7.4	4.6	na	4.4	na	na	4.8	4.9	5.1	na	na	na	na	na	na	3.5	2.0	2.5
JPMorgan Asset Mgt.	4.3	7.3	4.7	4.5	4.3	4.5	4.7	5.0	5.2	5.2	5.5	6.1	7.0	5.3	6.7	85.5	3.2	2.1	2.8
Trusco Capital Management	4.3	7.3	4.5	4.3	4.2	4.4	4.5	4.9	5.1	5.4	5.9	6.7	7.3	5.6 H	7.0 H	80.0	3.3	2.8	3.7 H
Deutsche Bank Securities, Inc.	4.3	7.3	4.3	na	4.4	na	na	5.0	5.3	5.3	5.5	na	na	na	na	na	3.9	2.2	2.3
Action Economics	4.3	7.3	na	4.3	4.2	4.5	4.9	4.9	4.9	5.1	5.7	5.9	6.6	5.1	6.3	80.5	3.9	3.4	2.7
Barclays Capital	4.2	7.2	4.4	4.1	4.2	4.4	na	4.6	4.7	4.8	na	6.5	7.4	5.1	6.6	na	3.0	2.1	3.5
Naroff Economic Advisors	4.2	7.2	4.6	4.5	4.4	4.6	4.9	5.1 H	5.4 H	5.8 H	6.1 H	6.7	7.5	5.0	6.8	86.0	3.2	2.4	2.2
Loomis, Sayles & Company	4.1	7.1	4.4	4.2	4.0	4.1	4.2	4.3	4.6	4.9	5.2	6.1	6.8	4.8	6.3	82.8	3.6	2.5	2.2
Goldman Sachs & Co.	4.1	7.1	4.4	na	4.1	na	4.5	4.4	4.7	5.0	na	6.7	na	na	6.7	na	3.0	2.9	2.1
Swiss Re	4.1	7.1	4.3	4.5	4.2	4.3	4.5	4.6	4.8	5.1	5.5	6.1	6.8	na	6.4	na	3.5	1.9	1.9
Georgia State University	4.1	7.1	na	na	4.1	4.2	4.4	4.7	4.7	4.9	na	6.0	6.8	na	6.3	na	3.2	2.1	2.0
Moody's Investors Service	4.1	7.1	4.5	4.3	4.1	4.3	4.5	4.7	4.9	5.1	5.4	5.9	6.8	5.2	6.7	86.0	2.4	2.4	2.8
U.S. Trust Company	4.0	7.0	4.3	4.1	4.2	4.3	4.3	4.0	3.9	3.8	4.1 L	4.7 L	5.5 L	4.0 L	5.3	85.0	3.7	1.8	2.2
UBS Warburg	4.0	7.0	4.3	na	4.2	na	na	4.3	4.7	5.0	na	na	na	na	na	na	3.0	2.2	2.5
ING Investment Mgt.	4.0	7.0	4.3	4.1	4.0	4.1	na	4.2	4.7	4.9	5.3	6.0	6.8	4.0 L	6.4	78.0	3.5	2.2	2.8
Standard & Poor's Corp.	4.0	7.0	4.3	4.1	3.9	4.0	4.2	4.6	4.7	4.9	na	6.1	7.0	5.2	6.4	77.6	3.0	2.2	1.8
Wells Capital Management	4.0	7.0	4.3	4.1	3.8	3.9	4.1	4.1	4.2	4.5	4.7	5.4	6.4	4.9	6.1	na	3.0	2.4	3.3
Classicalprinciples.com	4.0	7.0	4.2	na	4.1	4.3	4.4	4.5	4.7	5.0	5.6	6.1	6.8	na	6.5	na	3.4	1.9	2.1
Perna Associates	4.0	7.0	4.2	4.0	3.9	4.1	4.3	4.4	4.5	4.7	5.1	6.1	7.0	4.6	6.1	82.8	3.2	2.5	3.0
Comerica Bank	4.0	7.0	4.2	4.0	3.8	4.0	4.2	4.4	4.7	5.0	5.4	6.1	7.0	4.9	6.5	78.0	3.5	2.2	2.6
DePrince Associates	3.9	6.9	4.2	4.0	3.9	4.2	4.4	4.6	4.7	4.8	4.9	6.1	7.1	4.9	6.5	86.0	3.6	2.0	2.6
Chmura Economics & Analytics	3.9	6.9	4.1	4.0	4.0	4.1	4.2	4.5	4.6	4.8	5.2	5.9	na	na	6.2	75.9 L	2.8	2.8	2.5
Fannie Mae	3.9	6.9	na	3.9	3.9	4.1	3.6	3.9	4.2	4.3	na	5.6	6.2	4.6	5.6	na	3.7	2.4	2.1
Briefing.com	3.9	6.9	4.2	3.9	3.9	4.0	4.2	4.4	4.6	4.9	5.3	6.1	6.9	5.0	6.5	na	4.0	2.2	2.5
Banc of America Securities	3.9	6.9	4.2	na	4.1	4.3	4.5	4.4	4.5	4.6	5.0	5.6	6.5	na	6.2	na	3.7	2.2	2.7
Nat'l Assn. of Realtors	3.9	6.9	4.1	3.9	3.9	4.1	4.2	4.4	4.6	4.8	5.0	5.6	6.4	4.6	6.2	na	3.6	2.0	2.6
Woodworth Holdings	3.9	6.9	4.0	3.9	3.9	4.1	4.2	4.4	4.6	4.7	5.1	6.1	7.0	4.6	6.3	78.0	3.5	3.0	3.5
Prudential Equity Group LLC	3.8	6.8	4.4	4.2	3.9	4.3	4.5	4.6	4.6	4.8	5.4	6.0	6.6	5.2	6.4	79.0	3.8	2.0	2.2
Kellner Economic Advisers	3.8	6.8	4.0	3.8	3.4	3.7	3.9	4.2	4.2	4.0	4.1	5.9	6.4	5.0	5.9	85.0	2.0	2.0	2.4
Thredgold Economic Assoc.	3.8	6.8	4.0	3.8	3.8	4.0	4.1	4.4	4.6	4.8	5.1	5.8	6.5	4.6	6.3	82.0	3.4	2.2	2.6
LaSalle Nat'l Bank	3.8	6.8	3.9	4.1	3.6	3.7	3.8	4.0	4.2	4.5	4.9	5.6	6.5	4.9	6.1	79.3	2.8	2.1	1.8
Mesirow Financial	3.8	6.8	3.7	na	3.4	3.7	3.9	3.9	4.2	4.3	5.6	5.3	na	na	5.0 L	83.2	3.9	1.6 L	1.9
Bank of Toyko-Mitsubishi	3.8	6.8	4.0	4.1	3.8	4.0	4.2	3.9	4.1	4.3	4.7	4.9	5.7	4.5	5.8	87.0	3.8	2.7	2.5
Independent Economic Advisory	3.8	6.8	3.9	3.8	3.8	3.8	4.0	4.3	4.6	4.8	5.3	5.8	6.7	4.9	6.6	86.5	3.5	2.3	2.0
Wachovia	3.8	6.8	3.9	3.8	3.8	3.9	4.0	4.2	4.3	4.5	4.9	5.5	6.4	4.5	6.0	87.0	3.0	2.7	2.7
Wayne Hummer & Co.	3.7	6.7	4.0	3.8	3.7	3.9	4.2	4.5	4.7	5.0	5.4	6.1	6.8	5.0	6.5	83.2	3.5	2.2	2.4
PNC Financial Services	3.7	6.7	4.0	3.8	3.7	3.9	4.0	4.2	4.4	4.5	4.7	5.6	6.6	4.8	6.2	86.0	3.2	2.0	2.5
SunTrust Banks	3.7	6.7	4.0	3.7	3.6	3.7	3.8	3.9	4.1	4.3	4.8	5.7	6.5	4.3	6.5	82.2	1.8 L	2.4	2.7
ClearView Economics	3.7	6.7	3.9	3.7	3.6	3.7	3.8	4.1	4.2	4.3	4.6	5.3	6.2	4.4	5.9	87.0	3.5	1.9	3.0
Nomura Securities Inc.	3.7	6.7	3.9	3.7	3.6	3.5 L	3.8	4.4	4.5	4.7	4.8	5.6	6.5	na	6.3	86.0	3.5	2.4	2.3
J.W. Coons Advisors LLC	3.5	6.5	3.8	3.4	3.3	3.5 L	3.6 L	3.8	4.0	4.2	4.6	5.6	6.5	na	5.8	82.2	3.2	2.2	2.4
BMO Nesbitt Burns	3.5	6.5	4.0	3.9	3.7	3.7	3.8	3.6	3.7	3.8	4.1 L	na	na	na	na	na	3.0	3.4 H	2.6
Cycledata Corp.	3.5	6.5	3.8	3.6	3.5	3.7	3.9	4.0	4.1	4.3	4.7	5.3	6.1	4.3	5.8	80.0	2.7	2.5	2.9
The Northern Trust Company	3.3 L	6.3 L	3.5	na	3.1 L	na	3.6 L	4.1	4.3	4.3	na	5.3	na	4.5	5.8	na	3.1	3.2	na
Scotiabank	3.3 L	6.3 L	3.4	3.3 L	3.2	3.5 L	3.7	3.8	4.1	4.6	4.7	5.7	6.6	4.7	6.1	76.9	3.1	2.1	2.3
Merrill Lynch Economics	3.3 L	6.3 L	3.3 L	na	3.2	na	na	3.3 L	3.3 L	3.5 L	na	na	na	na	na	na	3.0	2.0	1.5 L
July Consensus	**3.9**	**6.9**	**4.2**	**4.0**	**3.9**	**4.1**	**4.2**	**4.4**	**4.5**	**4.7**	**5.1**	**5.9**	**6.7**	**4.8**	**6.3**	**82.6**	**3.3**	**2.3**	**2.5**
Top 10 Avg.	4.3	7.3	4.6	4.4	4.3	4.5	4.7	4.9	5.1	5.3	5.6	6.5	7.2	5.2	6.8	86.6	3.8	3.0	3.2
Bottom 10 Avg.	3.5	6.5	3.7	3.7	3.4	3.6	3.7	3.8	3.9	4.1	4.5	5.3	6.2	4.4	5.7	78.1	2.7	1.9	1.9
June Consensus	4.0	7.0	4.2	4.1	4.0	4.1	4.3	4.5	4.7	5.0	5.4	6.1	6.9	5.0	6.5	80.9	3.3	2.3	2.6
Number of Forecasts Changed From A Month Ago:																			
Down	11	12	13	16	16	20	23	25	33	33	28	30	29	21	27	6	11	11	10
Same	36	35	20	16	24	17	13	15	12	10	8	6	2	5	7	7	25	26	26
Up	3	3	14	8	10	7	7	10	5	7	4	9	9	8	11	20	13	12	12
Diffusion Index	42 %	41 %	51 %	40 %	44 %	35 %	31 %	35 %	22 %	24 %	20 %	27 %	25 %	31 %	32 %	71 %	52 %	51 %	52 %

JULY 1, 2005 ■ BI

Second Quarter 2006

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum – Average For Quarter															Avg. For Qtr.	(Q-Q % Change) (SAAR)		
	Short-Term							Intermediate-Term				Long-Term							
	1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Notes 20-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Major Currency $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index
RBS Greenwich Capital Econ.	5.0 H	8.0 H	5.2 H	5.0 H	4.9 H	5.1 H	5.2 H	5.4	5.4	5.5	5.8	6.7	7.5	5.5	7.1	89.5 H	4.0 H	2.0	2.5
Bear Stearns & Co.	4.9	7.9	5.2 H	5.0 H	4.9 H	5.0	5.2 H	5.4	5.4	5.6	na	7.1 H	8.1 H	5.3	7.2	86.1	3.4	3.0	3.0
Action Economics	4.8	7.8	na	4.8	4.7	4.9	5.1	5.1	5.1	5.2	5.9	6.0	6.6	5.3	6.4	80.0	3.8	2.3	2.7
JPMorgan Asset Mgt.	4.5	7.5	4.9	4.7	4.6	4.8	4.9	5.3	5.4	5.4	5.7	6.4	7.3	5.5	7.0	85.0	3.4	2.0	2.7
Trusco Capital Management	4.5	7.5	4.8	4.5	4.5	4.6	4.8	5.1	5.4	5.7	6.0	6.9	7.6	5.9 H	7.3	82.0	3.3	2.7	3.7 H
Naroff Economic Advisors	4.5	7.5	4.7	4.6	4.5	4.8	5.1	5.3	5.7 H	6.0 H	6.3 H	6.9	7.7	5.4	7.3 H	89.0	2.9	2.3	2.5
J.P. Morgan Chase	4.5	7.5	4.7	na	4.5	na	na	4.9	5.0	5.2	na	na	na	na	na	na	3.0	2.3	2.7
Citigroup Asset Management	4.5	7.5	4.7	4.5	4.3	4.4	4.6	4.8	5.0	5.2	5.5	6.3	7.0	na	6.7	na	2.9	2.8	3.1
Deutsche Bank Securities, Inc.	4.5	7.5	4.6	na	4.6	na	na	5.5 H	5.6	5.5	5.8	na	na	na	na	na	3.5	2.2	2.3
National City Corporation	4.5	7.5	4.5	4.4	4.2	4.3	4.5	4.9	5.1	5.3	5.7	6.5	7.4	5.1	6.9	77.2	3.6	2.0	2.4
Barclays Capital	4.4	7.4	4.6	4.3	4.4	4.6	na	4.6	4.7	4.8	na	6.5	7.4	5.1	6.6	na	3.0	2.2	2.7
Swiss Re	4.4	7.4	4.5	4.8	4.5	4.6	4.8	4.9	5.0	5.3	5.8	6.2	7.0	na	6.6	na	3.4	1.3 L	2.1
Loomis, Sayles & Company	4.4	7.4	4.6	4.4	4.2	4.3	4.4	4.5	4.8	4.9	5.2	6.1	6.8	4.7	6.3	81.9	3.6	2.1	2.4
Goldman Sachs	4.4	7.4	4.6	na	4.4	na	4.8	4.6	4.9	5.1	na	6.9	na	na	6.8	na	3.0	2.5	2.2
Georgia State University	4.3	7.3	na	na	4.2	4.3	4.5	4.8	4.8	4.9	na	6.1	6.9	na	6.4	na	3.3	2.1	2.3
Comerica Bank	4.3	7.3	4.5	4.3	4.1	4.3	4.5	4.6	4.9	5.2	5.5	6.3	7.2	5.1	6.7	76.0	3.5	2.3	2.7
Moody's Investors Service	4.3	7.3	4.7	4.4	4.2	4.4	4.6	4.8	4.9	5.1	5.4	5.9	6.8	5.2	6.7	86.5	3.4	2.3	2.8
Wayne Hummer & Co.	4.2	7.2	4.5	4.3	4.2	4.4	4.7	4.9	5.1	5.4	5.8	6.5	7.2	5.5	6.9	83.6	3.8	2.2	2.7
ING Investment Mgt.	4.2	7.2	4.5	4.3	4.2	4.3	na	4.4	4.8	5.0	5.4	6.2	7.0	5.1	6.5	77.0	3.5	2.3	2.9
PNC Financial Services Corp.	4.2	7.2	4.4	4.3	4.1	4.2	4.3	4.4	4.5	4.6	4.7	5.7	6.8	5.0	6.4	85.0	3.0	1.8	2.4
Fannie Mae	4.2	7.2	na	4.1	4.1	4.3	3.8	4.0	4.3	4.3	na	5.7	6.3	4.7	5.6	na	3.7	2.1	2.5
Woodworth Holdings	4.1	7.1	4.2	4.2	4.2	4.3	4.5	4.7	4.9	5.0	5.4	6.4	7.2	4.7	6.6	77.0	3.0	3.0	3.2
Chmura Economics & Analytics	4.1	7.1	4.3	4.1	4.1	4.2	4.3	4.6	4.7	4.9	5.2	6.0	na	na	6.3	74.5 L	3.0	3.0	2.2
Prudential Equity Group LLC	4.0	7.0	4.7	4.5	4.1	4.6	4.7	4.9	4.8	5.0	5.6	6.2	6.9	5.4	6.7	77.0	3.7	2.1	2.4
DePrince & Associates	4.0	7.0	4.3	4.1	4.0	4.2	4.4	4.6	4.8	4.9	5.1	6.3	7.3	5.0	6.6	86.3	3.5	1.9	2.7
UBS Warburg	4.0	7.0	4.3	na	4.2	na	na	4.3	4.7	5.0	na	na	na	na	na	na	3.0	2.2	2.5
Standard & Poor's Corp.	4.0	7.0	4.3	4.1	3.9	4.0	4.2	4.6	4.7	4.9	na	6.1	7.0	5.2	6.4	76.2	3.0	2.1	2.1
Wells Capital Management	4.0	7.0	4.3	4.2	3.8	3.9	4.1	4.2	4.3	4.5	4.7	5.5	6.6	5.1	6.1	na	2.8	2.5	3.3
Classicalprinciples.com	4.0	7.0	4.2	na	4.1	4.3	4.4	4.4	4.7	5.1	5.7	6.2	6.9	na	6.6	na	3.5	1.8	2.0
U.S. Trust Company	4.0	7.0	4.2	4.0	4.1	4.2	4.2	4.0	3.9	3.8	4.1 L	4.7 L	5.5 L	4.0 L	5.3 L	85.0	3.4	1.8	2.2
Kellner Economic Advisers	4.0	7.0	4.2	4.0	3.6	3.9	4.0	4.3	4.2	4.0	4.2	6.0	6.5	5.0	6.0	85.0	2.5	2.1	2.4
Banc of America Securities	4.0	7.0	4.2	na	4.3	4.5	4.7	4.4	4.5	4.6	5.0	5.6	6.5	na	6.2	na	3.8	2.1	2.5
Nat'l Assn. of Realtors	4.0	7.0	4.2	4.0	4.0	4.1	4.2	4.5	4.7	4.9	5.1	5.7	6.5	4.7	6.3	na	3.6	2.0	2.6
Thredgold Economic Assoc.	4.0	7.0	4.2	4.0	4.0	4.2	4.3	4.5	4.7	4.9	5.2	5.9	6.6	4.8	6.4	82.0	3.4	2.2	2.6
Briefing.com	4.0	7.0	4.2	4.0	4.0	4.2	4.4	4.6	4.8	5.1	5.5	6.3	7.1	5.2	6.7	na	3.5	2.3	2.6
Perna Associates	4.0	7.0	4.1	4.0	3.9	4.1	4.3	4.4	4.7	4.9	5.3	6.3	7.2	4.7	6.2	81.8	3.0	2.7	3.2
Wachovia	4.0	7.0	4.1	4.0	4.0	4.2	4.4	4.3	4.5	4.6	5.0	5.6	6.5	4.6	6.1	87.5	3.0	2.7	2.6
LaSalle Nat'l Bank	4.0	7.0	4.0	4.1	3.7	3.8	3.9	4.1	4.3	4.6	5.0	5.8	6.7	4.9	6.2	77.3	2.9	2.1	2.1
Mesirow Financial	4.0	7.0	3.9	na	3.6	3.9	4.1	4.0	4.3	4.4	5.8	5.5	na	na	6.2	82.5	3.8	1.5	1.9
ClearView Economics	3.9	6.9	4.2	3.9	3.8	3.9	4.0	4.3	4.3	4.4	4.7	5.3	6.3	4.5	6.1	85.0	3.1	1.9	3.0
J.W. Coons Advisors LLC	3.9	6.9	4.0	3.8	3.6	3.7	3.8	4.0	4.1	4.3	4.7	5.7	6.6	na	6.0	83.2	2.9	2.2	2.4
Nomura Securities Inc.	3.8	6.8	4.1	4.0	3.8	3.7	4.0	4.5	4.6	4.8	4.9	5.7	6.6	na	6.4	86.5	3.6	2.0	1.5 L
Bank of Toyko-Mitsubishi	3.8	6.8	4.0	4.1	3.8	4.0	4.2	3.7	3.9	4.1	4.5	4.7	5.5	4.3	5.6	89.0	4.0 H	2.5	2.7
Independent Economic Advisory	3.8	6.8	3.9	3.8	3.7	3.9	4.0	4.3	4.6	4.8	5.4	5.9	6.7	5.0	6.8	86.0	3.3	2.4	2.3
The Northern Trust Company	3.7	6.7	3.8	na	3.5	na	3.8	4.2	4.4	4.6	na	5.6	na	4.8	6.1	na	3.2	4.1 H	na
SunTrust Banks	3.6	6.6	3.9	3.6	3.5	3.7	3.8	3.8	4.1	4.3	4.7	5.6	6.4	4.2	6.3	82.3	1.9 L	2.3	2.7
BMO Nesbitt Burns	3.5	6.5	3.9	3.9	3.6	3.6	3.8	3.6	3.8	3.9	4.2	na	na	na	na	na	2.8	1.7	2.2
Cycledata Corp.	3.5	6.5	3.8	3.6	3.5	3.7	3.9	4.1	4.1	4.3	4.7	5.3	6.1	4.3	5.8	80.0	2.7	2.5	2.8
Scotiabank	3.3	6.3	3.4	3.3 L	3.2	3.5 L	3.7 L	3.8	4.2	4.8	4.9	6.0	6.8	5.0	6.3	75.6	3.2	2.1	2.3
Merrill Lynch Economics	3.0 L	6.0 L	3.1 L	na	3.0 L	na	na	3.2 L	3.3 L	3.6 L	na	na	na	na	na	na	3.3	1.5	1.7
July Consensus	**4.1**	**7.1**	**4.3**	**4.2**	**4.1**	**4.2**	**4.3**	**4.5**	**4.7**	**4.8**	**5.2**	**6.0**	**6.8**	**5.0**	**6.4**	**82.4**	**3.3**	**2.2**	**2.5**
Top 10 Avg.	4.6	7.6	4.8	4.7	4.6	4.7	4.9	5.2	5.3	5.5	5.8	6.7	7.5	5.4	7.0	87.1	3.8	2.9	3.1
Bottom 10 Avg.	3.6	6.6	3.8	3.8	3.5	3.7	3.8	3.8	4.0	4.1	4.5	5.3	6.2	4.5	5.9	76.8	2.7	1.7	2.0
June Consensus	4.2	7.2	4.4	4.2	4.1	4.3	4.5	4.6	4.9	5.1	5.5	6.3	7.0	5.1	6.6	80.5	3.3	2.2	2.6
Number of Forecasts Changed From A Month Ago:																			
Down	9	9	12	15	17	19	20	21	31	31	30	32	27	18	25	8	14	10	9
Same	35	34	25	17	23	18	16	20	15	11	5	7	5	6	10	6	24	29	32
Up	6	7	10	8	10	7	7	9	4	8	5	6	7	9	10	19	11	10	7
Diffusion Index	47 %	48 %	48 %	41 %	43 %	36 %	35 %	38 %	23 %	27 %	19 %	21 %	24 %	36 %	33 %	67 %	47 %	50 %	48 %

Third Quarter 2006

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum – Average For Quarter: Short-Term 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR Rate 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	Intermediate-Term 8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Notes 20-Yr.	Long-Term 12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Major Currency $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index
RBS Greenwich Capital Econ.	5.2 H	8.2 H	5.4 H	5.3 H	5.2 H	5.3 H	5.4 H	5.5 H	5.5	5.5	5.8	6.8	7.6	5.5	7.2	90.7	3.8	2.0	2.5
Bear Stearns & Co.	5.0	8.0	5.3	5.1	5.0	5.1	5.3	5.5 H	5.5	5.7	na	7.3 H	8.3 H	5.4	7.3	87.3	3.5	2.9	2.9
Action Economics	5.0	8.0	na	5.0	4.9	5.0	5.2	5.2	5.2	5.4	6.0	6.1	6.7	5.3	6.5	79.5	3.7	2.5	2.7
Deutsche Bank Securities, Inc.	4.8	7.8	4.8	na	4.9	na	na	5.5	5.8	5.8	6.0	na	na	na	na	na	3.4	2.1	2.1
Loomis, Sayles & Company	4.6	7.6	4.8	4.7	4.4	4.5	4.5	4.6	4.9	4.9	5.2	6.1	6.8	4.6	6.3	81.9	3.6	2.1	2.4
Comerica Bank	4.5	7.5	4.7	4.6	4.4	4.6	4.7	4.9	5.0	5.4	5.6	6.4	7.3	5.2	6.9	74.0	3.5	2.4	2.8
JPMorgan Asset Mgt.	4.5	7.5	4.9	4.7	4.5	4.7	4.9	5.2	5.4	5.4	5.7	6.3	7.2	5.5	6.9	84.8	3.3	1.9	2.6
Barclays Capital	4.5	7.5	4.8	4.5	4.6	4.6	na	4.6	4.7	4.8	na	6.5	7.4	5.1	6.6	na	3.5	2.1	2.2
Trusco Capital Management	4.5	7.5	4.8	4.5	4.5	4.6	4.8	5.1	5.4	5.7	5.9	6.9	7.6	5.9 H	7.3	84.0	2.8	2.5	3.2 H
Goldman Sachs & Co.	4.5	7.5	4.7	na	4.5	na	4.9	4.7	4.9	5.1	na	6.9	na	na	6.8	na	3.0	2.2	2.2
Swiss Re	4.5	7.5	4.7	5.1	4.6	4.8	5.0	5.0	5.1	5.4	5.8	6.3	7.1	na	6.7	na	3.4	1.5	2.3
Naroff Economic Advisors	4.5	7.5	4.7	4.7	4.6	4.8	5.1	5.4	5.8 H	6.1 H	6.4 H	7.0	7.8	5.5	7.6 H	91.0 H	3.5	2.2	2.3
J.P. Morgan Chase	4.5	7.5	4.7	na	4.5	na	na	4.9	5.0	5.2	na	na	na	na	na	na	3.0	2.5	2.8
Citigroup Asset Management	4.5	7.5	4.7	4.5	4.3	4.3	4.5	4.7	4.8	4.9	5.2	6.0	6.7	na	6.4	na	3.1	2.8	3.0
National City Corporation	4.5	7.5	4.6	4.5	4.2	4.4	4.6	5.0	5.2	5.4	5.8	6.7	7.6	5.2	7.1	76.1	3.5	1.4	2.4
Wayne Hummer & Co.	4.3	7.3	4.6	4.4	4.3	4.5	4.8	5.0	5.2	5.5	5.9	6.6	7.3	5.5	7.0	84.0	3.5	2.2	2.6
PNC Financial Services Corp.	4.3	7.3	4.5	4.4	4.2	4.2	4.3	4.4	4.5	4.6	4.7	5.8	7.0	5.1	6.5	84.0	na	na	na
Georgia State University	4.3	7.3	na	na	4.2	4.3	4.5	4.8	4.8	5.0	na	6.1	7.0	na	6.5	na	3.0	1.6	1.2
ClearView Economics	4.3	7.3	4.5	4.3	4.1	4.2	4.2	4.6	4.5	4.6	4.8	5.5	6.4	4.6	6.2	83.0	3.0	1.7	2.7
Fannie Mae	4.3	7.3	na	4.1	4.1	4.3	3.8	4.1	4.3	4.5	na	5.9	6.5	4.8	5.7	na	3.6	2.1	2.6
Moody's Investors Service	4.3	7.3	4.7	4.4	4.2	4.4	4.6	4.8	4.9	5.1	5.4	5.9	6.7	5.1	6.6	86.5	3.8	2.4	2.4
J.W. Coons Advisors LLC	4.3	7.3	4.4	4.1	3.9	3.9	4.0	4.1	4.2	4.4	4.7	5.9	6.8	na	6.1	83.4	3.5	2.1	2.4
Wachovia	4.3	7.3	4.4	4.3	4.3	4.5	4.6	4.5	4.6	4.7	5.1	5.8	6.8	4.6	6.2	88.0	3.0	2.8	2.5
Woodworth Holdings	4.3	7.3	4.4	4.3	4.3	4.5	4.6	4.8	5.0	5.2	5.6	6.6	7.5	4.8	6.9	76.0	3.0	3.0 H	3.0
Chmura Economics & Analytics	4.3	7.2	4.5	4.3	4.3	4.4	4.5	4.8	4.8	4.9	5.3	6.0	na	na	6.4	73.3 L	3.8	2.2	2.0
ING Investment Mgt.	4.2	7.2	4.5	4.3	4.2	4.3	na	4.5	5.0	5.3	5.7	6.5	7.2	5.2	6.8	76.0	3.5	2.3	2.9
DePrince & Associates	4.2	7.2	4.5	4.3	4.2	4.4	4.6	4.8	5.0	5.1	5.2	6.5	7.4	5.2	6.8	86.8	3.3	2.1	2.9
Briefing.com	4.1	7.1	4.3	4.1	4.1	4.3	4.5	4.7	4.9	5.0	5.4	6.2	7.0	5.2	6.6	na	3.5	2.3	2.7
Prudential Equity Group LLC	4.0	7.0	4.8	4.5	4.1	4.6	4.8	4.9	5.0	5.2	5.9	6.4	7.2	5.7	6.9	76.0	3.4	2.3	2.5
Kellner Economic Advisers	4.0	7.0	4.3	4.3	3.8	4.1	4.1	4.4	4.3	4.1	4.3	6.1	6.5	5.1	6.0	86.0	2.7	2.2	2.5
UBS Warburg	4.0	7.0	4.3	na	4.2	na	na	4.3	4.7	5.0	na	na	na	na	na	na	3.0	2.2	2.5
Standard & Poor's Corp.	4.0	7.0	4.3	4.1	3.9	4.0	4.2	4.6	4.7	4.9	na	6.1	7.0	5.2	6.4	75.1	2.6	1.5	1.2
Perna Associates	4.0	7.0	4.2	4.1	4.0	4.2	4.4	4.5	5.0	5.2	5.6	6.7	7.6	5.0	6.5	80.7	2.9	2.7	3.2 H
Nomura Securities Inc.	4.0	7.0	4.2	4.1	3.9	3.7	4.0	4.4	4.5	4.7	4.8	5.6	6.5	na	6.3	86.0	3.7	2.0	2.2
Classicalprinciples.com	4.0	7.0	4.2	na	4.1	4.3	4.4	4.4	4.8	5.1	5.7	6.2	6.9	na	6.6	na	3.7	1.6	1.8
Nat'l Assn. of Realtors	4.0	7.0	4.2	4.0	4.0	4.1	4.2	4.5	4.7	4.9	5.2	5.8	6.6	4.8	6.4	na	3.1	1.9	2.3
Thredgold Economic Assoc.	4.0	7.0	4.2	4.0	4.0	4.2	4.3	4.5	4.7	4.9	5.2	5.9	6.6	4.8	6.4	81.0	3.4	2.1	2.6
Bank of Toyko-Mitsubishi	4.0	7.0	4.2	4.3	4.0	4.2	4.4	3.9	4.1	4.3	4.7	4.9	5.7	4.5	5.8	90.0	3.7	2.8	2.8
Independent Economic Advisory	4.0	7.0	4.2	4.1	4.0	4.1	4.2	4.5	4.9	5.1	5.7	6.2	7.1	5.3	7.2	85.5	3.0	2.3	1.9
U.S. Trust Company	4.0	7.0	4.1	4.0	4.1	4.1	4.0	3.8	3.8	3.8 L	4.1 L	4.6 L	5.4 L	4.0 L	5.3 L	85.0	3.0	1.8	2.2
Banc of America Securities	4.0	7.0	4.1	na	4.3	4.5	4.7	4.4	4.6	4.7	5.1	5.7	6.6	na	6.3	na	3.6	2.1	2.5
LaSalle Nat'l Bank	4.0	7.0	4.0	4.1	3.8	3.9	4.0	4.2	4.4	4.7	5.0	5.9	6.8	5.0	6.2	75.7	2.6	1.4 L	1.1 L
Mesirow Financial	4.0	7.0	3.9	na	3.6	3.9	4.1	4.2	4.5	4.6	5.8	5.7	na	na	6.3	82.3	4.2 H	1.4	2.0
The Northern Trust Company	4.0	7.0	4.3	na	3.9	na	4.0	4.3	4.5	4.7	na	5.8	na	5.0	6.2	na	3.1	2.0	na
Wells Capital Management	3.9	6.9	4.1	4.0	3.7	3.8	4.1	4.2	4.2	4.4	4.7	5.5	6.6	5.2	6.1	na	3.0	2.7	3.2
BMO Nesbitt Burns	3.5	6.5	3.9	3.8	3.6	3.6	3.8	3.7	3.8	4.0	4.3	na	na	na	na	na	2.5 L	1.9	2.3
Cycledata Corp.	3.5	6.5	3.8	3.6	3.5	3.7	3.9	4.1	4.3	4.5	4.9	5.5	6.3	4.5	6.0	79.0	2.8	2.5	2.9
Scotiabank	3.5	6.5	3.7	3.6	3.5	3.8	4.0	4.1	4.4	5.0	5.1	6.2	7.0	5.2	6.5	74.7	3.3	2.1	2.3
SunTrust Banks	3.4	6.4	3.7	3.5 L	3.4	3.6 L	3.6 L	3.8	4.0	4.2	4.7	5.6	6.4	4.2	6.0	83.2	3.3	2.2	2.6
Merrill Lynch Economics	3.0 L	6.0 L	3.2 L	na	3.1 L	na	na	3.3 L	3.4 L	3.8	na	na	na	na	na	na	3.6	1.6	1.7
July Consensus	**4.2**	**7.2**	**4.4**	**4.3**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.3**	**6.1**	**6.9**	**5.0**	**6.5**	**82.1**	**3.3**	**2.1**	**2.4**
Top 10 Avg.	4.7	7.7	4.9	4.8	4.7	4.8	5.0	5.2	5.4	5.6	5.9	6.8	7.6	5.5	7.1	87.8	3.8	2.7	3.0
Bottom 10 Avg.	3.7	6.7	3.8	3.9	3.6	3.8	3.9	3.9	4.0	4.2	4.6	5.4	6.3	4.5	5.9	75.6	2.8	1.6	1.7
June Consensus	4.3	7.3	4.4	4.3	4.2	4.3	4.5	4.7	4.9	5.1	5.5	6.3	7.1	5.2	6.6	80.4	3.4	2.2	2.5
Number of Forecasts Changed From A Month Ago:																			
Down	12	12	12	11	18	22	23	24	32	30	27	29	25	18	25	9	17	11	14
Same	35	35	24	17	22	10	10	18	12	10	7	8	8	8	9	5	25	27	28
Up	3	3	11	12	10	12	10	8	6	10	6	8	6	9	11	18	7	11	6
Diffusion Index	41 %	41 %	49 %	51 %	42 %	39 %	35 %	34 %	24 %	30 %	24 %	27 %	26 %	37 %	34 %	64 %	40 %	50 %	42 %

JULY 1, 2005 ■ L

Fourth Quarter 2006

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum – Average For Quarter															Avg. For Qtr.	(Q-Q % Change) (SAAR)		
	Short-Term							Intermediate-Term				Long-Term							
	1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR Rate 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Notes 20-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Major Currency $ Index	B. Real GDP	C. GDP Price Index	D Cons. Price Index
RBS Greenwich Capital Econ.	5.4 H	8.4 H	5.6 H	5.5 H	5.4 H	5.4 H	5.5 H	5.6 H	5.6	5.5	5.8	6.8	7.6	5.4	7.2	91.5	3.7	2.0	2.5
Bear Stearns & Co.	5.0	8.0	5.2	5.0	4.9	5.0	5.1	5.3	5.4	5.5	na	7.1 H	8.1 H	5.2	7.1	88.5	3.7	2.8	3.0
Deutsche Bank Securities, Inc.	5.0	8.0	5.1	na	5.1	na	na	5.2	5.4	5.5	5.8	na	na	na	na	na	3.5	1.9	2.1
Action Economics	5.0	8.0	na	5.0	4.9	5.0	5.2	5.2	5.3	5.5	6.1	6.2	6.7	5.4	6.5	78.5	3.7	2.7	2.7
Comerica Bank	4.9	7.9	5.1	5.0	4.8	5.0	5.1	5.2	5.4	5.5	5.7	6.5	7.4	5.3	7.0	72.0	3.5	2.5	2.9
ClearView Economics	4.8	7.8	5.0	4.7	4.6	4.6	4.6	4.9	4.7	4.8	5.0	5.6	6.6	4.7	6.4	81.0	2.9	1.5	2.5
Loomis, Sayles & Company	4.8	7.8	5.0	4.8	4.6	4.6	4.7	4.8	5.0	5.0	5.3	6.2	6.9	4.8	6.5	81.4	3.5	2.1	2.6
JPMorgan Asset Mgt.	4.5	7.5	4.8	4.6	4.5	4.7	4.8	5.2	5.3	5.3	5.6	6.3	7.2	5.4	6.9	84.0	3.4	1.9	2.5
Barclays Capital	4.5	7.5	4.8	4.5	4.6	4.6	na	4.6	4.7	4.8	na	6.5	7.4	5.1	6.6	na	3.5	2.2	2.8
Trusco Capital Management	4.5	7.5	4.8	4.5	4.5	4.6	4.8	5.1	5.4	5.7	5.9	6.9	7.6	5.9 H	7.3	84.7	2.8 L	2.5	2.8
Goldman Sachs & Co.	4.5	7.5	4.7	na	4.5	na	4.9	4.6	4.9	5.0	na	7.0	na	na	6.8	na	3.0	2.4	2.3
Swiss Re	4.5	7.5	4.7	5.1	4.6	4.8	5.0	5.1	5.2	5.5	5.9	6.4	7.2	na	6.8	na	3.3	1.6	2.4
Naroff Economic Advisors	4.5	7.5	4.7	4.7	4.7	4.9	5.2	5.5	5.8 H	6.0 H	6.3 H	7.0	7.7	5.5	7.7 H	93.0 H	3.0	2.4	2.5
J.P. Morgan Chase	4.5	7.5	4.7	na	4.5	na	na	4.8	5.0	5.2	na	na	na	na	na	na	3.0	2.4	2.7
Citigroup Asset Management	4.5	7.5	4.7	4.5	4.3	4.3	4.4	4.6	4.7	4.8	5.0	5.9	6.6	na	6.3	na	3.0	2.6	2.8
National City Corporation	4.5	7.5	4.6	4.5	4.3	4.4	4.6	5.0	5.3	5.5	5.9	6.8	7.7	5.2	7.1	74.9	3.5	1.7	2.4
Wachovia	4.5	7.5	4.6	4.5	4.5	4.7	4.9	4.7	4.8	4.9	5.3	6.0	7.0	4.7	6.3	89.5	3.1	2.7	2.4
Chmura Economics & Analytics	4.5	7.5	4.7	4.6	4.6	4.7	4.7	5.0	4.9	5.0	5.4	6.1	na	na	6.5	71.0 L	3.7	2.3	1.9
Wayne Hummer & Co.	4.4	7.4	4.7	4.5	4.4	4.6	4.9	5.1	5.3	5.6	6.0	6.8	7.5	5.7	7.2	84.1	3.4	2.2	2.7
Woodworth Holdings	4.4	7.4	4.5	4.5	4.5	4.6	4.8	5.0	5.2	5.4	5.8	6.8	7.6	4.9	7.0	78.0	3.0	3.0 H	3.0
ING Investment Mgt.	4.3	7.3	4.6	4.4	4.3	4.4	na	4.5	5.0	5.5	5.9	6.6	7.4	5.3	6.9	75.0	3.0	2.4	3.0
PNC Financial Services	4.3	7.3	4.5	4.4	4.2	4.2	4.3	4.4	4.5	4.6	4.7	5.8	7.0	5.1	6.5	83.0	na	na	na
Kellner Economic Advisers	4.3	7.3	4.4	4.5	4.0	4.3	4.2	4.5	4.4	4.1	4.2	6.2	6.5	5.0	6.0	88.0	3.0	2.4	2.4
Briefing.com	4.3	7.3	4.4	4.2	4.3	4.5	4.6	4.8	5.1	5.0	5.4	6.2	7.0	5.2	6.6	na	3.3	2.2	2.5
Georgia State University	4.3	7.3	na	na	4.2	4.3	4.5	4.8	4.9	5.1	na	6.2	7.1	na	6.8	na	3.3	1.9	1.8
Fannie Mae	4.3	7.3	na	4.1	4.1	4.3	3.9	4.2	4.3	4.4	na	6.0	6.6	4.7	5.7	na	3.4	2.1	2.7
J.W. Coons Advisors LLC	4.3	7.3	4.5	4.3	3.9	3.9	4.0	4.1	4.2	4.5	4.8	6.0	6.8	na	6.1	83.4	4.1	2.2	2.4
Bank of Toyko-Mitsubishi	4.3	7.3	4.5	4.6	4.3	4.5	4.6	4.1	4.3	4.5	4.9	5.1	5.9	4.7	6.0	88.0	3.5	2.9	3.0
The Northern Trust Company	4.3	7.3	4.4	na	4.0	na	4.0	4.4	4.5	4.8	na	5.9	na	5.1	6.3	na	3.0	2.1	na
Moodys Investors Service	4.2	7.2	4.6	4.3	4.2	4.3	4.4	4.6	4.7	4.9	5.1	5.6	6.5	4.8	6.4	86.3	3.5	2.5	2.8
Prudential Equity Group LLC	4.0	7.0	4.9	4.6	4.1	4.7	4.9	4.9	5.0	5.2	5.9	6.4	7.2	5.7	6.9	75.0	3.3	2.4	2.6
UBS Warburg	4.0	7.0	4.3	na	4.2	na	na	4.3	4.7	5.0	na	na	na	na	na	na	3.0	2.2	2.5
Standard & Poor's Corp.	4.0	7.0	4.3	4.1	3.9	4.0	4.2	4.6	4.7	4.9	na	6.1	7.0	5.2	6.4	72.9	3.1	1.8	1.8
Perna Associates	4.0	7.0	4.3	4.0	4.0	4.2	4.4	4.5	5.2	5.4	5.8	7.0	7.9	5.2	6.7	80.7	3.5	2.7	3.2 H
Nomura Securities Inc.	4.0	7.0	4.2	4.1	3.8	3.7	3.9	4.4	4.4	4.6	4.8	5.5	6.4	na	6.2	85.0	3.5	2.1	2.5
Independent Economic Advisory	4.0	7.0	4.2	4.1	4.0	4.1	4.2	4.5	5.0	5.2	5.9	6.5	7.3	5.4	7.4	86.0	3.1	2.0	1.9
Nat'l Assn. of Realtors	4.0	7.0	4.2	4.0	4.1	4.2	4.3	4.6	4.8	5.0	5.3	5.9	6.7	4.9	6.5	na	3.4	1.8	2.2
Thredgold Economic Assoc.	4.0	7.0	4.2	4.0	4.0	4.2	4.3	4.5	4.7	4.9	5.2	5.9	6.6	4.8	6.4	81.0	3.4	2.1	2.6
Banc of America Securities	4.0	7.0	4.1	na	4.3	4.5	4.7	4.4	4.6	4.8	5.2	5.8	6.7	na	6.4	na	3.3	2.0	2.4
LaSalle Nat'l Bank	4.0	7.0	4.0	4.1	3.9	4.0	4.0	4.2	4.4	4.7	5.0	5.9	6.8	5.0	6.2	75.1	3.1	1.8	1.8
Mesirow Financial	4.0	7.0	3.9	na	3.6	3.9	4.1	4.3	4.6	4.7	5.8	5.8	na	na	6.5	82.0	4.1 H	1.4 L	2.0
Scotiabank	3.8	6.8	4.0	3.9	3.8	4.0	4.3	4.3	4.5	5.0	5.1	6.2	7.0	5.2	6.5	73.9	3.4	2.1	2.3
Wells Capital Management	3.7	6.7	3.9	3.8	3.5	3.7	4.0	4.1	4.1	4.3	4.5	5.4	6.5	5.2	6.1	na	3.5	2.4	3.1
BMO Nesbitt Burns	3.5	6.5	4.0	3.9	3.6	3.7	4.0	3.7	3.9	4.1	4.4	na	na	na	na	na	2.9	2.0	2.4
Cycledata Corp.	3.5	6.5	3.8	3.6	3.5	3.7	3.9	4.2	4.4	4.5	4.9	5.5	6.3	4.5	6.0	79.0	2.9	2.5	3.0
U.S. Trust Company	3.5	6.5	3.6	3.5	3.5	3.5 L	3.5 L	3.5 L	3.6 L	3.8 L	4.0 L	4.5 L	5.3 L	3.9 L	5.3 L	85.0	2.9	1.8	2.2
SunTrust Banks	3.4	6.4	3.6	3.4 L	3.4	3.6	3.6	3.8	4.0	4.2	4.7	5.5	6.4	4.2	6.0	84.0	3.6	2.3	2.6
Merrill Lynch Economics	3.0 L	6.0 L	3.3 L	na	3.2 L	na	na	3.5 L	3.7	4.2	na	na	na	na	na	na	3.6	1.5	1.5 L
July Consensus	**4.3**	**7.3**	**4.5**	**4.4**	**4.2**	**4.4**	**4.5**	**4.6**	**4.8**	**4.9**	**5.3**	**6.1**	**7.0**	**5.1**	**6.5**	**81.7**	**3.3**	**2.2**	**2.5**
Top 10 Avg.	4.8	7.8	5.0	4.9	4.8	4.9	5.1	5.2	5.4	5.6	6.0	6.9	7.6	5.5	7.2	88.1	3.7	2.7	3.0
Bottom 10 Avg.	3.6	6.6	3.8	3.8	3.6	3.8	3.9	3.9	4.1	4.2	4.6	5.4	6.3	4.6	5.9	74.6	2.9	1.7	1.9
June Consensus	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Number of Forecasts Changed From A Month Ago:																			
Down	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Same	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Up	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Diffusion Index	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %	na %

International Interest Rate And Foreign Exchange Rate Forecasts

United States

	3 Mo. Euro Dollar Rate			10 Yr. Gov't Bond Yield %			Fed's Major Currency $ Index		
Blue Chip Forecasters	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Scotiabank	3.38	3.38	3.38	4.20	4.45	4.85	83.6	78.3	75.6
Deutsche Bank Research	3.75	4.00	4.25	4.25	4.40	4.65	83.0	82.0	80.0
WestLB	3.90	4.20	4.20	4.40	4.70	4.50	83.0	80.0	78.0
ING Financial Markets	4.00	4.15	4.45	4.20	4.50	4.90	91.0	90.6	88.7
Mizuho Research Institute	4.10	4.60	4.90	4.50	4.90	5.30	88.0	86.0	85.0
July Consensus	**3.83**	**4.07**	**4.24**	**4.31**	**4.59**	**4.84**	**85.7**	**83.4**	**81.5**
High	4.10	4.60	4.90	4.50	4.90	5.30	91.0	90.6	88.7
Low	3.38	3.38	3.38	4.20	4.40	4.50	83.0	78.3	75.6
Last Months Avg.	3.48	3.86	4.16	4.54	4.75	4.94	84.1	82.4	81.0

Japan

	3 Mo. Euro Yen Rate			10 Yr. Gov't Bond Yield %			US $/Yen		
Blue Chip Forecasters	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Scotiabank	0.05	0.05	0.15	1.30	1.50	1.65	104.0	97.0	93.0
Deutsche Bank Research	0.10	0.10	0.20	1.30	1.40	1.65	105.0	104.0	100.0
WestLB	0.10	0.10	0.20	1.60	1.80	2.00	108.0	104.0	100.0
ING Financial Markets	0.15	0.20	0.30	1.50	1.60	1.80	105.0	104.0	102.0
Mizuho Research Institute	0.08	0.09	0.10	1.40	1.60	1.85	112.0	110.0	103.0
July Consensus	**0.10**	**0.11**	**0.19**	**1.42**	**1.58**	**1.79**	**106.8**	**103.8**	**99.6**
High	0.15	0.20	0.30	1.60	1.80	2.00	112.0	110.0	103.0
Low	0.05	0.05	0.10	1.30	1.40	1.65	104.0	97.0	93.0
Last Months Avg.	0.10	0.10	0.19	1.48	1.65	1.82	104.2	102.0	100.2

United Kingdom

	3 Mo. Euro Sterling Rate			10 Yr. Gilt Yields %			Pound Sterling/US $		
Blue Chip Forecasters	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Scotiabank	4.80	4.80	4.55	4.75	4.90	4.80	1.84	1.96	2.00
Deutsche Bank Research	4.80	4.80	4.65	4.50	4.50	4.40	1.80	1.80	1.85
WestLB	4.80	4.70	4.50	4.50	4.70	4.40	1.76	1.83	1.90
ING Financial Markets	4.60	4.30	4.30	4.50	4.60	4.70	1.69	1.67	1.72
Mizuho Research Institute	4.80	4.80	4.80	4.60	4.80	5.30	na	na	na
July Consensus	**4.76**	**4.68**	**4.56**	**4.57**	**4.70**	**4.72**	**1.77**	**1.82**	**1.87**
High	4.80	4.80	4.80	4.75	4.90	5.30	1.84	1.96	2.00
Low	4.60	4.30	4.30	4.50	4.50	4.40	1.69	1.67	1.72
Last Months Avg.	4.76	4.69	4.63	4.76	4.79	4.80	1.86	1.87	1.86

Switzerland

	3 Mo. Euro Franc Rate %			10 Yr. Gov't Bond Yield %			SF/US $		
Blue Chip Forecasters	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Scotiabank	0.70	0.90	1.10	2.25	2.50	2.00	1.20	1.08	1.04
Deutsche Bank Research	0.75	0.80	1.00	2.10	2.25	2.30	1.25	1.20	1.15
WestLB	0.80	0.80	1.30	2.10	2.30	2.30	1.28	1.21	1.15
ING Financial Markets	0.80	1.05	1.25	2.25	2.40	2.60	1.25	1.25	1.18
Mizuho Research Institute	na	na	na	na	na	na	na	na	na
July Consensus	**0.76**	**0.89**	**1.16**	**2.18**	**2.36**	**2.30**	**1.25**	**1.19**	**1.13**
High	0.80	1.05	1.30	2.25	2.50	2.60	1.28	1.25	1.18
Low	0.70	0.80	1.00	2.10	2.25	2.00	1.20	1.08	1.04
Last Months Avg.	0.75	0.93	1.28	2.26	2.45	2.44	1.17	1.12	1.12

Canada

	3 Mo. Euro Dollar Rate			10 Yr. Gov't Bond Yield %			US $/C $		
Blue Chip Forecasters	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Scotiabank	2.58	2.58	2.33	3.95	4.15	4.40	1.22	1.19	1.16
Deutsche Bank Research	2.75	2.85	3.00	4.25	4.40	4.50	1.22	1.22	1.20
WestLB	2.60	2.90	3.20	4.40	4.80	4.70	1.25	1.25	1.22
ING Financial Markets	3.00	3.10	3.40	4.30	4.40	4.60	1.24	1.23	1.22
Mizuho Research Institute	na	na	na	na	na	na	na	na	na
July Consensus	**2.73**	**2.86**	**2.98**	**4.23**	**4.44**	**4.55**	**1.23**	**1.22**	**1.20**
High	3.00	3.10	3.40	4.40	4.80	4.70	1.25	1.25	1.22
Low	2.58	2.58	2.33	3.95	4.15	4.40	1.22	1.19	1.16
Last Months Avg.	2.66	2.75	2.96	4.41	4.58	4.63	1.24	1.21	1.21

JULY 1, 2005 ■ BL

International Interest Rate And Foreign Exchange Rate Forecasts

Blue Chip Forecasters	3 Mo. Euro Dollar Rate		
	In 3 Mo.	In 6 Mo.	In 12 Mo.
Scotiabank	5.70	5.70	5.50
Deutsche Bank Research	5.70	5.70	5.60
WestLB	5.70	5.70	5.60
ING Financial Markets	5.80	5.95	5.95
Mizuho Research Institute	na	na	na
July Consensus	**5.73**	**5.76**	**5.66**
High	5.80	5.95	5.95
Low	5.70	5.70	5.50
Last Months Avg.	5.85	5.86	5.81

Australia

10 Yr. Gov't Bond Yield %		
In 3 Mo.	In 6 Mo.	In 12 Mo.
5.70	5.85	5.40
5.40	5.40	5.30
5.50	5.70	5.50
5.50	5.60	5.70
na	na	na
5.53	**5.64**	**5.48**
5.70	5.85	5.70
5.40	5.40	5.30
5.58	5.69	5.53

A $/US $		
In 3 Mo.	In 6 Mo.	In 12 Mo.
0.77	0.82	0.85
0.75	0.78	0.79
0.75	0.78	0.78
0.78	0.80	0.81
na	na	na
0.76	**0.80**	**0.81**
0.78	0.82	0.85
0.75	0.78	0.78
0.78	0.79	0.78

Blue Chip Forecasters	3 Mo. Euro Rate		
	In 3 Mo.	In 6 Mo.	In 12 Mo.
Scotiabank	2.10	2.10	2.10
Deutsche Bank Research	2.10	2.10	2.30
WestLB	2.10	2.20	2.70
ING Financial Markets	2.15	2.15	2.45
Mizuho Research Institute	2.10	2.15	2.30
July Consensus	**2.11**	**2.14**	**2.37**
High	2.15	2.20	2.70
Low	2.10	2.10	2.10
Last Months Avg.	2.14	2.17	2.36

Eurozone

10 Yr. Euro Bond Yield %		
In 3 Mo.	In 6 Mo.	In 12 Mo.
3.20	3.35	3.65
3.30	3.40	3.50
3.50	3.70	3.70
3.50	3.60	3.90
na	na	na
3.38	**3.51**	**3.69**
3.50	3.70	3.90
3.20	3.35	3.50
3.60	3.68	3.76

Euro/US $		
In 3 Mo.	In 6 Mo.	In 12 Mo.
1.25	1.37	1.43
1.23	1.24	1.26
1.20	1.28	1.35
1.22	1.22	1.26
1.20	1.23	1.25
1.22	**1.27**	**1.31**
1.25	1.37	1.43
1.20	1.22	1.25
1.29	1.32	1.33

Blue Chip Forecasters	10 Yr. Gov't Bond Yields %											
	Germany			France			Italy			Spain		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Scotiabank	3.20	3.35	3.65	3.25	3.40	3.70	3.40	3.55	3.85	3.25	3.40	3.70
West LB	3.40	3.50	3.50	3.40	3.50	3.50	3.60	3.70	3.80	3.40	3.50	3.50
ING Financial Markets	3.50	3.60	3.90	3.50	3.60	3.90	3.70	3.80	4.10	3.60	3.80	4.10
Mizuho Research Institute	3.50	3.70	4.20	3.50	3.70	4.20	3.70	3.90	4.40	3.50	3.70	4.20
July Consensus	**3.40**	**3.54**	**3.81**	**3.41**	**3.55**	**3.83**	**3.60**	**3.74**	**4.04**	**3.44**	**3.60**	**3.88**
High	3.50	3.70	4.20	3.50	3.70	4.20	3.70	3.90	4.40	3.60	3.80	4.20
Low	3.20	3.35	3.50	3.25	3.40	3.50	3.40	3.55	3.80	3.25	3.40	3.50
Last Months Avg.	3.60	3.70	3.90	3.61	3.71	3.91	3.78	3.89	4.08	3.64	3.76	3.96

Consensus Forecasts 10-year Bond Yields vs U.S. Yield

	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-2.76	-2.89	-3.01	-3.05
United Kingdom	0.29	0.26	0.11	-0.12
Switzerland	-2.04	-2.14	-2.23	-2.54
Canada	-0.21	-0.09	-0.15	-0.29
Australia	1.23	1.22	1.05	0.64
Germany	-0.84	-0.91	-1.05	-1.03
France	-0.83	-0.90	-1.04	-1.02
Italy	-0.65	-0.71	-0.85	-0.80
Spain	-0.86	-0.87	-0.99	-0.97
Eurozone	-0.70	-0.94	-1.08	-1.15

Consensus Forecasts 3 Mo. Interest Rates vs U.S. Rate

	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-3.41	-3.73	-4.17	-4.05
United Kingdom	1.37	0.93	0.61	0.32
Switzerland	-2.72	-3.06	-3.18	-3.07
Canada	-0.84	-1.09	-1.21	-1.25
Australia	2.15	1.90	1.70	1.43
Eurozone	-1.31	-1.72	-1.93	-1.87