

The Index Investor

Why Pay More for Less?

Global Asset Class Returns

<i>YTD 30Sep03</i>	<u>In USD</u>	<u>In AUD</u>	<u>In CAD</u>	<u>In EURO</u>	<u>In JPY</u>	<u>In GBP</u>
US Equity	15.00%	(6.40%)	(1.53%)	3.90%	8.46%	11.61%
US Bonds	3.80%	(17.60%)	(12.73%)	(7.30%)	(2.74%)	0.41%
AUS Equity	29.50%	8.10%	12.97%	18.40%	22.96%	26.11%
AUS Bonds	19.33%	(2.07%)	2.80%	8.23%	12.79%	15.94%
CAN Equity	31.50%	10.10%	14.97%	20.40%	24.96%	28.11%
CAN Bonds	23.20%	1.80%	6.67%	12.10%	16.66%	19.81%
Euroland Equity	16.20%	(5.20%)	(0.33%)	5.10%	9.66%	12.81%
Euroland Bonds	15.64%	(5.76%)	(0.89%)	4.54%	9.10%	12.25%
Japan Equity	26.00%	4.60%	9.47%	14.90%	19.46%	22.61%
Japan Bonds	4.63%	(16.77%)	(11.90%)	(6.47%)	(1.91%)	1.24%
UK Equity	10.40%	(11.00%)	(6.13%)	(0.70%)	3.86%	7.01%
UK Bonds	5.35%	(16.05%)	(11.18%)	(5.75%)	(1.19%)	1.96%
World Equity	17.35%	(4.05%)	0.82%	6.25%	10.81%	13.96%
World Bonds	7.85%	(13.55%)	(8.68%)	(3.25%)	1.31%	4.46%
Commodities	9.70%	(11.70%)	(6.83%)	(1.40%)	3.16%	6.31%
XR Chng v. USD	0.00%	21.40%	16.53%	11.10%	6.54%	3.39%

Model Portfolio Update

The objective of our first set of model portfolios is to deliver higher returns than their respective benchmarks, while taking on no more risk. The benchmark for the first portfolio in this group is an aggressive mix of 80% domestic equities, and 20% domestic bonds. Through the end of September, this benchmark had returned 12.8%, while our model portfolio had

returned 16.1%. We have also compared our model portfolios to a set of global benchmarks. In this case, the global benchmark is a mix of 80% global equities, and 20% global bonds. Through the end of last month, it had returned 15.5%.

The benchmark for the second portfolio in this group is a mix of 60% domestic equities and 40% domestic bonds. Through the end of last month, it had returned 10.5%, while our model portfolio had returned 14.3%, and the global benchmark had returned 13.6%.

The benchmark for the third portfolio in this group is a conservative mix of 20% domestic equities and 80% domestic bonds. Through the end of last month, it had returned 6.0%, while our model portfolio had returned 8.1% and the global benchmark 9.8%.

The objective of our second set of model portfolios is to deliver less risk than their respective benchmarks, while delivering at least as much return. The benchmark for the first portfolio in this group is an aggressive mix of 80% domestic equities, and 20% domestic bonds. Through the end of last month, this benchmark had returned 12.8%, while our model portfolio had returned 14.9%. We have also compared our model portfolios to a set of global benchmarks. In this case, the global benchmark is a mix of 80% global equities, and 20% global bonds. Through the end of last month, it had returned 15.5%.

The benchmark for the second portfolio in this group is a mix of 60% domestic equities and 40% domestic bonds. Through the end of last month, it had returned 10.5%, while our model portfolio had returned 11.9%, and the global benchmark had returned 13.6%.

The benchmark for the third portfolio in this group is a conservative mix of 20% domestic equities and 80% domestic bonds. Through the end of last month, it had returned 6.0%, while our model portfolio had returned 8.2% and the global benchmark 9.8%.

The objective of our third set of model portfolios is not to outperform a benchmark index, but rather to deliver a minimum level of compound annual nominal return over a ten-year period. Through last month, our 12% target return portfolio has returned 16.3% year-to-date, our 10%

target return portfolio has returned 14.1% our 8% target return portfolio has returned 12.9%, and our 6% target return portfolio has returned 8.4%.

Last month, the active portfolio was allocated as follows: 60% to the Vanguard Inflation Protected Securities Fund, 15% each to the Oppenheimer Real Assets Fund and the T. Rowe Price International Bond Fund, and 10% to the U.K. Equity Market iShare. These will not change next month. Based on our current outlook for the next few years (see below) we still prefer a conservative stance. Year-to-date, our actively managed portfolio has returned 13.7%.

Equity Market Valuation Update

Our valuation analysis rests on two fundamental assumptions. The first is that the long term real equity risk premium is 4.0% per year. The second is the rate of productivity growth the economy will achieve. As described in our June, 2003 issue, we use both high and a low productivity growth assumptions. Given these assumptions, here is our updated market valuation analysis at the end of last month:

Country	Real Risk Free Rate +	Equity Risk Premium =	Required Real Return on Equities	Expected Real Growth Rate* +	Div Yield =	Expected Real Equity Return**
Australia	3.12%	4.00%	7.12%	4.90%	3.80%	8.70%
Canada	3.03%	4.00%	7.03%	2.10%	1.90%	4.00%
Eurozone	1.64%	4.00%	5.64%	2.50%	2.60%	5.10%
Japan	2.03%	4.00%	6.03%	2.80%	1.00%	3.80%
U.K.	2.05%	4.00%	6.05%	2.50%	3.40%	5.90%
U.S.A.	2.57%	4.00%	6.57%	4.50%	1.70%	6.20%

**High Productivity Growth Scenario. See Asset Class Review, in our June 2003 Issue, for details of both productivity growth scenarios for each region.*

*** When expected return is greater than required return, theoretical index value will be greater than actual index value.*

Country	Implied Index Value*	Current Index Value	Current/Implied (high productivity growth)	Current/Implied (low productivity growth)
Australia	438.92	256.42	58%	85%
Canada	103.18	267.73	259%	312%
Eurozone	108.48	131.01	121%	178%
Japan	29.60	95.62	323%	423%
U.K.	263.89	275.53	104%	149%
U.S.A.	333.89	406.56	122%	181%

* *High productivity growth scenario.*

Updated Economic Outlook

Many new economic forecasts have been released this month, including the International Monetary Fund's semi-annual *World Economic Outlook*, the World Bank's *Global Economic Prospects*, and surveys of the world economy by both *The Economist* and *The Financial Times*. Because they are important qualitative inputs into a medium term asset allocation process, we think it is important that our readers have a clear understanding of what they say. To that end, we will first summarize their view of the current situation and its critical uncertainties. Based on different outcomes for these uncertainties, we will then develop different scenarios for how the global economy could evolve over the next five years. Finally, we will put probabilities on our scenarios, recognizing that while this is possibly helpful in the short term, it will no doubt someday be cited in hindsight as further evidence of our human fallibility!

The Current Situation

About two years ago, following the sharp fall in equity market valuations, the world economy faced overcapacity in many industries (thanks to overinvestment during the boom years), and stood on the precipice of a global recession. Even worse, due to the substantial amounts of household and corporate debt that had been built up during the boom years, a global slowdown ran the risk of causing an accelerating collapse in asset values and a debt implosion that might have triggered a global deflation. Thanks to the Japanese experience, U.S. policymakers took aggressive action to prevent this scenario from developing. That action took the form of very aggressive fiscal action (primarily in the form of tax cuts) as well as a substantial expansion of the money supply. European action was far more restrained. On the fiscal front, it was restrained by the Stability and Growth Pact, which limited Eurozone countries to government deficits equal to no more than three percent of gross domestic product (GDP). On the monetary front, the European Central Bank is charged only with maintaining price stability (unlike the Federal Reserve, which is also charged with maintaining employment). As such, it seemed (to outside observers) to be concerned that monetary easing would (because of Europe's structural obstacles to growth) result in higher inflation rather than a substantial increase in real GDP growth. In Japan, policymakers continued to struggle with their country's slow real growth and ongoing deflation, with effective policy actions too often blocked by political infighting.

In so far as the goal of the U.S. authorities was to avoid a deep global depression and an accompanying bout of price deflation, they have succeeded, up to now. However, that success has come at a price. The United States continues to be the single locomotive pulling GDP growth around the world.

The IMF's most recent World Economic Outlook succinctly sums up the dangers inherent in this situation. Early on, it notes that we live in highly uncertain times: "The equity boom in the late 1990s was the largest in modern history: the unwinding of its effects is uncharted

territory...While the direct impact of equity market losses on household consumption growth should now have peaked, household balance sheets in some countries, notably the United States, remain stretched and housing markets -- boosted in part by the aggressive easing of monetary policy in the last three years -- are unlikely to provide the same support to the recovery going forward as they did in the past. In addition, adjustment in the corporate sector -- eliminating excess capacity, restructuring balance sheets, and rebuilding defined benefit pension funds -- still has some way to go, particularly in Europe." Moreover, "in marked contrast to the situation in the mid 1980s, when the United States last ran a current account deficit of this size, neither Japan nor, to a lesser extent, Europe is well placed to pick up the slack if growth in the United States were to slow."

As a result, the IMF notes, "a prolonged period of slower growth would make the global economy more vulnerable to new adverse shocks, especially given the still heavy dependence on the United States, the relatively low level of inflation in some countries, and the increasingly limited room for policy maneuver in many countries." In other words, the risk of global recession and deflation, while reduced for now, still exists.

Given the weakness of the Eurozone and Japanese economies, recent surveys unanimously agree that in the short term, global growth will continue to depend on the performance of the U.S. economy, which carries great risks. The IMF notes that "the[global economic] recovery will continue to be led by the United States where, despite a weak labor market and considerable excess capacity, current data have shown the greatest sign of improvement... and there is the most policy stimulus in the pipeline. In the Euro area, the forecast has once again been significantly reduced, reflecting continued disappointing private domestic demand and the appreciation of the Euro...There are still relatively few signs of a broad pickup in real [growth]...indicators of household and business confidence generally remain at depressed levels; unemployment continues to edge up; and industrial production has yet to show an sustained upward trend. The German economy remains weak for the third year in a row, adding to the subpar performance of the Euro area as a whole, and threatening to hold back the region's recovery prospects."

Meanwhile, "in Japan...[while] the outlook has been revised upward significantly...[it] is still clouded by deflation and corporate and banking system weaknesses."

The crux of the problem is this: "While stronger U.S. growth would, of course, benefit the rest of the world, it would come at the cost of exacerbating the already large U.S. current account deficit...Despite the depreciation of the dollar, the U.S. current account deficit is projected at 5 percent of GDP in 2003, falling to only 4% of GDP by 2008, suggesting that further adjustment will be needed to achieve medium term sustainability. While the extent, nature, and timing of further dollar adjustment is impossible to predict, history suggests that even an orderly adjustment is likely to be associated with a slowdown in U.S. growth, and, if growth in the rest of the world remains weak, in global growth as well. In addition, a disorderly adjustment remains an important risk, particularly if the offsetting appreciation continues to be concentrated on a few currencies." That last bit of euphemistic bureaucratic language probably needs some translation for many readers. Put bluntly, "disorderly adjustment" means a sudden crash in the value of the dollar (which would trigger a sharp rise in U.S. prices and interest rates, and an equally abrupt recession) and/or a sharp rise in protectionism, as countries try to protect their voters from the effects of rapidly unwinding global economic imbalances (which would also probably trigger a deep recession).

However, in the IMF's view, it isn't just a sharp fall in the value of the U.S. dollar we should be worried about. They go on to note that " a further sharp rise in bond yields could adversely affect the recovery, particularly if that were not driven by expectations of higher growth. This would be especially so in countries where house prices have risen sharply in recent years, where[a rise in rates] would reduce the support that [housing price appreciation] is presently providing to demand...In addition, if growth and corporate earnings were to disappoint, the recent rise in equity markets could prove ephemeral, putting renewed pressure on household, corporate, and financial balance sheets."

In sum, from the IMF's viewpoint, "there are increasing signs that the expected pick up in global activity is developing, although it is as yet unclear how broad-based and robust it will be...Policymakers face major medium term challenges: to reduce the dependence of global

growth on the United States; to foster an orderly reduction in global imbalances; and to strengthen medium-term government fiscal positions in view of future pressures from aging populations."

Critical Uncertainties and Future Scenarios

The trillion dollar question is how much longer this process of U.S. led growth can go on, and what will happen when its limits are eventually reached. The scenario that actually develops will depend on how two critical uncertainties are resolved. The first is whether or not the dollar experiences a sharp fall in value. The second is whether or not structural reforms of the Eurozone and Japanese economies are successfully implemented. We'll now turn to a more detailed discussion of the different scenarios we think the resolution of these uncertainties could produce.

The U.S. Dollar Crashes

Let's start with a little historical perspective. Based on Federal Reserve data, the last peak in the real value of the U.S. dollar versus the currencies of its major trading partners came in March, 1985. This was shortly before the signing of the Plaza Accord, which led to a prolonged depreciation of the U.S. dollar (and increased growth stimulus in Europe and Japan). After the Plaza Accord, the real value of the dollar fell by about 41% until it reached its low in July, 1995. Between then and its peak in February, 2002, the real value of the U.S. dollar rose again by about 49%, before falling back by about 17% by the end of September, 2003. In short, history suggests that the real value of the dollar has a lot more room to fall.

If this fall happened suddenly, the impact could be severe. U.S. import prices would rise, causing an increase in inflation. Interest rates also would rise, slowing economic activity. In short, we could find ourselves in a 1970s type period of "stagflation". From an asset allocation point of view, under this scenario U.S. investors would benefit if they held real return bonds, foreign currency bonds, and perhaps commodities, commercial and residential property (though the latter three seem less certain to produce attractive returns). Returns on

domestic nominal return bonds, and both foreign and domestic equities are likely to be unattractive under this scenario. For non-U.S. dollar investors, U.S. assets would be unattractive, as would all equities, assuming a period of slow global growth. Since most commodities are priced in U.S. dollars, and since demand for commodities would drop in a stagnant economy, this asset class also seems likely to disappoint under this scenario. That leaves domestic real return and nominal return bonds, as well as domestic property. With respect to bonds, to the extent that an influx of former dollar assets produced not only a rise in the exchange rate, but also a fall in inflation and interest rates, nominal return bonds might actually be preferred to real return bonds under this scenario. On the other hand, to the extent that a global recession produced a concerted attempt at global reflation by the world's central banks (more on that below), real return bonds might produce better medium term results.

What could trigger a sharp sell off in the U.S. dollar? Nobody can really know the answer to this question in advance. When and if it happens, it will be sudden and surprising. At some point, smart private sector investors will sense an increase in the risk of holding U.S. dollar assets, and will begin to move into other currencies. Eventually, these moves will be recognized, and the "market herd" will begin to follow them.

Many people inevitably respond to this scenario with the reasonable question "but where would the dollar assets go?" The underlying assumption is that one big factor holding up the dollar is the unattractiveness of investments in other currencies, and/or the inability of these markets to absorb a big inflow without severe disruption. Logic suggests that improvements in the prospective returns on non-U.S. dollar assets (beyond those from exchange rate gains) must play a part in this equation. Hence, the actual implementation of key structural reforms in Germany (especially reforming the labor market) and Japan (especially forcing the write-off of bad loans, and the reform of the banking system) might make a move out of dollars seem more attractive. Conversely, a good argument against this scenario developing would be continued resistance to structural reforms in these two key countries.

But there is also another argument against the dollar crash scenario, which produces our next scenario.

The Game Continues at a Slower Pace

To understand the logic behind this scenario, let's start with a look at the 2002 U.S. trade deficit (a key component of the current account deficit), with different countries and regions:

Country or Region	U.S. 2002 Trade Deficit in Billions of Dollars*
Canada	(48)
Mexico	(37)
Canada and Mexico (NAFTA)	(85)
Eurozone	(67)
United Kingdom	(8)
Asian 10 (Hong Kong, Indonesia, Macao, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam)	(64)
Japan	(70)
China	(103)
Asian Countries (A10+Japan+China)	(237)

*U.S. Bureau of Economic Analysis

As you can see from the table, a substantial part of the United States current account problem is its trade balance versus Asian countries. Since the flip side of a current account surplus is a capital account deficit (where the country exports more capital than it imports), these countries are the biggest accumulators of dollar denominated assets in the world today. And since the growth of their economies is so heavily dependent on the continued growth of their exports to the United States, these countries are not going to precipitate a dollar crash by selling their U.S. dollar assets. This is especially true in the case of Japan, which needs the continued support of strong export growth to cushion the inevitable fallout from aggressive

structural reforms in the banking and corporate sectors. In short, this argument says that we shouldn't let our economic thinking be constrained by political boundaries.

In effect, what counts is the aggregate current account position of the "dollar bloc" and not just that of the United States. And the dollar bloc doesn't yet have a sufficiently negative aggregate current account problem versus the rest of the world to trigger a dollar collapse (in the table above, you can see that the Asian 10 plus China deficit about equals the NAFTA plus Europe deficit). Stephen Roach from Morgan Stanley adds an additional element to this argument. He notes that since intra-regional trade in Asia has substantially increased in recent years. Moreover, this trade is largely denominated in dollars, and is made more predictable by the "soft" exchange rate pegs that these countries maintain versus the dollar. Given this, any change in individual countries' exchange rates versus the dollar would be extremely disruptive, and is therefore likely to be resisted.

This scenario does not mean that no adjustment of the U.S. current account deficit will take place. Some changes in exchange rates will occur, but mostly in the form of dollar depreciation versus the Euro, rather than the Asian currencies. But more important, rather than being based on a change in relative prices of imports versus domestic goods (as happens when exchange rates changed), most of the current account deficit reduction in this scenario will be driven by a drop in U.S. incomes. The good news is that economically, this has been shown to be a more effective adjustment mechanism. For example, in their paper "Trade Elasticities for the G7 Countries", Hooper, Johnson, and Marquez of the Federal Reserve estimated that while a 1% drop in the trade-weighted U.S. dollar exchange rate would cut imports by just 0.3%, a 1% fall in U.S. incomes would cut imports by 1.8%. The underlying logic makes sense. In the face of a change in relative prices, many foreign suppliers will simply cut prices and profit margins to maintain their market share. Where foreign imports are actually internal transfers within a globally integrated supply chain (as is increasingly the case with U.S. imports from Asia), this will be accomplished via a change in internal transfer prices. But when income falls, all discretionary purchases are cut, regardless of whether they come from domestic or foreign suppliers.

Given this, our view is that under this scenario, even without a sharp fall in the trade weighted dollar exchange rate, we will still see an increase in the risk premium foreign investors require on dollar assets. This increase in U.S. interest rates, together with reaching the limits of the household sector's debt capacity, will trigger a slowdown in U.S. economic activity and an increase in domestic saving, which in turn will reduce the U.S. current account deficit. However (and this is a very important however), this process may eventually (and rather quickly at that) prove politically untenable. Not many politicians I know would look forward to telling their constituents that what lies ahead is a long period of slow growth and less consumption. The result may very well be increased pressure for increased inflation to reduce the real value of households' (i.e., voters) debt burdens. If this were to be attempted unilaterally, it could easily lead us into the dollar collapse scenario. Hence, a more likely outcome would be a coordinated attempt by the world's central banks to raise the level of global inflation (for more on this, see the paper "Economic Slowdown in the U.S., Rehabilitation of Fiscal Policy, and the Case for a Coordinated Global Reflation" by Alex Izurieta of the University of Cambridge).

The asset allocation implications of this scenario are therefore somewhat complex. For a U.S. dollar based investor, rising interest rates make domestic nominal bonds a bad bet, while falling exchange rates make foreign currency bonds look more attractive. However, rising inflation rates also make real return bonds and commercial and residential property more attractive too. With a weak global economy and falling value of the dollar, commodities seem likely to disappoint, unless they are repriced using a basket of currencies. Weak global growth also seems likely to lead to weak equity market returns.

Finally, one must weigh against the arguments in favor of this scenario the recent comments issued by the G8 finance ministers following their meeting in Doha, which echoed this passage in the IMF's September World Economic Outlook: "It would be desirable for the necessary currency appreciation to be spread more broadly [beyond the Euro, and include] some downward pressure on the yen...[Also] greater upward exchange rate flexibility in emerging markets in Asia would significantly facilitate the global adjustment process."

One big incentive that might inspire these countries to make such adjustments would be the prospect of higher growth in Europe and Japan. This would also boost U.S. exports, which would make it possible to achieve current account deficit reductions without the need for deep cuts in economic activity and imports. This is the scenario to which we now turn.

New Growth Engines Take Over

The following table gives an idea of the relative abilities of different countries and regions to become new "growth engines" for the world economy.

Country or Region	Percent of World GDP in 2002*
United States	21%
Canada	2%
Mexico	2%
Canada, Mexico, USA(NAFTA)	25%
Eurozone	16%
United Kingdom	3%
Eurozone + UK	19%
Japan	7%
Asian 10 (Hong Kong, Indonesia, Macao, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam)	7%
China	12%
Asian 10 + China (dollar block)	19%
Asian 10 + China + Japan	26%

*CIA World Handbook, at purchasing power parity exchange rates

As this table shows, some combination of Europe, Japan, and/or the Asian Dollar Bloc has the requisite size to replace the United States/NAFTA as the main driver of global economic growth.

Doing this, however, will require significant and difficult changes in these regions' fiscal, monetary, and structural policies. Consider the following table, which shows the IMF's most recent projections for different regional economies (broken down into the "economic balance equation" we have used before).

Regional Economic Outlook
(all figures are expressed as a percent of GDP)

<i>2003 Forecast</i>					
	Output (100%) less Private Consumption = Private Savings	Less Private Investment	Equals Private Sector Balance	Plus Net Govt Balance	Equals Current Account Balance
United States	15.5%	15.0%	0.5%	-5.2%	-4.7%
Eurozone	19.3%	17.0%	2.3%	-1.3%	1.0%
Japan	25.8%	17.9%	7.9%	-5.1%	2.8%
Asian NICs*	22.9%	16.2%	6.7%	-0.2%	6.5%
<i>2004 Projection</i>					
	Output (100%) less Private Consumption = Private Savings	Less Private Investment	Equals Private Sector Balance	Plus Net Govt Balance	Equals Current Account Balance
United States	15.5%	15.0%	0.5%	-5.6%	-5.1%
Eurozone	19.5%	17.2%	2.3%	-1.2%	1.1%
Japan	25.0%	17.9%	7.1%	-4.2%	2.9%
Asian NICs*	23.0%	16.5%	6.5%	0.1%	6.6%

* Newly Industrialized Countries

As you can see, the U.S. economy saves and invests relatively less (as a percentage of GDP) than other economies, while also running a much bigger government deficit. It is able to live

beyond its means by an amount equal to an estimated 4.7% of GDP this year only because others are willing to either invest (through direct investment or the purchase of U.S. equities) or lend the difference. This is the process that cannot continue. At some point, there are limits: on the amount of dollar assets foreigners want to hold, and on the amount of debt household balance sheets can support. However, in order for other regions are to take up the slack in global demand growth, the table makes clear that it is primarily domestic consumption in these areas will have to rise (which, in turn would cause private savings and current account surpluses to decrease).

Were this to happen, we would, in effect, repeat the experience of the late 1980s, when faster domestic demand growth in Europe and Japan allowed a substantial dollar depreciation to take place gradually without causing a global economic recession. The asset allocation implications of this scenario are undoubtedly the most attractive for equities, and for most other asset classes as well. At the margin, due to the gradual depreciation of the U.S. dollar, for U.S. based investors foreign currency bonds and foreign equities (both developed and emerging market) would probably outperform domestic ones, as would foreign currency bonds. At the same time, time, non-U.S. dollar based investors would also benefit from reducing their U.S. allocations somewhat.

But what are the chances of this scenario actually coming to pass? Right now, they aren't good. In Europe, domestic consumption spending is held back by low consumer confidence, which in turn seems to be caused by rising unemployment that has its roots in restrictive labor market policies (e.g., France's mandatory 35 hour work week). Similarly, government fiscal policy is constrained by the three percent (of GDP) cap set on deficit spending by the Stability and Growth Pact that was signed ahead of the conversion from local currencies to the Euro. To be sure, structural changes may take place, and to that end the recent persistence of European governments in the face of traditional labor resistance to reform has been encouraging. And the rising Euro exchange rate will also put pressure on them to continue on this path. But against this one must set European governments' relatively weak track record in this area. Time will tell if things are really different this time.

Similarly, in Japan the good news is that with his reelection this month as his party's leader, Prime Minister Koizumi has never been in a stronger position to force through the reforms of Japan's banking and corporate sectors that are crucial to renewed domestic demand growth. The bad news, however, is that even if these reforms are actually carried out this time (and history is not encouraging on this point), consumers may still be reluctant to increase their spending. Why? Because despite the fact that Japan's society is aging faster than almost any other country's, it still has a relatively weak government social insurance program. As a result, Japanese consumers may still believe it is in their best interest to save rather than spend. So, absent either a new social insurance program, and/or a clear and credible medium term policy commitment to positive inflation (which many believe is the only cure for Japan's embedded deflationary mindset), the odds in favor of increased consumer spending in Japan seem slim at best.

And what are the chances that increased domestic demand growth in Asian developing countries will become growth engines for the global economy? Realistically, they are probably not good. First, many of these countries also have underdeveloped social insurance systems, which tends to reduce consumption and increase savings. Second, at the national policy level, some have written that the "mercantilist strategy" (i.e., high savings, export led growth, and high foreign exchange reserves) still holds great attraction in this region. Neither of these obstacles to increased domestic demand growth is easy to change in the short run.

Subjective Probabilities

Some time in the next three years, we strongly suspect at least one of our global economic adjustment scenarios will become reality (in fact, it could be more than one because they are not completely discrete). But which one, and when? The following table summarizes our subjective assessment of the probability a scenario will be realized over the next three years.

Scenario	2004 Probability	2005 Probability	2006 Probability
Dollar Crashes	30%	40%	50%
Game Continues	50%	35%	20%
New Growth Engines	20%	25%	30%
Total	100%	100%	100%

As you can see, we believe that the chances are reasonably good that the current game can continue for at least one more year. However, after that this scenario's probability sharply declines. In its place, we think the most likely scenario (but not by much) is a sharp dollar correction, which would probably force the world into a global recession, and eventually trigger a cooperative reflation program. Finally, we think the least likely scenario is the one we would most prefer to see: other regions increasing their domestic demand growth by an amount sufficient to offset a necessary and unavoidable slowdown in the United States' economy. In sum, the current period seems to be the calm before the approaching storm.

Labor Income Uncertainty, Residential Real Estate, and Asset Allocation

Thus far, our asset allocation review has focused on financial assets. This month, we're going to take an in-depth look at how two non-financial assets can have a substantial impact on this process. The first of these is your future labor income. To convert this into an asset, you can discount your expected future labor income back to its present value, which you can think of as your "human capital." The second important non-financial asset is, for many people, the value of the home they own. In the next two articles, we will start by looking at what theory says about how each of these should affect the allocation of financial assets. We will then move on to what different empirical studies have found. Finally, we will summarize the implications of the theory and the data for how people should allocate the financial assets in their portfolio to achieve their long term goals. Before we begin, we should mention one important caveat: the academic study of these issues is still, relatively speaking, in its infancy. While our results are quite interesting, you shouldn't regard anything that follows as the final

word on these subjects. There is still much to learn, and we will continue to research and report on new findings in these areas as they become available.

The Impact of Human Capital on Financial Asset Allocation

As we just noted, you can convert annual labor income (a flow) into human capital (an asset) by discounting it to its present value. The present value of your human capital therefore depends on a number of different variables. The first is your current expectation for the size of your annual future labor income flows. All else being equal, the higher your expected future annual labor income, the higher the present value of your human capital. The second consideration is how many remaining years of labor income you expect to receive. All else being equal, the more remaining years of income, the higher the value of your human capital. The third variable is the riskiness of your labor income. This is a function not only of the different factors that directly affect it (e.g., global, national and regional/local economic conditions, conditions in your industry and company, and personal factors, such as your ability to hold your tongue in the face of clueless comments by your boss...), but also of the flexibility you have to supplement it (e.g., by working a second job). All else being equal, the less risky your labor income, the higher the value of your human capital.

To get a better understanding of how risky labor income actually is, we looked at national accounts data from the United Kingdom and the United States. In the former, between 1971 and 2001, the average annual nominal change in compensation of employees was 9.95% per year (based on annualized quarterly data), with a standard deviation of only 3.20% per year. The United States data covered 1971 to 2002, and was broken down into three categories: wages and salaries paid to private sector employees, wages and salaries paid to public sector employees, and proprietors' income for non-farm businesses (essentially, self-employment income). The average annual rates of change, and associated standard deviations, are shown in the following table, along with comparable data for the returns and risk for domestic bonds and equities over the same period.

	Average Annual Change or Return	Standard Deviation
Public Sector Wages and Salaries	6.39%	1.53%
Private Sector Wages and Salaries	7.33%	2.51%
Proprietors' Income	7.98%	4.41%
Domestic Bonds	9.08%	6.98%
Domestic Equities	12.70%	17.59%

This table makes two interesting points. First, labor income is less risky than domestic bonds or equities. Second, within the broad category of labor income, public sector employment is the least risky, while owning one's own business is the most risky.

Now let's look at the theoretical linkage between the value of your human capital and the allocation of your financial portfolio between different asset classes. Assuming people seek to avoid big swings in their current consumption of goods and services, the higher the value of your human capital, the more risk you can afford to take in your financial portfolio (because temporary setbacks in the value of the latter will be much less likely to affect your current consumption).

In their paper "Investing Retirement Wealth: A Lifecycle Model", Campbell, Cocco, Gomes, and Maenhout note the impact of aging on the labor income/financial asset allocation relationship: "A typical individual starts adult life with little financial wealth; initially, as labor income increases, human wealth may grow faster than financial wealth, but fairly early in adult life financial wealth starts to accumulate faster than the present value of remaining labor income. This implies that most younger investors with relatively safe labor income should concentrate their portfolios heavily in equities, and gradually shift toward less risky investments as they approach retirement." It also implies that younger investors with relatively riskier labor income should allocate less of their investment portfolio to riskier asset classes.

These authors also add detail to the relationship between labor income risk and financial portfolio risk: "the [current] theoretical literature on [the relationship between labor income and financial asset allocation] can loosely be summarized as follows...If labor income is [low risk], then [holdings of low risk financial assets] are crowded out and the household will tilt its portfolio strongly toward [higher risk] assets...If labor income is risky, but uncorrelated with [the returns on] risky financial assets, then [low risk] financial asset holdings are still crowded out, but less strongly; and the portfolio tilt toward [higher risk] assets is reduced. And if labor income is positively correlated with risky financial assets, then [higher risk] assets can be crowded out, tilting the portfolio toward [lower risk] financial assets."

A critical empirical issue is therefore the extent to which changes in labor income are correlated with returns on different asset classes. In the past, the standard theoretical models assumed a relatively strong positive correlation between changes in labor income and changes in the rate of return on a broad equity index. This conclusion was based on the observation that many investors held relatively low percentages of their financial portfolios in higher risk asset classes such as equities. However, recent research has found that this assumption was incorrect.

The following table shows the correlations between nominal changes in different types of labor income in the United States between 1971 and 2002 and nominal returns on different asset classes.

Asset Class	Correlation with Changes in Public Sector Wages and Salaries	Correlation with Changes in Private Sector Wages and Salaries	Correlation with Changes in Proprietors' Income
Real Return Bonds	.18	(.01)	(.06)
Domestic Bonds	(.14)	(.13)	(.26)
Foreign Bonds	(.26)	(.20)	(.12)
Domestic Equity	(.07)	.09	(.01)
Foreign Equity	(.12)	(.02)	.00
Emerging Equity	.10	.04	.09

Asset Class	Correlation with Changes in Public Sector Wages and Salaries	Correlation with Changes in Private Sector Wages and Salaries	Correlation with Changes in Proprietors' Income
Commodities	.10	(.02)	.18
Commercial Property	.04	(.39)	(.16)
Residential Property*	.17	.05	(.03)

* For further discussion of this asset class, see following article

The analysis presented in this table shows that changes in labor income generally have very weak correlations with the returns on different asset classes. It also suggests that, if one were trying to hedge changes in one's labor income, one might want to consider the use of domestic or foreign bonds. However, given that labor income appears to be much less risky than financial assets the need for this seems to be minimal. However, this analysis is also based on aggregate level figures. Could people in different occupations face a higher degree of labor income risk?

In their paper "Occupation Level Income Shocks and Asset Returns, authors Davis and Willen examined changes in labor income across ten different U.S. occupational groups, and found that none had a statistically significant relationship with U.S. equity market returns. Moreover, they also note that "several [other] studies that consider a variety of countries, time periods, and income components [also] find zero or small correlations between aggregate equity returns and the value of human capital." As a result, they conclude that "the market equity portfolio has modest value as a hedge instrument for the average investor's labor income." However, a later study by Campbell, Cocco, Gomes and Maenhout found that the relationship between labor income and equity market returns was positive for people who are self-employed, and for college graduates (who are more likely to hold positions where compensation is partly tied to the performance of a company's stock). They concluded that "privately owned business risk is an important substitute for stock market risk." In other words, all else being equal, you would expect to find a self-employed person or someone whose compensation was tied to the performance of her company's stock holding a lower

percentage of risky assets in his or her portfolio than someone with an equivalent amount of labor income from less risky sources.

Finally, Davis and Willen also found stronger correlations between changes in labor income and returns on industry level equity indexes. This suggests two possibilities for hedging labor income risk. You could maintain a permanent short position in the equity index for the industry in which you work, or, alternatively, one could tilt one's investment portfolio toward asset classes with returns that have historically been negatively correlated with returns on your industry's equity index. Practically, it is very difficult for most investors to continuously maintain a short position in a stock index (either directly or via put options). Given this, we took a closer look at the second strategy. In the following table, we show the correlation of nominal returns (we used nominal since labor income is denominated in nominal currency units) between ten different sector indexes and the equity market as a whole. We also show the three asset classes (including other equity indexes) with the highest negative correlation with each equity index.

Sector (based on Dow Jones Sector Exchange Traded Funds)	Correlation of Returns with Overall Equity Market	Asset Classes or Sectors with Highest Negative Correlation of Returns with Sector
Basic Materials	(.17)	Energy Sector (.30); Financial Services Sector (.30) and Europe Equity Index (.16)
Consumer Cyclical	.28	Real Return Bonds (.11); Foreign Bonds (.10); Residential Real Estate (.10)
Consumer Non-Cyclical	.57	Real Return Bonds (.42); Domestic Bonds (.31); Residential Real Estate (.19)
Energy	.89	Real Return Bonds (.57); Domestic Bonds (.37); Foreign Bonds (.30)
Financial Services	.66	Real Return Bonds (.48); Commodities (.30); Basic Materials Sector (.30)
Healthcare	.57	Real Return Bonds (.37); Residential Real Estate (.26); Foreign Bonds (.02)

Sector (based on Dow Jones Sector Exchange Traded Funds)	Correlation of Returns with Overall Equity Market	Asset Classes or Sectors with Highest Negative Correlation of Returns with Sector
Industrials	.78	Real Return Bonds (.37); Foreign Bonds (.22); Residential Real Estate (.19)
Technology	.55	Real Return Bonds (.27); Foreign Bonds, Commodities, and Residential Real Estate, all (.10)
Telecommunications	.96	Real Return Bonds (.54); Residential Real Estate (.29); Foreign Bonds (.21)
Utilities	.86	Real Return Bonds (.44); Domestic Bonds (.32); Residential Real Estate (.30)

This table makes two points. First, to the extent that labor income is positively correlated with the returns on an industry equity index, the equity market as a whole does not provide a good hedging vehicle. In fact, in every case but one when the industry index (and also, we assume in this case, labor income) declines, the aggregate equity market index will likely do the same. Second, it would seem that real return bonds, foreign bonds, residential real estate, and, to a lesser extent, other asset classes provide opportunities for hedging some amount of labor income risk in different industries.

There are, however, two important caveats to these conclusions.

Most importantly, they are based on a relatively short data set (the broad-based Dow Jones industry sector index returns have only been available since 1992), which makes them tentative at best. The second caveat is that the crucial link in this argument between labor income and the return on sector equity indexes is subject to some uncertainty. For example, Davis and Willen noted that the sign of the relationship between the two (which one would normally expect to be positive) was sometimes found to be negative. As an example of the latter, these authors cited "the introduction of labor saving technology, [which] may generate higher returns on industry equity index, but lower earnings for workers." They concluded

that "the usefulness of industry level equity portfolios as hedging instruments for [labor income] is...an empirical issue... which no single study can definitively settle."

The Impact of Owner-Occupied Housing on Financial Asset Allocation

A recent report in Australia ("A Primer on a Proposal for Global Housing Finance Reform" by Caplin and Joye) succinctly summarized the current situation with respect to the treatment of residential real estate in most asset allocation analyses: "When Australians plan for retirement, they must consider how a disparate collection of assets combine to form the overall portfolio of 'household wealth.' Yet surprisingly one of their most valuable assets is often excluded from these planning decisions entirely -- the owner occupied home...One risky and highly illiquid asset dominates almost all holdings in most household portfolios: owner-occupied housing. To cast this into relief, suppose your financial planner proposed this investment strategy: You place between 60% and 80% of all you wealth in the stock of a single company for a minimum of, say, five to ten years. The company makes one product and has one plant. It operates in an industry which has grown rapidly and which is favored by federal tax laws. This industry is, however, also characterized by large fluctuations in value, arising as a result of both macroeconomic and idiosyncratic conditions, high transaction costs, and extremely low liquidity. You would probably decline the opportunity to embark on such a risky endeavor. Nevertheless, most people make exactly this commitment when they decide to acquire their own home. And while dwellers can insure against damage from natural disasters, it is almost impossible to insulate oneself from market meltdowns or regional economic swings."

Moreover, "the home ownership experience evolves strikingly over the course of the life-cycle. When young, families scramble to scrape together funds for a down payment so that they can graduate from the difficulties of rental accommodation to the supposed nirvana of owner occupation. This period of intense saving often induces a considerable consumption squeeze and may severely constrain lifestyle choices. In the middle years, dwellers frequently struggle against the specter of relentless mortgage payments -- the so called "house poor." Finally, in later life many manage to pay off all their debts and live in the home clear and free. Unfortunately, by this time retirement beckons and the majority of households have precious

little income other than their pensions. They are now 'asset rich, but cash poor.' [Indeed, for most homeowners aged 60 and above, the dwelling represents more than 80% of total non-pension assets]. Upon death, most leave their homes as (unintended) bequests to heirs and/or the public authorities."

In a subsequent paper ("Innovative Approaches to Reducing the Costs of Home Ownership, Volume 1", a Report published by the Menzies Research Center in June, 2003 for the Prime Minister's Home Ownership Task Force by Caplin, Joye, Butt, Glaeser, and Kuczynski), the authors noted that, "regrettably, the risk properties of residential real estate receive very little attention...Two key facts regarding house price risk are worthy of comment. First is its scale. By any reasonable measure, real estate risk is of immense importance to the typical homeowner. Secondly, this hazard is multifaceted: there is no single statistic that adequately summarizes it. Instead, to appreciate the many dimensions of housing risk, we must tell a complex story. In a nutshell: (a) Property prices are volatile and positively related to labor income; (b) Most families are highly leveraged to real estate; and (c) The dwelling is often the dominant asset in the household's portfolio...It is commonly accepted that house price risk is not at all well understood by academics. The small number of studies that do exist tend to conclude that fluctuations in the real value of real estate constitutes a serious economic threat to the average household's standard of living. Furthermore, this hazard is exacerbated by three intertwined factors: (1) The indivisibility of the dwelling asset, which compels home owners to bind together their consumption and investment decisions; (2) The high proportion of wealth that is, as a direct result, held in the form of housing, and (3) The absence of instruments that would enable occupiers to hedge the financial risks associated with this investment."

The main reasons residential real estate is so difficult to incorporate into an asset allocation analysis is because it differs from traditional financial assets in so many ways. To begin with, it is both a consumption good and an investment good. In the former sense, it replaces rental payments (and hedges against their future increase), while also providing intangible benefits such as social status display (e.g., the "McMansion" phenomenon) and an enhanced sense of security (see for example, the paper "A New Kind of Gold?" by Trimbath and Montoya of the Milken Institute).

As an investment good, residential real estate has identifiable risk and return characteristics. Unfortunately, these are not easy to measure. Virtually all published residential real estate indexes are based on price changes, rather than the total return calculations one finds in the case of financial assets. The reason for this is easy to understand: while house price changes are (relatively) easy to measure, the "dividend" or "annual income payment" on this asset is not. For example, any such calculation should include not only the value of avoided rent, but also maintenance expense, tax benefits, and possibly some valuation of the intangible benefits of home ownership cited above. To say the least, the measurement challenges involved are daunting.

Four other factors further contribute to the difficulty of comparing residential real estate to financial assets. Unlike financial assets, most residential real estate is bought on margin -- that is, using a combination of mortgage debt and owners equity. Closely related to this is the unique tax treatment given to residential real estate in many countries (e.g., mortgage interest and property tax deductibility, the exclusion of avoided rent from taxable income, special capital gains tax, treatment, etc.). On top of this, residential real estate is a relatively inefficient market: transaction costs are very high in the residential real estate market (e.g., the typical brokerage commission in the United States, including search costs, has been estimated at ten percent of the transaction's value), no two assets are alike, and informationally, the market is not very efficient (e.g., individual houses do not sell very often, and real estate agents business practices are regulated more loosely than those of security salespersons). Finally, owner-occupied housing is, so far, an indivisible asset: once you have purchased a house, you cannot sell off a portion of your equity interest in order to achieve a better risk/return trade off in your overall asset portfolio.

Because of these unique characteristics, a number of authors have suggested that in practice, people choose the level of real estate that is optimal from a consumption point of view, and thereby "back in" to their allocation to it as an investment. The net result is usually an allocation to residential real estate that is too high in terms of asset allocation theory (see, for example, "Owner Occupied Housing and the Composition of the Household Portfolio" by Flavin and Yamashita). Some authors have estimated that this over-allocation to residential real estate reduces net worth at retirement by as much as fifteen percent or more, because the

heightened risk caused by mortgage borrowing reduces the allocation to risky assets such as equity. Most often, substantial investment in risky financial assets (and the benefits of their potentially higher compound returns) is deferred until mortgages have been paid down (see, for example, "Home Ownership as a Constraint on Asset Allocation" by Cauley, Pavolov, and Schwartz).

This last point raises obvious and important questions about the nature of residential real estate as an asset class. The authors of the limited number of studies which have been done all seem to agree, despite differences in the data and methodologies they use, that the returns on residential real estate have a relatively low correlation with the returns on domestic bonds and equities (which potentially makes this asset class an attractive addition to a portfolio). The following table summarizes the findings on correlation from a number of recent studies.

Country	Correlation of Residential Real Estate Returns with Domestic Bonds	Correlation of Residential Real Estate Returns with Domestic Equities	Study and Authors
United Kingdom	(.04)	.34	"Hedging Housing Risk in London" by Iacoviello and Ortalo-Magne
Sweden	(.36)	(.02)	"Hedging Housing Risk" by Englund, Hwang, and Quigley
France	(.37)	(.10)	"Owner Occupied Housing and the Composition of the Household Portfolio" by Lagarenne and le Blanc
Australia	(.02)	.07	"A Primer on a Proposal for Global Housing Finance Reform" by Caplin and Joye

Country	Correlation of Residential Real Estate Returns with Domestic Bonds	Correlation of Residential Real Estate Returns with Domestic Equities	Study and Authors
United States	.14	(.04)	Index Investor Inc. (uses national data); see also "The Single Family Home in the Investment Portfolio" by William Goetzmann (uses data from four U.S. cities) and "The Effect of Single Family Housing on Multi-Asset Portfolio Allocations" by Dean Gatzlaff (uses 20 Florida cities)

Unfortunately, it is much more difficult to compare across different studies the estimated returns and risk on residential real estate as an asset class, because they all use different methodologies to estimate these statistics (e.g., some impute an annual income value, while others just measure price changes). As a result, we have conducted our own analysis, using data from the United States.

Our residential real estate return data are based on the quarterly price change index produced by the Office of Federal Housing Enterprise Oversight (www.ofheo.gov) since 1975. This index is based on repeat sales of the same property over time, which has some theoretical advantages over different approaches to constructing a residential real estate index (for more on different index approaches, see "Prices of Single Family Homes Since 1970: New Indexes for Four Cities" by Case and Shiller). We have not made any adjustments to the quarterly returns to reflect imputed net income. Rather, we have assumed that depreciation is exactly offset by maintenance spending, and the total consumption benefit is equal to the mortgage payment plus tax benefits. As a result, we assume that the investment return on residential real

estate is entirely due to price changes (a conservative assumption that probably understates the returns on this asset class). We have, however, made two adjustments to the national level data to make them better reflect the situation faced by most investors.

First, because the OFHEO data are unleveraged, we have assumed an average mortgage debt level of forty percent over the holding period of the home. Second, we have had to adjust the national level data to reflect the fact that the risk faced by an individual homeowner (like an investor in a single company's stock) is much higher than that faced by an investor in a broadly diversified market index. A number of studies suggest that this difference in risk (as measured by the standard deviation of returns) is quite significant in the case of housing. A number of studies have found that the correlation of residential real estate returns between different cities is quite low. For example, "The Portfolio Implications of Homeownership", by Eicholtz, Koedijk, and de Roon compared returns between 1980 and 1997 in Los Angeles, San Francisco, Chicago, New York and Boston. The highest correlation between residential real estate returns in these cities was only .32, between Los Angeles and San Francisco. Case and Shiller reached the same conclusion in "Prices of Single Family Homes Since 1970", which compared Atlanta, Chicago, Dallas and San Francisco, as did Chinloy and Cho in "Housing Returns and Restrictions on Diversification," which was also based on city comparisons.

It is clear that the risk faced by an investor whose allocation to residential real estate takes the form of a single home is very different from an investor who owns a well diversified aggregate index for this asset class. As Caplin and Joye note (in "A Primer on a Proposal for Global Housing Finance Reform"), "the volatility of a broad real estate return series is likely to materially underestimate the true level of risk at the individual home owner level. The underlying prices used to estimate representative returns are averages, which one would expect to realize only when holding a well-diversified portfolio of property. In reality, households own a single residence, which is subject to far greater idiosyncratic price variability (a good analogy is the difference between owning a broad based equity index versus stock in a single company). Case and Shiller recommend multiplying aggregate housing market risk (defined as the standard deviation of returns) by a factor equal to the square root of five to approximate the homeowner's exposure...Using Swedish data, Englund,

Hwang and Quigley concluded that one should multiply regional data by a factor equal to the square root of 6." In our analysis, we have followed the latter recommendation, and multiplied our national level standard deviation of returns by 2.45 (which is approximately the square root of six) to obtain a risk/return assumption for residential real estate which approximates the actual situation faced by a typical investor.

Based on these adjustments, and using quarterly OFHEO data covering 1975 Q2 to 2002 Q4, we estimated the real return on U.S. residential real estate to be 4.85% per year, with a standard deviation of 7.57%. This is quite close to the 4.7% average annual real return and 8.1% standard deviation estimate for Australia in the Caplin and Joye paper, which uses a similar methodology. It is also close to estimates for the Euro area (4.3% return, 3.6% standard deviation for the aggregate market; 8.82% for a single house using our adjustment approach) and the United States (4.6% return, 5.39% for a single house) developed for the 1982-2001 period in another recent study ("The Role of Wealth in the Economy: The 2002 Annual Meeting Papers of the Royal Netherlands Economic Association"). However, it should also be noted that this study found that in the U.K., both residential property returns (7.9%) and the standard deviation for a single house (20.8% using our approach) were considerably higher than in other countries.

Before moving on to the correlation of residential real estate returns with those on other asset classes, two other points are in order with respect to return and risk. First, in countries (such as the U.S.) where taxes are not indexed to inflation, and where real estate receives special benefits, its relative return (compared to other asset classes) tends to improve when inflation is high. In effect, high inflation increases the effective tax rate on other assets, while reducing it on residential real estate (see, for example, "Inflation, Income Taxes, and Owner-Occupied Housing" by James Poterba). Given that inflation was declining during much of the sample period covered by the OFHEO data (1975 to 2002), our returns estimate may understate the attractiveness of real estate as an asset class. That being said, on the risk side of the equation we have to guard against a tendency to see housing as a one-way bet on which you can't lose money. For example, in their Australian study, Caplin, Joye, Butt, Glaeser and Kuczynski compared 40,650 same house repeat sales in the states of New South Wales, Queensland and Victoria between 1984 and 2002, and calculated the real returns realized by the sellers. In the

bottom 25 percent of this distribution, they found that the median seller suffered a real loss of (10.9%). In the bottom 10 percent, it was even worse, with a median real loss of (20.5%). In contrast, the median for the overall distribution was a gain of 14.2%, while the top ten percent of the distribution realized a median real gain of 140.6%. Unfortunately, when it comes to housing as an investment, too many people focus the last number, and ignore, or are unaware, of the possibility of a significant real loss.

The correlation of real returns between residential real estate and other asset classes is shown in the following table. Please note that it is based on quarterly data from 1988 to 2002, which is less accurate than the monthly data we usually use in our analyses.

<i>Real Returns from 88 to 02</i>	<i>Real Return Bonds</i>	<i>Domestic Bonds</i>	<i>Foreign Currency Bonds</i>	<i>Domestic Equity</i>	<i>International Equity</i>	<i>Commodities</i>	<i>Commercial Property</i>	<i>US Res Real Estate with 40% Debt</i>	<i>Emerging Equities</i>
Real Return Bonds	1.00								
Domestic Bonds	0.31	1.00							
Foreign Currency Bonds	0.24	0.50	1.00						
Domestic Equity	-0.46	-0.03	-0.11	1.00					
International Equity	-0.30	0.01	0.27	0.74	1.00				
Commodities	0.15	-0.19	-0.01	-0.32	-0.21	1.00			
Commercial Property	-0.08	0.15	-0.11	0.44	0.33	-0.12	1.00		
US Res Real Estate with 40% Debt	0.17	0.14	-0.11	-0.04	-0.03	-0.11	0.06	1.00	
Emerging Equities	-0.35	-0.27	-0.26	0.64	0.54	-0.19	0.25	0.02	1.00

Like other studies, we also find a low level of correlation between real returns on residential real estate and those on other asset classes.

The next step in our analysis was an examination of the benefits of residential real estate as an asset class from the perspective of a U.S. dollar based investor (unfortunately, we did not have comparable residential real estate data series for other currencies). Our first approach was to see how the inclusion of residential real estate changed the composition of the minimum variance portfolio. As you may recall from last month's issue, the MVP is the combination of asset weights which minimizes the portfolio standard deviation (that is, it minimizes risk) for a given set of asset classes. We looked at residential real estate from three perspectives. First, we considered the impact of the asset class as a whole, using the lower 3.09% standard deviation for the aggregate index. Next, we considered the impact of residential real estate from a homeowner's point of view, and used the higher 7.57% real standard deviation. Finally, we calculated the MVP from the perspective of an investor who has already invested fifty percent of her or his assets in residential real estate, but still wants to minimize the riskiness of her or his financial asset portfolio – a not uncommon situation. The following table shows these three minimum variance portfolios, as well as the MVP without residential real estate.

Asset Class	MVP without RRE	MVP for RRE Asset Class (RRE STD = 3.09%)	MVP for Homeowner (RRE STD = 7.57%)	MVP for Homeowner with 50% allocation to RRE
Real Return Bonds	71.3%	48.6%	66.1%	35.6%
Domestic Bonds	15.3%	10.5%	14.2%	7.6%
Foreign Bonds	3.5%	2.4%	3.3%	1.8%
Commercial Property	4.6%	3.2%	4.3%	2.3%
Commodities	1.3%	0.9%	1.2%	0.7%
Dom. Equities	1.7%	1.2%	1.6%	0.8%

Asset Class	MVP without RRE	MVP for RRE Asset Class (RRE STD = 3.09%)	MVP for Homeowner (RRE STD = 7.57%)	MVP for Homeowner with 50% allocation to RRE
Foreign Equities	1.5%	1.0%	1.4%	0.8%
Emerging Market Equities	0.8%	0.5%	0.7%	0.4%
Residential Real Estate	0.0%	31.6%	7.2%	50.0%
	100.0%	100.0%	100.0%	100.0%
Portfolio Standard Deviation	2.11%	1.75%	2.03%	3.93%

This table makes four important points. First, as an asset class (column two), residential real estate is very attractive, and can bring significant diversification (risk reduction) benefits to a portfolio. However, the diversification benefits associated with an investment in a specific house (column three) are far lower than those associated with an investment (were it possible) in the asset class as a whole. Third, as shown in column four, the inseparability of the consumption and investment benefits associated with purchasing a house often forces people to over-invest in residential real estate, and involuntarily raise the riskiness of the overall asset portfolio. Finally, it is interesting to note how the inclusion of residential real estate in the Minimum Variance Portfolio has the greatest impact on holdings of real return bonds. This seems to be in line with most people's intuition that residential real estate is a good hedge against inflation.

The next step in our analysis was to include residential real estate in our 3%, 5%, and 7% real target return portfolios, and rerun our simulation optimization analyses for them. As was the case for the Minimum Variance Portfolios, we did this for (1) residential real estate as an asset class, (2) for a specific house, and (3) for an investor who has already committed fifty percent of his or her assets to a specific house. In the first two cases, we allowed the investor to

rebalance her portfolio annually to her target asset weights. In the third case, the investor starts off with fifty percent of his assets in his house. While his financial assets are rebalanced annually to their target weights, housing is not (in other words, when it comes to housing, our investor follows a simple “buy and hold” strategy).

The results of this analysis mirror those in the MVP analysis, with declining percentages of each portfolio allocated to real estate as we moved from case (1) to case (2). However, as case (3) is potentially the most interesting for many of our readers, we will present it in more detail below. As we have done previously, we ran different simulation optimizations using assumptions based on both historical data and future estimates for the returns on each asset class. For residential real estate, we followed the approach used in other studies, and used the returns on the asset class as a whole, and a higher standard deviation to reflect the higher risk associated with owning a specific house (obviously, given the low correlations of returns between different cities – and houses within cities -- found in other studies, this assumption is at best a very rough approximation of the actual situation faced by a homeowner). Finally, as we have done before, we combined the two portfolios using a weight of .67 for the one based on historical data, and .33 for the one based on future return assumptions. The results are presented below:

	3% Target Return		
	Wts. Based On Historical Returns	Wts. Based on Estimated Future Returns	Wts. Based on Combined Returns (.67/.33)
Real Return Bonds	0%	5%	1.7%
Domestic Bonds	5%	0%	3.4%
Foreign Bonds	15%	20%	16.7%
Commercial Property	0%	0%	0.0%
Commodities	10%	20%	13.3%
Domestic Equity	20%	5%	15.1%
Foreign Equity	0%	0%	0.0%
Emerging Mkt Equity	0%	0%	0.0%

	3% Target Return		
	Wts. Based On Historical Returns	Wts. Based on Estimated Future Returns	Wts. Based on Combined Returns (.67/.33)
Housing	50%	50%	50.0%
	100%	100%	100.0%
Exp. Annual Return	5.9%	5.9%	
Exp. Standard Deviation	4.8%	5.1%	
Prob. Of Target	94%	90%	

	5% Target Return		
	Wts. Based On Historical Returns	Wts. Based on Estimated Future Returns	Wts. Based on Combined Returns (.67/.33)
Real Return Bonds	0%	0%	0.0%
Domestic Bonds	0%	0%	0.0%
Foreign Bonds	30%	5%	21.8%
Commercial Property	0%	0%	0.0%
Commodities	0%	20%	6.6%
Domestic Equity	5%	5%	5.0%
Foreign Equity	0%	0%	0.0%
Emerging Mkt Equity	15%	20%	16.7%
Housing	50%	50%	50.0%
	100%	100%	100.0%
Exp. Annual Return	7.0%	6.3%	
Exp. Standard Deviation	5.8%	6.5%	
Prob. Of Target	44%	28%	

	7% Target Return		
	Wts. Based On Historical Returns	Wts. Based on Estimated Future Returns	Wts. Based on Combined Returns (.67/.33)
Real Return Bonds	0%	0%	0.0%
Domestic Bonds	0%	0%	0.0%
Foreign Bonds	0%	0%	0.0%
Commercial Property	15%	0%	10.1%
Commodities	0%	20%	6.6%
Domestic Equity	20%	10%	16.7%
Foreign Equity	0%	0%	0.0%
Emerging Mkt Equity	15%	20%	16.7%
Housing	50%	50%	50.0%
	100%	100%	100.0%
Exp. Annual Return	6.6%	6.2%	
Exp. Standard Deviation	7.9%	7.2%	
Prob. Of Target	2%	1%	

These tables make a critically important point. By making substantial, undiversified investments in residential real estate, many people appear to have significantly reduced the probability that they will achieve high real rates of return over the long term on their asset portfolio. Based on our analysis, people who are counting on roughly an even mix of financial and housing assets to finance their retirement should prudently plan on earning real portfolio returns of no more than three per cent per year.

In an interesting twist on this argument, Eicholtz, Koedijk, and de Roon (in their paper “The Portfolio Implications of Homeownership”) approached the question from the opposite direction, and asked what level of net annual consumption benefit would be necessary (given the expected price change based rate of return) to justify the high proportion of household

assets invested in housing. Where fifty percent of assets are invested in residential real estate, the breakeven net consumption benefit was ten percent per year (note that their study only included domestic bonds and stocks as the other assets in the household portfolio). Unfortunately, no researcher that we know of has been able to estimate whether the net tangible and intangible benefits of homeownership approach this level! So for now, we'll stick with the conclusion that most people are over-invested in residential property.

Beyond this, the tables also raise another interesting question. Many studies have shown that as the percentage of assets invested in residential real estate increases, people tend to hold a greater percentage of low risk assets (e.g., domestic bonds) in their financial portfolios. Conversely, as mortgages are paid down, the proportion of the financial portfolio invested in risky assets increases (before decreasing again as retirement approaches). However, as shown above, our simulation optimization analysis suggests that this may not be the best approach, and that many people probably could improve their chances of achieving a given target rate of return by holding a different mix of assets.

We believe there are two alternative explanations for why people do not hold a more optimal mix of assets. The first is that people are simply unaware of the fact that they could improve their expected long -term returns by changing the asset allocation in their portfolios. As we said at the beginning of this article, life-cycle asset allocation is a topic still in its infancy. Most asset allocation articles written to date have been, and still are, based on the single-period mean/variance optimization approach. And very few of them include labor income or residential real estate (much less both at the same time).

However, another explanation also comes to mind: the missing variable may be people's inaccurate perception of the riskiness of their labor income. Our guess is that the logic (implicit or explicit) used by many people is similar to the following: "I own a house with a mortgage. If the economy encounters bad times, not only will equity and housing market returns decline, but so too may my labor income (out of which I must make my mortgage payments). I therefore should invest my financial portfolio in relatively low risk assets like short term bonds and bank deposits." As we have noted, the limited number of studies which

have been done have generally found that most people's labor income has relatively low risk (measured in terms of the standard deviation of its average percentage change from year to year). Hence, most people's need for investments to hedge their labor income should be low. Second, it is not clear that a downturn in labor income should automatically result in a downturn in housing values. At the aggregate level, our analysis has shown that, rather than having the strong positive correlation assumed by the conventional wisdom, residential real estate itself may be an effective hedging vehicle for labor income. The recent boom in U.S. mortgage refinancings to provide funds for consumption spending seems to lend support to this point. On the other hand, if one works for a company that heavily depends on local market conditions, then a shock to the local economy could result in reductions in both labor income and local housing values. This point really seems to depend on specific circumstances. (For further discussion of how labor income, residential property, and financial assets are interrelated, see "Hedging House Price Risk in Incomplete Markets" by Joao Cocco).

We should also mention a much-discussed financial market innovation that has the potential to radically change the situation we have just described. The underlying objective is to separate the housing and investment aspects of home ownership. This would be accomplished through the establishment of a mechanism that would enable homeowners to sell off a portion of the equity in their house to special purpose funds which would pool these interests and sell index fund-type securities whose risk/return profile matched that of the aggregate residential real estate asset class. The paper "Innovative Approaches to Reducing the Costs of Home Ownership, Volume 1", by Caplin, Joye, Butt, Glaeser, and Kuczynski provides an excellent overview of the how such a market in "housing partnerships" might work, as does "Household Asset Portfolios and the Reform of the Housing Finance Market" (TIAA-CREF Research Dialogue #55).

Based on our analysis, the potential benefits from the introduction of this type of security would be very, very large indeed. However, with one exception, we have yet to see the introduction of these vehicles for making housing equity liquid and transferable. The exception is in the U.K., where instruments have been introduced that allow one to hedge

exposure to changes in London area house price indexes from two to seven quarters forward in time. To date, these instruments have not proved to be as popular as their sponsors had hoped. Many observers have attributed this to the short time horizons involved, and noted that, as homeowners are long term investors, they would be far more interested in longer term instruments.

So where does this leave us? We have seen that an expanded view of the asset allocation problem includes not only your financial assets, but also your labor income and residential real estate. We have also seen that, all else being equal, the present value of your future labor income (i.e., your human capital) will decline as you approach retirement. Assuming economic theory is correct, and people maximize their satisfaction by minimizing the ups and down in their consumption over time, this leads to the conclusion that one's investment portfolio should gradually be shifted toward less risky assets as one grows closer to retirement.

The more interesting questions involve the interrelationship of labor income, housing, and financial assets. Here, the accurate perception of the riskiness of one's future labor income appears to be critical. In general, for a given set of long term financial goals, the riskier your labor income, the less risky your asset portfolio should be. However, most people's labor income is, in a statistical sense, probably much less risky than they assume it to be. Consequently, they have the capacity to hold a higher percentage of relatively riskier assets than they actually have in their portfolios. Moreover, even when your labor income is riskier than average, this still does not automatically mean that you should avoid all apparently "risky" financial asset classes. Keep in mind that it is the relationship between portfolio (not asset class) risk and labor income that matters. However, also keep in mind that the potential results from using financial and housing assets to hedge labor income risk are far from guaranteed. The correlations between asset class returns and different types of labor income are generally relatively weak.

So far this seems relatively straightforward. As we have seen, it is our taste for consuming housing that tends to get our asset portfolios in trouble. In short, our consumption desires lead

many of us to allocate more of our assets to a single house (usually on a leveraged basis) than is prudent from an investment point of view. In the medium term, the solution to this problem is surely the separation of housing consumption from housing investment. Unfortunately, while much discussed, the housing partnership securities that would do this are not yet in existence. In the short term, we must take another route.

One alternative is to reduce our consumption of housing (and therefore the portion of our asset portfolio we invest in it). This would seem to be particularly appropriate when a person's labor income is closely tied to economic conditions in the same region in which their house is located.

A second alternative is to offset some of the investment side affects of our housing consumption by paying careful attention to the way we allocate the assets in our financial portfolio. This requires us to overcome a certain amount of conventional wisdom, such as the false notion that real housing (price) returns are strongly correlated with real bond and equity returns.

However, we suspect that most people are actually using a third alternative: mentally separate your house from your financial portfolio, and count only on the latter to finance your retirement. Explicitly or implicitly, this also means that you are treating your house as a potential bequest to some combination of charity, your heirs, and the tax authorities.

Objectively, none of these three strategies is preferable to the others -- it really comes down to a matter of personal choice. Our strong view, however, is that such choices should be made consciously, and with full understanding of the other alternatives that have been rejected. Unfortunately, this is too often not the case. We hope this article will help to change that.