



Christopher J. Brightman, CFA

“Unless we change our policies to encourage immigration, employment, and investment, our new normal growth rate will be 1%.”

1%... The New Normal Growth Rate?

In 1981 David Stockman, the Director of the Office of Management and Budget for newly elected President Ronald Reagan, published a budget using such an optimistic set of assumptions that it was derisively nicknamed Rosy Scenario. In Stockman's 1986 book, *The Triumph of Politics*, he explained in vivid detail his disillusionment with the politics that thwarted the spending reforms that were supposed to accompany Reagan's tax cuts. He also expressed his fear for the country's future, given the explosion in deficits and accumulation of debt. While dreading the consequences of the deficits and debt of the 1980s seems quaint from today's perspective, and memories of the Reagan era are fading into history, Rosy Scenario lives on.

Too many of today's fiscal projections extrapolate past growth trends without adjusting for the dramatic deterioration in our future growth outlook. The 2.5% long-term potential growth assumptions for the U.S. economy held out by the White House and Congressional Budget Office are wildly optimistic; indeed, the White House forecast centers on 4% real growth during the proposed recovery years of 2014-2017. While we wouldn't challenge the idea that such growth is *possible*, even the White House concedes that these are aggressive assumptions. Rosy Scenario indeed.

The Rosy forecasts are far too tightly anchored to past growth rates, during a demographic "sweet spot" for the developed world. They ignore the headwinds that have been central to our research in the past few years—the "3-D Hurricane" of deficits, debt, and demography. Specifically, the challenges to a Rosy Scenario arise in three core areas: population growth, employment rate growth, and productivity.

Population Growth

Our population growth has slowed and will continue to slow. Data from the U.S. Census Bureau shows that the annual growth of the U.S. population declined from an average of 1.8% in the 1950s to 1.0% by the 1970s and then down to 0.9% in recent years. This waning growth of our population should not be a surprise; population growth rates have already dropped to zero or less in Japan and much of Europe. The Census Bureau (Ortman and Guarneri, 2009) projects in their low immigration scenario that our population growth rate will decline to 0.8% in the next two decades.

Even these census projections do not take account of the possible demographic impact of the worst economic environment since the Great Depression. We don't yet know the full effect of the Great Recession on our



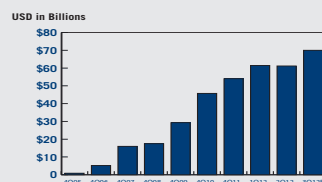
620 Newport Center Drive, Suite 900
Newport Beach, CA 92660

+1 (949) 325-8700

info@researchaffiliates.com

www.researchaffiliates.com

RAFI® Managed Assets*



*Includes RAFI® assets managed or sub-advised by Research Affiliates® or RAFI licensees.

Media Contacts

Tucker Hewes
Hewes Communications
+1 (212) 207-9451
tucker@hewescomm.com

Joel Chernoff
Research Affiliates
+1 (949) 325-8729
chernoff@ralic.com

population growth, but the experience of the 1930s is instructive. During the first two decades of the 20th century, the U.S. population grew by an average of 1.5% per year. Then, population growth dropped by more than half to only 0.7% per year during the 1930s.

We have strong evidence that a similar drop in population growth is occurring now. The household formation rate has plummeted and with it the fertility rate. The Centers for Disease Control reports: “The 2011 preliminary number of U.S. births was 3,953,593, 1% less (or 45,793 fewer) births than in 2010; the general fertility rate (63.2 per 1,000 women age 15–44 years) declined to the lowest rate ever reported for the United States.”

Immigration has also plummeted. The Pew Hispanic Center states: “From 1995 through 2000, we estimate that 3 million Mexicans moved to the United States, and nearly 700,000, including family members born in the United States, went

home. From 2005 through 2010, we estimate that about 1.4 million Mexicans arrived, and the same number, including U.S.-born children, left. Considering everything, a return to the migration levels of the late 1990s now seems inconceivable.” Given these declines in both fertility and immigration, forecasts for annual population growth of 0.8% seem optimistic for the next two decades (see **Figure 1**).

Employment Rate

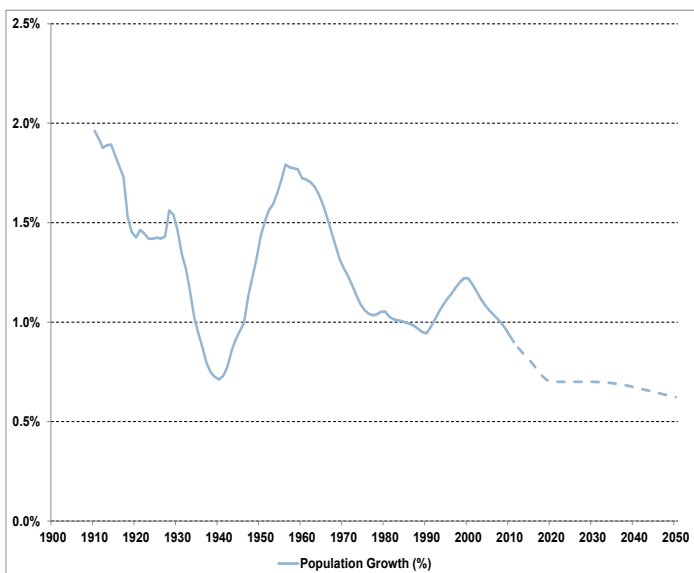
During the second half of the 20th century, the proportion of our population over age 16 who were employed rose from 56% to 64%. As shown in **Figure 2**, more than all of this growth is attributable to the rise of the female employment rate from 32% in 1950 to 58% by 2000. The male employment rate declined steadily from 82% in 1950 to 72% in 2000.

The female employment rate crested in 2000, and the male rate has continued its long gradual decline. The total employ-

ment rate declined from its peak of 64% in 2000 to 58% in 2010. Some of this decline is attributable to the recession; some to policy changes that reduce incentives to work (Mulligan, 2012); and some to our aging, a trend that will undoubtedly continue. It bears noting that the effect of demography on employment is an issue on which a libertarian investment manager can agree with neo-Keynesian economist: Paul Krugman (2012) explains this same effect on his blog.

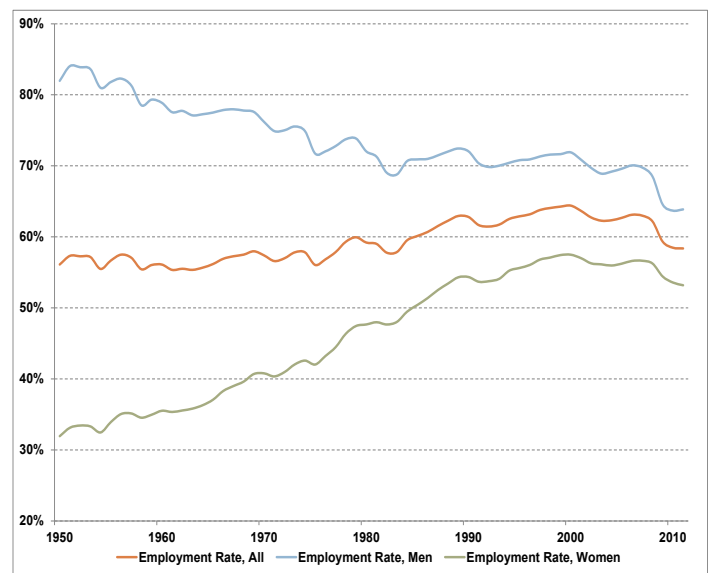
When baby boomers began to work in the 1970s, the proportion of the population over age 55 was less than 18%. Over the past decade, during which the leading edge of the boomers reached age 55, the proportion of the population aged over 55 has risen to 25% (see **Figure 3**). That may not sound like a big change, but it’s a 19% jump in just half a generation. Those of us over age 55 will rise to 31% of the population by 2030, a 48% jump in 30 years, and will continue to grow thereafter.¹

Figure 1. Population Growth



Source: Research Affiliates, based on 10-year annualized average data from the U.S. Census Bureau.

Figure 2. Employment Rates



Source: Research Affiliates, based on data from BLS and the U.S. Census Bureau.

To state the obvious, we can't see a large jump in the share of the population over 55, without a corresponding drop in the roster under 55. The average employment rate for people aged 25-54 from 1990 through 2010 was 82%; in sharp contrast, the average employment rate for people over age 55 was only 29%. A fast rising proportion of the population in an age group with a low employment rate will lower the total employment rate. While boomers may have to remain employed at rates higher than today's oldsters, many will choose to retire and others will no longer be able to work.

The rise in the employment rate from 56% in 1950 to 64% in 2000 boosted GDP growth by 0.3% per year relative to a constant employment rate. From 2000 through 2010, the employment rate declined to 58%, enough to shave 1% per year off of GDP, relative to a constant employment rate. Matters have not improved since 2010. While the recession accelerated this decline, demography will continue to exert downward pressure on the U.S. employment rate. A simple calculation, assuming constant employment rates by demographic sub-group, suggests a 0.2% per year continued demographic reduction in GDP growth over the next two decades as boomers move into their retirement years.

The best data for assembling these forecasts comes from the U.S. Census Bureau and the Bureau of Labor Statistics. The Census Bureau provides future population growth rate estimates. Near-term, these are highly reliable. Next year's 65-year-olds are alive today, age 64; we can count them. The census forecasts do not become blurry, as to the scale of the working age population, until well past 2030. Only the very distant forecasts should be viewed as speculative.

The future path for the total U.S. employment rate can then be calculated with some precision using the detailed demographic data readily available from the Bureau of Labor Statistics (though surprisingly few bother to do so). Any careful examination of the data will confirm our conclusions regarding a slowing rate of population growth and a declining trend in the total employment rate.

Productivity

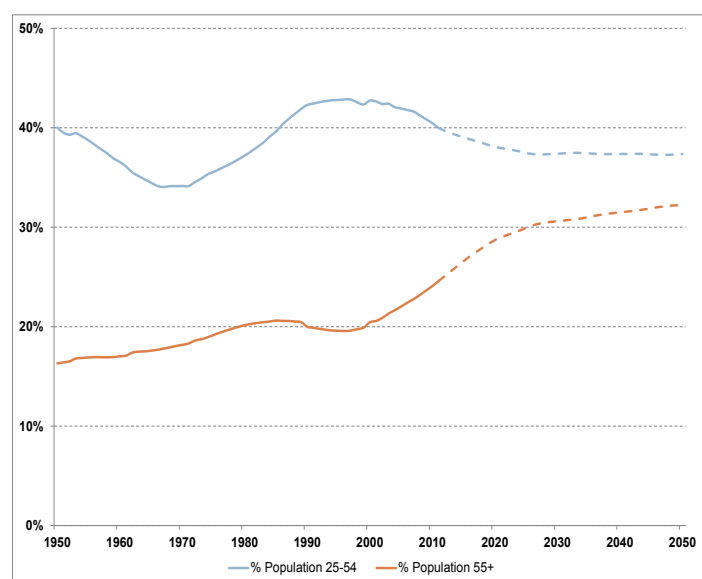
The third component of GDP growth, productivity, is more difficult to predict.

Here again demography provides some strong clues. Arnott and Chaves (2012) explain that "For each of us, the biggest jump in our contribution to GDP occurs as we transition from nonworking adolescents into gainfully employed 20-somethings. Another, often smaller, jump in our contribution to GDP occurs as we mature into our 30s. By our 40s, the evidence of real wages would suggest that most of us are at or approaching our peak contribution to GDP, with a falling contribution to GDP in our 50s

and 60s." It's not that mature adults are unproductive; rather, once we reach peak productivity (outside of unskilled labor, this appears to happen in our 40s and 50s), our productivity crests; our contribution to GDP *growth* turns negative. The aging of the baby boom generation over the next two decades will depress the U.S. employment rate, and the aging of the labor force will slow our productivity growth.

The unavoidable fiscal contraction required to address our unsustainable budget deficit also dampens the outlook for productivity growth. The U.S. government deficit, as officially measured, has grown to nearly 10% of GDP; if the government were to rely on generally accepted accounting principles (GAAP), our deficit has averaged 10% of GDP for a generation. Debt as officially reported has grown to over 100% of GDP. But, again, this figure soars when we add in state and local government debt and govern-

Figure 3. Aging Population



Source: Research Affiliates, based on data from the U.S. Census Bureau.

ment sponsored enterprises (FNMA and FHLMC). The debt level is truly horrific if we count the present value of entitlement commitments (see **Figure 4**).

Borrowing to invest can raise our future productivity growth, but only if the return on capital exceeds the cost of debt. Unfortunately, we did not borrow to invest; we borrowed to consume. Debt-financed consumption did not just raise employment. It inflated our measure of output per person. As the global financial crisis so convincingly demonstrated, much of our recent GDP growth was unsustainable, debt-financed consumption. For this reason, reported GDP over recent decades overstates both our true prosperity and our true growth.² If GDP more properly measured production instead of consumption, then measured productivity growth would have been significantly lower. Reducing consumption to a level that may be sustained by domestic production requires sharply lower growth

“Considering both the aging of our population and the required fiscal contraction, we estimate productivity growth of 0.5% per year for the next several decades.”

in real GDP per capita, until we are no longer spending beyond our means (see Arnott, 2011a).

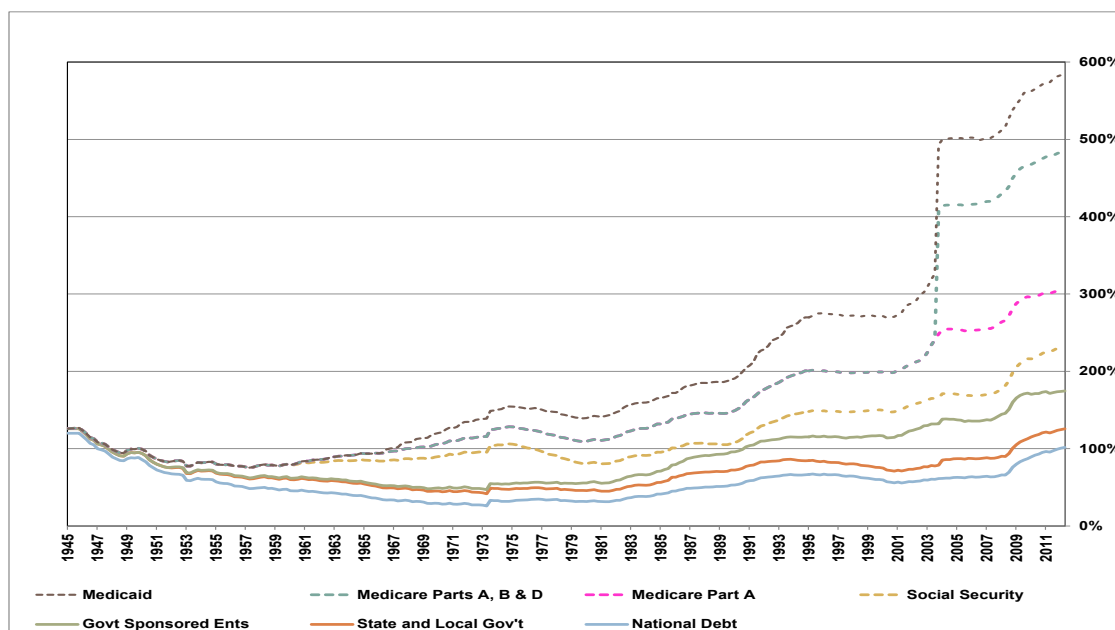
Considering both the aging of our population and the required fiscal contraction, we estimate productivity growth of 0.5% per year for the next several decades. This forecast may strike many as overly pessimistic. But before dismissing our estimate, consider the 2012 writing of Robert J. Gordon of Northwestern University, perhaps the world’s foremost

expert on productivity growth. Professor Gordon says: “Even if innovation were to continue into the future at the rate of the two decades before 2007, the U.S. faces six headwinds that are in the process of dragging long-term growth to half or less of the 1.9% annual rate experienced between 1860 and 2007. These include demography, education, inequality, globalization, energy/environment, and the overhang of consumer and government debt. A provocative ‘exercise in subtraction’ suggests that future growth in consumption per capita for the bottom 99 percent of the income distribution could fall below 0.5% per year for an extended period of decades.” We would include the top 1% in Dr. Gordon’s assessment; slow growth will not spare the affluent.

1% Growth Rate

For the 50 years from 1951 through 2000, U.S. GDP growth averaged 3.3% per year.³ We can attribute this historical growth to three primary components:

Figure 4. Public Debt and Unfunded Obligations, Percent of GDP from 1945



Source: Research Affiliates, based on data from Centers for Medicare & Medicaid Services, U.S. Social Security Administration, The Federal Reserve, and TreasuryDirect.

1.4% from population growth, 0.3% from a rising employment rate, and 1.6% from growth of output per person employed (productivity). In the coming 20 years, all three components of growth will be much lower.

Births and fertility rates are declining. Immigration has slowed to a trickle in response to harsh immigration policies and a dimmed growth outlook. For the next two decades, the U.S. population will grow by only 0.7% per year, half the rate of growth witnessed in the late 20th century.

The total employment rate will continue to decline as boomers move from their 50s into their 60s and 70s. Whereas a rising employment rate added 0.3% per year to GDP growth from 1950 through 2000, the demographic effect on the employment ratio will subtract 0.2% for the next two decades. The population will be growing by 0.7% per year, but the employable work force will be growing by only about 0.5% per year.

Productivity growth faces severe headwinds from both demography and fiscal contraction. If the productivity growth of our aging labor force is 0.5%, then future GDP growth will be centered around 1%.

Demography guarantees a sharp slowdown in GDP growth. 1% real growth is still growth. It's a joy to behold, if our expectations are anchored on zero, as was the case throughout human history before the industrial revolution. But, if our expectations are tied to the 3% growth from 1950 to 2000, the 1% growth seems abysmal.

Slower growth is not a serious problem; it's the expectations gap that poses economic and political dangers in the years ahead.

Demography is Destiny?

Demography is destiny. But, while it is the most immutable force shaping our future, it is not the only force that matters.

This 1% "new normal" for GDP growth is, of course, subject to considerable uncertainty. Our policy choices will have a dramatic influence on all three drivers of economic growth. Immigration reform, while politically difficult, could help slow the decline in population growth. We can increase the rate of employment by revising our transfer payment policies to provide ample incentives for employers to employ and for the labor force to seek employment. We can boost productivity by changing our tax policy to encourage savings and investment, rather than printing money to support debt-financed consumption.

“Investing requires savings and we have been saving far too little.”

It seems unlikely that we can reverse the decline in fertility rates observed across the developed world.⁴ Immigration can, however, move the needle on U.S. population growth by several tenths of a percentage point per year. The United States absorbed one million immigrants per year in the past when our total population was much smaller than today. The positive contributions of immigration to growth are well documented, as summarized by Professor Gordon Hanson (2012) at UC San Diego. While the economics are uncontroversial, the politics are not promising. Both the right and the

left have their own separate reasons to resist changing our immigration policies.

The structure of our tax and transfer payment systems has a significant influence on employment rates. Our combination of regressive payroll taxes and phase-out of transfer payments results in *effective* marginal tax rates above 40%—in some cases far above 40%—for the working poor (Kotlikoff and Rapson, 2006), while we tax carried interest in private equity deals at only 15%. As the authors observe: “The patterns by age and income of marginal net tax rates on earnings, marginal net tax rates on saving, and tax-arbitrage opportunities can be summarized with one word—bizarre.” Reform of our tax and transfer payment systems, to reward work instead of penalizing it, could add as many as 30 million jobs in a few short years (Arnott, 2011b).

The most important determinant of our productivity per person is the amount of capital we have available for investment, and wise use of that capital. Investing to improve productivity in all of its forms, from machine tools, to transportation infrastructure, to education, can all raise our productivity. Investing requires savings and we have been saving far too little. To increase productivity requires that we reorient our economy away from debt-financed consumption and toward saving-financed investment.

In this context, ending the mortgage interest deduction seems oddly absent from our political debate, perhaps because it would run counter to long-standing bipartisan policies promoting the American dream of home ownership and perhaps because it would simply be too unpopular. Nonetheless, the

tax deductibility of interest on home mortgages (which was effectively reaffirmed when the Tax Reform Act of 1986 rescinded the deductibility of credit card interest) has been credibly identified as one of the factors that eventuated in the financial crisis (Szegö, 2011). Because borrowing against one's house is inexpensive on an after-tax basis, it was easy to rationalize converting the wealth effect

of rising prices from a psychological phenomenon to actual cash on hand for consumer spending. Banks and families are still paying for the good times, and the overhang of properties in foreclosure ensures that the residential real estate market will not fully recover for years to come. Yet there is little discussion of changing the tax code with regard to debt collateralized by borrowers' homes.

Unless we change our policies to encourage immigration, employment, and investment, our new normal growth rate will be 1%. Government tax and spending plans, based upon the Rosy Scenario of extrapolating past growth rates, are likely to exacerbate our already unsustainable deficits and dangerous accumulation of debt.

Endnotes

1. See Current Estimates Data, Population Estimates, United States Census Bureau: <http://www.census.gov/popest/data/>
2. We think our reliance on GDP aggravates and encourages our current problems. GDP measures consumption. So, we think we're gaining ground when we increase consumption, even if that consumption is funded by deficit spending or by increases in personal debt. See Arnott (2011a).
3. U.S. Department of Commerce: Bureau of Economic Analysis.
4. For each the G-7, fertility rates fell below replacement levels between 1965 and 1975. Among the BRIC's, only India still has a fertility rate above replacement levels, and that rate is falling very fast. Fertility rates that are below replacement rates eventually lead to a population of zero (as John Calhoun's rats demonstrated in the 1960s). But we'll leave this puzzle for future generations to solve.

References

Arnott, Robert D. 2011a. "Does Unreal GDP Drive our Policy Choices?" *Fundamentals* (April).

———. 2011b. "30 Million New Jobs in 5 Years? Yes We Can!" *Real Clear Markets* (October 12).

Arnott, Robert D., and Denis B. Chaves. 2012. "Demographic Changes, Financial Markets, and the Economy," *Financial Analysts Journal*, vol. 68, no. 1 (January/February):23-46.

Gordon, Robert J. 2012. "Is U.S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds," NBER Working Paper No. 18315 (August): <http://www.nber.org/papers/w18315>.

Hanson, Gordon H. 2012. "Immigration and Economic Growth," *Cato Journal*, vol. 32, no. 1 (Winter):25-34.

Kotlikoff, Laurence, and David Rapson. 2006. "Does it Pay, at the Margin, to Work and Save?—Measuring Effective Marginal Taxes on Americans' Labor Supply and Saving," NBER Working Paper 12533 (December).

Krugman, Paul. 2012. "Constant-Demography Employment (Wonkish but Relevant)," *The New York Times* (October 6).

Mulligan, Casey B. 2012. "Do Welfare Policies Matter for Labor Market Aggregates? Quantifying Safety Net Work Incentives Since 2007," University of Chicago Working Paper (January).

Ortman, Jennifer M., and Christine E. Guarneri. 2009. "United States Population Projections: 2000 to 2050," United States Census Bureau.

Szegö, Giorgio. 2011. "Causes of the Economic Crisis: Can the Flap of a Butterfly Wing in Brazil Destroy the Coliseum...After 30 Years?" *Journal of Risk Management in Financial Institutions*, vol. 4, no. 3 (June):216-228.

Performance Update

FTSE RAFI® Equity Index Series*

TOTAL RETURN AS OF 10/31/12	BLOOMBERG TICKER	YTD	12 MONTH	ANNUALIZED			
				3 YEAR	5 YEAR	10 YEAR	10 YEAR VOLATILITY
FTSE RAFI® All World 3000 ¹	TFRAW3	11.08%	7.22%	6.53%	-1.65%	11.35%	18.95%
MSCI All Country World ²	GDUEACWF	12.67%	9.17%	8.10%	-2.42%	8.32%	16.94%
FTSE RAFI® Developed ex US 1000 ³	FRX1XTR	9.01%	1.64%	0.93%	-5.16%	9.64%	20.47%
MSCI World ex US Large Cap ⁴	MLCUWXUG	11.21%	4.96%	3.79%	-5.03%	8.68%	18.50%
FTSE RAFI® Developed ex US Mid Small ⁵	TFRDXUSU	9.28%	2.49%	5.36%	-0.41%	14.06%	19.05%
MSCI World ex US Small Cap ⁶	GCUDWXUS	12.99%	5.27%	6.77%	-3.42%	12.11%	20.52%
FTSE RAFI® Emerging Markets ⁷	TFREMU	9.00%	1.84%	4.67%	-2.03%	22.41%	24.78%
MSCI Emerging Markets ⁸	GDUEEGF	11.66%	2.98%	5.70%	-3.17%	16.56%	24.21%
FTSE RAFI® 1000 ⁹	FRI0XTR	14.26%	15.64%	14.01%	1.96%	9.17%	17.61%
Russell 1000 ¹⁰	RU10INTR	14.32%	14.97%	13.48%	0.53%	7.31%	15.29%
S&P 500 ¹¹	SPTR	14.29%	15.21%	13.21%	0.36%	6.91%	15.01%
FTSE RAFI® US 1500 ¹²	FRI5USTR	12.73%	12.36%	15.22%	4.06%	12.85%	22.26%
Russell 2000 ¹³	RU20INTR	11.75%	12.08%	14.82%	1.19%	9.58%	20.35%
FTSE RAFI® Europe ^{14**}	TFREUE	11.31%	10.45%	3.84%	-4.79%	6.49%	18.33%
MSCI Europe ^{15**}	GDDLE15	13.87%	15.08%	8.15%	-3.59%	5.63%	15.40%
FTSE RAFI® Australia ^{16**}	FRAUSTR	18.42%	13.24%	4.34%	-1.56%	8.98%	13.31%
S&P/ASX 200 ^{17**}	ASA51	15.81%	10.27%	3.57%	-3.45%	8.66%	13.42%
FTSE RAFI® Canada ^{18**}	FRCANTR	7.50%	5.97%	7.14%	1.44%	11.15%	13.68%
S&P/TSX 60 ^{19**}	TX60AR	7.15%	5.07%	6.06%	-0.74%	9.89%	14.08%
FTSE RAFI® Japan ^{20**}	FRJPNTR	-0.35%	-5.08%	-5.42%	-12.52%	1.48%	18.95%
MSCI Japan ^{21**}	GDDLJN	4.42%	-0.68%	-4.24%	-13.24%	0.05%	18.45%
FTSE RAFI® UK ^{22**}	FRGBRTR	8.58%	9.80%	7.33%	0.06%	7.99%	16.08%
MSCI UK ^{23**}	GDDLUK	7.44%	8.65%	8.48%	0.77%	7.48%	14.04%

*To see the complete series, please go to: http://www.ftse.com/Indices/FTSE_RAFI_Index_Series/index.jsp.

**The above indices have been restated to reflect the use of local currencies for all single country strategies and EUR for Europe regional strategies rather than USD.

Russell Fundamental Index Series*

TOTAL RETURN AS OF 10/31/12	BLOOMBERG TICKER	YTD	12 MONTH	ANNUALIZED			
				3 YEAR	5 YEAR	10 YEAR	10 YEAR VOLATILITY
Russell Fundamental Global Index Large Company ²⁴	RUFGLTU	11.52%	8.57%	8.48%	-0.51%	11.61%	17.50%
MSCI All Country World Large Cap ²⁵	MLCUAWOG	12.82%	9.58%	7.77%	-2.47%	7.70%	16.60%
Russell Fundamental Developed ex US Index Large Company ²⁶	RUFDXLTU	8.67%	1.73%	2.50%	-4.02%	11.03%	18.91%
MSCI World ex US Large Cap ²⁷	MLCUWXUG	11.15%	5.05%	3.44%	-5.11%	8.14%	18.35%
Russell Fundamental Developed ex US Index Small Company ²⁸	RUFDXSTU	11.66%	5.66%	6.46%	-0.64%	14.04%	18.54%
MSCI World ex US Small Cap ⁶	GCUDWXUS	12.99%	5.27%	6.77%	-3.42%	12.11%	20.52%
Russell Fundamental Emerging Markets ²⁹	RUFGETRU	11.65%	4.10%	7.51%	-0.37%	22.12%	24.54%
MSCI Emerging Markets ⁸	GDUEEGF	11.66%	2.98%	5.70%	-3.17%	16.56%	24.21%
Russell Fundamental US Index Large Company ³⁰	RUFUSLTU	14.33%	16.19%	14.73%	2.72%	9.68%	16.02%
Russell 1000 ¹⁰	RU10INTR	14.32%	14.97%	13.48%	0.53%	7.31%	15.29%
S&P 500 ¹¹	SPTR	14.29%	15.21%	13.21%	0.36%	6.91%	15.01%
Russell Fundamental US Index Small Company ³¹	RUFUSSTU	12.99%	12.54%	17.15%	5.51%	13.25%	21.15%
Russell 2000 ¹³	RU20INTR	11.75%	12.08%	14.82%	1.19%	9.58%	20.35%
Russell Fundamental Europe ^{32**}	RUFEUTE	12.32%	11.59%	7.22%	-2.79%	9.24%	17.18%
MSCI Europe ^{15**}	GDDLE15	13.87%	15.08%	8.15%	-3.59%	5.63%	15.40%

*To see the complete series, please go to: http://www.russell.com/indices/data/Fundamental/About_Russell_Fundamental_indexes.asp.

**The above indices have been restated to reflect the use of local currencies for all single country strategies and EUR for Europe regional strategies rather than USD.

Performance Update

Fixed Income/Alternatives

TOTAL RETURN AS OF 10/31/12	BLOOMBERG TICKER	YTD	12 MONTH	ANNUALIZED			
				3 YEAR	5 YEAR	10 YEAR	10 YEAR VOLATILITY
RAFI® Bonds Investment Grade Master ³³	—	9.41%	9.87%	9.22%	8.78%	6.92%	6.01%
ML Corporate Master ³⁴	COAO	10.48%	10.51%	9.31%	7.92%	6.79%	6.18%
RAFI® Bonds High Yield Master ³⁵	—	13.46%	13.99%	12.85%	11.66%	12.35%	10.13%
ML Corporate Master II High Yield BB-B ³⁶	H0A4	12.31%	12.90%	11.82%	8.34%	9.89%	9.37%
RAFI® US Equity Long/Short ³⁷	—	1.57%	2.39%	3.44%	3.23%	5.90%	11.57%
1-Month T-Bill ³⁸	GB1M	0.04%	0.04%	0.07%	0.46%	1.62%	0.50%
FTSE RAFI® Global ex US Real Estate ³⁹	FRXR	27.88%	16.45%	6.41%	-2.30%	—	—
FTSE EPRA/NAREIT Global ex US ⁴⁰	EGXU	30.57%	18.91%	8.96%	-4.69%	—	—
FTSE RAFI® US 100 Real Estate ⁴¹	FRUR	19.58%	18.89%	24.28%	5.90%	—	—
FTSE EPRA/NAREIT United States ⁴²	UNUS	14.09%	14.66%	21.63%	1.00%	—	—
Citi RAFI Sovereign Developed Markets Bond Index Master ⁴³	CRFDMU	5.02%	3.06%	4.64%	5.55%	7.61%	7.84%
Merrill Lynch Global Governments Bond Index II ⁴⁴	WOG1	2.90%	2.52%	4.40%	6.13%	6.72%	7.14%
Citi RAFI Sovereign Emerging Markets Local Currency Bond Index Master ⁴⁵	CRFELMU	12.97%	8.11%	—	—	—	—
JPMorgan GBI-EM Global Diversified ⁴⁶	JGENVUUG	12.70%	7.25%	—	—	—	—

Definition of Indices:

- (1) The FTSE RAFI® All World 3000 Index is a measure of the largest 3,000 companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value), across both developed and emerging markets.
- (2) The MSCI All Country World Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets.
- (3) The FTSE RAFI® Developed ex US 1000 Index is a measure of the largest 1000 non U.S. listed, developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
- (4) The MSCI World ex US Large Cap Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets, excluding the United States.
- (5) The FTSE RAFI® Developed ex US Mid Small Index tracks the performance of small and mid-cap companies domiciled in developed international markets (excluding the United States), selected and weighted based on the following four fundamental measures of firm size: sales, cash flow, dividends and book value.
- (6) The MSCI World ex US Small Cap Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of small cap developed markets, excluding the United States.
- (7) The FTSE RAFI® Emerging Markets Index comprises the largest 350 Emerging Market companies selected and weighted using fundamental factors (sales, cash flow, dividends, book value).
- (8) The MSCI Emerging Markets Index is an unmanaged, free-float-adjusted cap-weighted index designed to measure equity market performance of emerging markets.
- (9) The FTSE RAFI® 1000 Index is a measure of the largest 1,000 U.S. listed companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
- (10) The Russell 1000 Index is a market-capitalization-weighted benchmark index made up of the 1,000 highest-ranking U.S. stocks in the Russell 3000.
- (11) The S&P 500 Index is an unmanaged market index that focuses on the large-cap segment of the U.S. equities market.
- (12) The FTSE RAFI® US 1500 Index is a measure of the 1,001st to 2,500th largest U.S. listed companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
- (13) The Russell 2000 is a market-capitalization weighted benchmark index made up of the 2,000 smallest U.S. companies in the Russell 3000.
- (14) The FTSE RAFI® Europe Index is comprised of all European companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
- (15) The MSCI Europe Index is a free-float adjusted market capitalization weighted index that is designed to measure the equity market performance of the developed markets in Europe.
- (16) The FTSE RAFI® Australia Index is comprised of all Australian companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
- (17) The S&P/ASX 200 Index, representing approximately 78% of the Australian equity market, is a free-float-adjusted, cap-weighted index.
- (18) The FTSE RAFI® Canada Index is comprised of all Canadian companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
- (19) The S&P/Toronto Stock Exchange (TSX) 60 is a cap-weighted index consisting of 60 of the largest and most liquid (heavily traded) stocks listed on the TSX, usually domestic or multinational industry leaders.
- (20) The FTSE RAFI® Japan Index is comprised of all Japanese companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
- (21) The MSCI Japan Index is an unmanaged, free-float-adjusted cap-weighted index that aims to capture 85% of the publicly available total market capitalization of the Japanese equity market.
- (22) The FTSE RAFI® UK Index is comprised of all UK companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
- (23) The MSCI UK Index is an unmanaged, free-float-adjusted cap-weighted index that aims to capture 85% of the publicly available total market capitalization of the British equity market.
- (24) The Russell Fundamental Global Index Large Company is a measure of the largest companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks), across both developed and emerging markets.
- (25) The MSCI All Country World Large Cap Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets.
- (26) The Russell Fundamental Developed ex US Large Company is a subset of the Russell Fundamental Developed ex US Index, and is a measure of the largest non-U.S. listed developed country companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks).
- (27) The MSCI World ex US Large Cap Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of large cap-developed markets, excluding the United States.
- (28) The Russell Fundamental Developed ex US Index Small Company is a subset of the Russell Fundamental Developed ex US Index, and is a measure of small non-U.S. listed developed country companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks).
- (29) The Russell Fundamental Emerging Markets Index is a measure of Emerging Market companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks).
- (30) The Russell Fundamental U.S. Index Large Company is a subset of the Russell Fundamental US Index, and is a measure of the largest U.S. listed companies, selected and weighted using fundamental measures; (adjusted sales, retained cash flow, dividends + buybacks).
- (31) The Russell Fundamental US Index Small Company is a subset of the Russell Fundamental US Index, and is a measure of U.S. listed small companies, selected and weighted using fundamental measures; (adjusted sales, retained cash flow, dividends + buybacks).
- (32) The Russell Fundamental Europe Index is a measure of European companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks).
- (33) The RAFI® Bonds Investment Grade Master Index is a U.S. investment-grade corporate bond index comprised of non-zero fixed coupon debt with maturities ranging from 1 to 30 years issued by publicly traded companies. The issuers held in the index are weighted by a combination of four measures of their fundamental size—sales, cash flow, dividends, and book value of assets.
- (34) The Merrill Lynch U.S. Corporate Master Index is representative of the entire U.S. corporate bond market. The index includes dollar-denominated investment-grade corporate public debt issued in the U.S. bond market.
- (35) The RAFI® Bonds High Yield Master is a U.S. high-yield corporate bond index comprised of non-zero fixed coupon debt with maturities ranging from 1 to 30 years issued by publicly traded companies. The issuers held in the index are weighted by a combination of four measures of their fundamental size—sales, cash flow, dividends, and book value of assets.
- (36) The Merrill Lynch Corporate Master II High Yield BB-B Index is representative of the U.S. high yield bond market. The index includes domestic high-yield bonds, including deferred interest bonds and payment-in-kind securities. Issues included in the index have maturities of one year or more and have a credit rating lower than BBB-/Baa3, but are not in default.
- (37) The RAFI® US Equity Long/Short Index utilizes the Research Affiliates Fundamental Index® (RAFI®) methodology to identify opportunities that are implemented through long and short securities positions for a selection of U.S. domiciled publicly traded companies listed on major exchanges. Returns for the index are collateralized and represent the return of the strategy plus the return of a cash collateral yield.
- (38) The 1-Month T-bill return is calculated using the Bloomberg Generic 1-month T-bill. The index is interpolated based off of the currently active U.S. 1 Month T-bill and the cash management bill closest to maturing 30 days from today.
- (39) The FTSE RAFI® Global ex US Real Estate Index comprises 150 companies with the largest RAFI fundamental values selected from the constituents of the FTSE Global All Cap ex U.S. Index that are classified by the Industry Classification Benchmark (ICB) as Real Estate.
- (40) The FTSE EPRA/NAREIT Global ex US Index is a free float-adjusted index, and is designed to represent general trends in eligible listed real estate stocks worldwide, excluding the United States. Relevant real estate activities are defined as the ownership, trading and development of income-producing real estate.
- (41) The FTSE RAFI® US 100 Real Estate Index comprises of the 100 U.S. companies with the largest RAFI fundamental values selected from the constituents of the FTSE USA All Cap Index that are classified by the Industry Classification Benchmark (ICB) as Real Estate.
- (42) The FTSE EPRA/NAREIT United States Index is a free float-adjusted index, is a subset of the EPRA/NAREIT Global Index and the EPRA/NAREIT North America Index and contains publicly quoted real estate companies that meet the EPRA Ground Rules, EPRA/NAREIT Index series is seen as the representative benchmark for the real estate sector.
- (43) The Citi RAFI Sovereign Developed Markets Bond Index Series seeks to reflect exposure to the government securities of a universe of 23 developed markets. By weighting components by their fundamentals, the indices aim to represent each country's economic footprint and proxies for its ability to service debt.
- (44) The Merrill Lynch Global Government Bond Index I tracks the performance of investment grade sovereign debt publicly issued and denominated in the issuer's own domestic market and currency.
- (45) The Citi RAFI Sovereign Emerging Markets Local Currency Bond Index Series seeks to reflect exposure to the government securities of a universe of 14 emerging markets. By weighting components by their fundamentals, the indices aim to represent each country's economic footprint and proxies for its ability to service debt.
- (46) The JPMorgan GBI-EM Diversified Index seeks exposure to the local currency sovereign debt of over 15 countries in the emerging markets.

Source: All index returns are calculated using total return data from Bloomberg and FactSet. Returns for all single country strategies and Europe regional strategies are in local currency. All other returns are in USD.

© 2012 Research Affiliates, LLC. The material contained in this document is for general information purposes only. It is not intended as an offer or a solicitation for the purchase and/or sale of any security or financial instrument, nor is it advice or a recommendation to enter into any transaction. Research results relate only to a hypothetical model of past performance (i.e., a simulation) and not to an asset management product. No allowance has been made for trading costs or management fees, which would reduce investment performance. Actual results may differ. Index returns represent back-tested performance based on rules used in the creation of the index, are not a guarantee of future performance, and are not indicative of any specific investment. Indexes are not managed investment products and cannot be invested in directly. This material is based on information that is considered to be reliable, but Research Affiliates® and its related entities (collectively "RA") make this information available on an "as is" basis and make no warranties, express or implied, regarding the accuracy of the information contained herein. RA is not responsible for any errors or omissions or for results obtained from the use of this information. Nothing contained in this material is intended to constitute legal, tax, securities, financial or investment advice, nor an opinion regarding the appropriateness of any investment. The information contained in this material should not be acted upon without obtaining advice from a licensed professional. Research Affiliates, LLC, is an investment adviser registered under the Investment Advisors Act of 1940 with the U.S. Securities and Exchange Commission (SEC). Citigroup Index LLC (Citigroup), a subsidiary of Citigroup Inc., and RA have agreed to jointly create and distribute investable bond indices (the "Citi RAFI Bond Index Series") based on the RA patented Fundamental Index methodology. Neither Citigroup nor RA make any warranties regarding the accuracy or completeness of any data related to the Citi RAFI Bond Index Series. All information is provided for information purposes only. Neither Citigroup nor RA accept any liability for any errors or any loss arising from the use of any data or information set forth in this publication. CITI is a registered trademark and service mark of Citigroup Inc. or Citibank, N.A., is used under license by RA, and is used and registered throughout the world. All intellectual property contributed by RA and Citigroup shall remain solely vested with the respective contributor. The RAFI® US Equity Long/Short Index is calculated by S&P Dow Jones Indices LLC or its affiliates. S&P® is registered trademark of Standard & Poor's Financial Services LLC and Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC; the marks have been licensed for use by S&P Dow Jones Indices LLC and its affiliates. Investment products based on the RAFI® US Equity Long/Short Index are not sponsored, endorsed, sold or promoted by S&P Dow Jones Indices LLC, Dow Jones, S&P or their respective affiliates and none of S&P Dow Jones Indices LLC, Dow Jones, S&P or their respective affiliates makes any representation regarding the advisability of investing in such product(s). S&P Dow Jones Indices LLC, its affiliates, sources and distribution agents, and each of their respective officers, directors, employees, agents, representatives and licensors (collectively, the "Index Calculation Agent") shall not be liable to RA, any customer or any third party for any loss or damage, direct, indirect or consequential, arising from (i) any inaccuracy or incompleteness in, or delays, interruptions, errors or omissions in the delivery of the RAFI® US Equity Long/Short Index or any data related thereto (the "Index Data") or (ii) any decision made or action taken by RA, any customer or third party in reliance upon the Index Data. The Index Calculation Agent does not make any warranties, express or implied, to RA, any of its customers or anyone else regarding the Index Data, including, without limitation, any warranties with respect to the timeliness, sequence, accuracy, completeness, currentness, merchantability, quality or fitness for a particular purpose or any warranties as to the results to be obtained by RA, any of its customers or other person in connection with the use of the Index Data. The Index Calculation Agent shall not be liable to RA, its customers or other third parties for loss of business revenues, lost profits or any indirect, consequential, special or similar damages whatsoever, whether in contract, tort or otherwise, even if advised of the possibility of such damages. The RAFI® US Investment Grade Bond Index and RAFI® US High Yield Bond Index are calculated by ALM Research Solutions, LLC, (ALM) in conjunction with RA. All rights and interests in the RAFI® US Investment Grade Bond Index and the RAFI® US High Yield Bond Index vest in RA. All rights in and to the RA Fundamental Index® concept used in the calculation of the RAFI® US Investment Grade Bond Index and the RAFI® US High Yield Bond Index vest in RA. The above RAFI® indexes are not sponsored or promoted by ALM or its respective affiliates. Neither ALM nor RA make any warranties, express or implied, to any of their customers or anyone else regarding the accuracy or completeness of any data related to the RAFI® US Investment Grade Bond Index, or the RAFI® US High Yield Bond Index. All information is provided for information purposes only. Neither ALM nor RA accept any liability for any errors or any loss arising from the use of information in this publication. Russell Investments is the source and owner of the Russell index data contained or reflected in this material and copyrights related thereto. Russell Investments and RA have entered into a strategic alliance with respect to the Russell Fundamental Index Series. Subject to RA's intellectual property rights in certain content (see below), Russell Investments is the owner of all copyrights related to the Russell Fundamental Indexes. Russell Investments and RA jointly own all trademark and service mark rights in and to the Russell Fundamental Indexes. The presentation may contain confidential information and unauthorized use, disclosure, copying, dissemination, or redistribution is strictly prohibited. Russell Investments is not responsible for the formatting or configuration of this material or for any inaccuracy in the presentation. Investors should be aware of the risks associated with data sources and quantitative processes used in our investment management process. Errors may exist in data acquired from third party vendors, the construction of model portfolios, and in coding related to the index and portfolio construction process. While RA takes steps to identify data and process errors so as to minimize the potential impact of such errors on index and portfolio performance, we cannot guarantee that such errors will not occur. The trade names Fundamental Index® and RAFI®, the RAFI logo, and the Research Affiliates® corporate name and logo are registered trademarks and are the exclusive intellectual property of RA. Any use of these trade names and logos without the prior written permission of RA is expressly prohibited. RA reserves the right to take any and all necessary action to preserve all of its rights, title and interest in and to these marks. The Fundamental Index® method is patented and patent-pending proprietary intellectual property of RA. (US Patent No. 7,620,577; 7,747,502; 7,792,719; 7,778,905; and 8,005,740; Patent Pending Publ. Nos. US-2007-0055598-A1, US-2008-0288416-A1, US-2010-0191628, US-2010-0262563, WO 2005/076812, WO 2007/078399 A2, WO 2008/118372, EPN 1733352, and HK1099110). The views and opinions expressed are those of the author and not necessarily those of RA. The opinions are subject to change without notice.