

JOURNAL OF FINANCE CASE RESEARCH

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Letter from the Editor

I am pleased to present the 2016 issue of the *Journal of Finance Case Research*, the official journal of *The Institute of Finance Case Research* (IFCR). 2016 was a challenging year for the Institute and the journal. Much credit goes to the senior editor (Bob Stretcher), associate editors and the reviewers for their help and patience over the past year. This journal and its continued success is a product of sheer will and determination on his part.

The IFCR provides an avenue for the writing of cases and their submission for peer review. Cases accepted for publication in the *Journal* have met the quality requirements of a double-blind review process, and they are available for use through *Journal* subscriptions or by contacting the *Institute* for electronic copy access. Teaching notes are available to instructors desiring to use each case by contacting either the *Institute* or the authors.

The *Institute* continues to promote the interaction of case writers in conference settings. I invite case writers and case users to participate in the activities of the *Institute*. Our case sessions are held at a variety of finance conferences and provide the opportunity for interaction with others with a similar interest. Our recent conference activities have taken place in Fort Lauderdale, San Antonio, Charleston, Denver, Savannah and other popular destinations. Cases submitted for conference presentation are eligible for the review process for the *Journal*, and we have collaborated with different conferences (such as FEA) on special issues in the past.

Our overall objective is to create an outlet for case writers, and to build a source of quality cases for case users. Cases presented at our conferences, having had the advantage of being exposed to the scrutiny of experienced casewriters, have a better chance of final acceptance for journal publication.

Our acceptance rate is never more than 25%. The *Journal* is listed in *Cabell's Directory of Publishing Opportunities in Economics and Finance*, and it is also on the Australian Business Deans' Journal Quality List.

This issue of the *Journal of Finance Case Research* contains several cases that we hope you will find useful in your courses and consulting work. Please visit our website often for updates and conference information. We encourage all parties interested in the production, promotion, and use of cases in finance to become active participants in the IFCR.

Timothy B. Michael, Editor
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ASSET PRICE BUBBLES: THE FED'S DILEMMA

Arthur L. Centonze, Pace University

The U.S. Fed's Federal Open Market Committee (FOMC), lowered its short-term policy rate, the federal funds rate, from 6.5% in late 2000 to 1% in June 2003 and kept the rate at that level until June 2004. The low cost of capital helped to stimulate spending, particularly on housing, raising the specter of a housing bubble. The case explores the period prior to the global financial crisis through FOMC announcements, minutes and member speeches in order to better understand participant thinking on the economy, asset prices, financial innovation, risk, and the appropriate policy response. Should the Greenspan Fed, and later the Bernanke Fed, have taken a more activist approach to monetary policy to subdue the sharp rise in house prices and a more vigilant approach to regulatory and supervisory oversight to deal with excessive risks taken by financial institutions and households in the run-up to the global financial crisis?

INTRODUCTION

Over the first half of the decade of the 2000's, the U.S. Federal Reserve's Federal Open Market Committee (FOMC), under Fed Chair Alan Greenspan's leadership, monitored changes in a number of economic indicators in order to inform their decisions on the path of monetary policy. The FOMC is a twelve member policymaking body consisting of the seven Federal Reserve Board members and five presidents of the twelve district reserve banks in the Federal Reserve System. The committee meets eight times a year to set monetary policy in an effort to achieve the economic goals of maximum employment and economic growth, stable prices, and moderate long-term interest rates. In the pursuit of these goals and given the state of perceived macroeconomic conditions at the time, the FOMC lowered its short-term policy rate, the federal funds rate, from 6.5% in late 2000 to 1% in June 2003 and kept the rate at that historically low level until June 2004.

The minutes of the FOMC's meetings over this period indicate that after the 2001 recession, which was caused largely by the bursting of the dot com equity bubble of the late 1990's, the growth in real and nominal GDP gathered steam, consumption and investment spending rose, the unemployment rate began to fall in lagged fashion, and the headline CPI inflation rate began to climb. Exhibit 1 provides a summary of selected US economic indicators over the 1999 – 2008 period and suggests that short and long-term interest rates remained low despite the firming of monetary policy in 2004.

Exhibit 1: United States Selected Economic Indicators

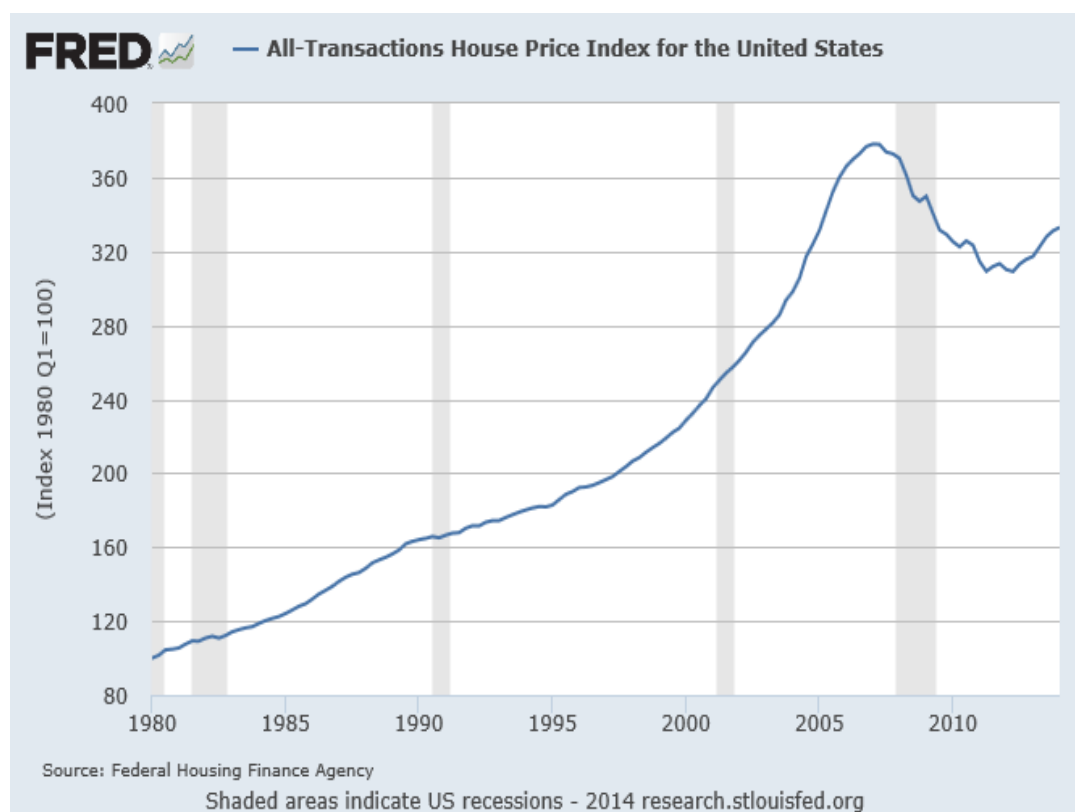
(Annual change in percent, unless otherwise noted)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Real GDP	4.4	3.7	0.8	1.6	2.7	4.2	3.2	2.9	2.0	0.4
Nominal GDP	6.0	5.9	3.2	3.9	4.8	7.0	6.3	6.1	4.8	2.6
Private final consumption	5.1	4.7	2.5	2.7	2.9	3.9	3.5	3.1	2.8	-0.2
Gross private domestic investment	8.3	6.5	-3.0	-5.2	3.6	9.7	7.5	2.4	-3.1	3.8
Net exports ¹	-1.0	-0.9	-0.2	-0.7	-0.5	-0.7	-0.3	-0.1	0.6	1.2
Unemployment rate	4.2	4.0	4.7	5.8	6.0	5.5	5.1	4.6	1.2	5.8
CPI inflation	2.2	3.4	2.8	1.6	2.3	2.7	3.4	3.2	2.9	3.8
Personal savings (% of DI)	4.4	4.2	4.3	5.0	4.8	4.6	2.5	3.3	3.0	4.9
Three-month T-bill rate ²	4.6	5.8	3.4	1.6	1.0	1.4	3.2	4.7	4.4	1.4
Ten-year T-bond rate ²	5.7	6.0	5.0	4.6	4.0	4.3	4.3	4.8	4.6	3.7

Sources: Haver Analytics, IMF staff estimates, Board of Governors of the Federal Reserve System, H-15, Bureau of Economic Analysis

¹Contributors to growth²Secondary market rate

The low cost of capital during this period, coupled with a low measured savings rate, stimulated steep spending on consumer durables and assets like housing and equities raising the specter of a second bubble that could also end badly (Figure 1).

Figure 1: Housing Prices 1980-2014

However, the FOMC minutes indicate consistently that meeting participants believed the increase in home sales and brisk increases in both housing and equity prices, while boosting household net worth and fueling the growth in consumer spending, did not pose a threat to the economy that would trigger a change in monetary policy.

Approximately six months later, the minutes of the December 14, 2004 FOMC meeting signaled a change in thinking: They state:

Some participants believed that the prolonged period of policy accommodation had generated a significant degree of liquidity that might be contributing to signs of potentially excessive risk-taking in financial markets evidenced by quite narrow credit spreads, a pickup in initial public offerings, an upturn in mergers and acquisition activity, and anecdotal reports that speculative demands were becoming apparent in the markets for single-family homes and condominiums.

A few months later the minutes of the June 29-30, 2005 FOMC meeting signaled an even more portentous change. At this meeting the participants reviewed and discussed staff reports on the rise in housing valuations. The minutes report:

Prices of houses in the United States had risen sharply in recent years, especially in certain areas of the country, to very high levels relative to incomes or rents. In addition to local market factors, a wide range of influences appeared to be supporting home prices, including solid gains in disposable income, low mortgage rates, and financial innovation in the residential mortgage market. Prices might be somewhat above the levels consistent with these underlying factors, but measuring the extent of any overvaluation either nationally or in regional markets posed considerable conceptual and statistical difficulties. Meeting participants noted that the rise in house prices had been accompanied by a modest shift toward potentially riskier types of mortgages, including adjustable-rate and interest-only loans, which could pose challenges to both lenders and borrowers.

For Alan Greenspan and the other participants at the FOMC meeting this conclusion, if reliable, could be critically important in determining the future path of monetary policy as well as the Fed's posture toward regulatory and supervisory oversight of financial institutions and markets. Would the Fed adopt a tighter monetary policy to subdue the sharp rise in house prices? Would the Fed invoke more rigorous regulatory and supervisory measures to deal with the innovation in mortgage products and attendant risks? For example, would the Fed require banks to hold higher capital and liquidity buffers, or lower leverage levels; or require them to tighten lending standards and adopt enhanced risk management processes and disclosures; or require them to retain some credit risk when issuing asset backed securities? Or would the Fed simply wait for events to take their toll on economic growth, employment and overall prices before responding? To take action or not, this was Greenspan and the Fed's dilemma in the face of another potential asset price bubble that could sink the U.S. economy so soon after the bursting of the dot com bubble.

ALAN GREENSPAN, BEN BERNANKE AND THE FED'S DILEMMA

In 1987, President Ronald Reagan appointed Alan Greenspan chairman of the Federal Reserve Board. He served in that role until 2006, during four U.S. presidencies, helping to shape monetary policy for 19 years, a period which included the longest economic expansion in U.S. history. Prior to joining the Board, Greenspan worked on Wall Street as a financial adviser and

corporate board member. He received several presidential appointments to boards and commissions, served President Gerald Ford as Chair of the Council of Economic Advisers, and headed President Jimmy Carter's bipartisan National Commission on Social Security Reform. In addition, he served as a member of President Ronald Reagan's Economic Policy Advisory Board and was a consultant to the Congressional Budget Office.

During his tenure as chairman of the Board of Governors, Greenspan led the Federal Reserve through a number of crises, including the October 1987 stock market crash, the Asian financial crisis of 1997, and the September 11, 2001, terrorist attacks. His reputation as a central banker was that of a strong inflation fighter whose focus was on controlling prices more than on promoting full employment. Greenspan was also skeptical of regulation. He believed that markets would exert self-control and that financial institutions, out of self-preservation, would control the urge to take excessive risks.

Ben Bernanke became a member of the Board of Governors of the Federal Reserve in 2002 after a career as Professor of Economics and Public Affairs and chair of the Economics Department at Princeton University. A conservative ideologically, he had devoted much of his academic career to studying the causes of the Great Depression and was considered an expert on how to prevent financial crises from escalating and threatening the general economy.

In June 2005 he took a leave from the Board to join the George W. Bush administration as Chair of the President's Council of Economic Advisors. While Bernanke had been present at all the FOMC meetings between 2002 and March 2005, he did not participate in the extensive discussion of the implications of the sharp rise in housing prices that took place at the June 2005 meeting.

When Alan Greenspan's 19 years as Fed Chairman was scheduled to end in early 2006, President Bush nominated Bernanke to replace him as Chair. Bernanke took office in February 2006 and served throughout the financial crisis and Great Recession until January 2014 when he was replaced by the Vice-Chair of the Board, Janet Yellen.

Bernanke, along with Greenspan, was a pivotal member of the Board of Governors and FOMC during the period of sharply rising house prices. In 1999, while at Princeton, he co-authored with Mark Gertler at New York University an article entitled *Monetary Policy and Asset Price Volatility* in which they examine the role that asset prices should play in the formulation of monetary policy. Specifically, the authors address whether policymakers should be concerned about asset price fluctuations, in what ways asset price fluctuations affect the overall economy, and whether monetary policy should respond to asset price volatility, and if so, how. Their discussion is in the context of a "flexible inflation targeting regime" which they support as a means to achieve the goals of price stability and financial stability. In such a regime a central bank would decide on a specific level of long run inflation to achieve, e.g. 2% each year, and have the flexibility in the short run to pursue other objectives such as output and employment stabilization should economic circumstances warrant. Monetary policy would be tightened actively, and even pre-emptively, to reduce inflationary pressures in order to achieve the target rate, but not used specifically to respond to changes in asset prices unless the changes are expected to affect the central bank's forecast of inflation. Bernanke and Gertler, however, go on to pose the issue as follows.

Should fluctuations in asset prices be of concern to policymakers? In the economist's usual benchmark case, a world of efficient capital markets and without regulatory distortions, movements in asset prices simply reflect changes in underlying economic fundamentals. Under these circumstances, central bankers would have no reason to concern themselves with asset

price volatility per se. Asset prices would be of interest only to the extent that they provide useful information about the state of the economy.

Matters change, however, if two conditions are met. The first is that “non-fundamental” factors sometime underlie asset market volatility. The second is that changes in asset prices unrelated to fundamental factors have potentially significant impacts on the rest of the economy. If these two conditions are satisfied, then asset price volatility becomes, to some degree, an independent source of economic instability, of which policymakers should take account.

...For our purposes here, the main advantage of flexible inflation targeting is that it provides a unified framework both for making monetary policy in normal times, and for preventing and ameliorating the effects of financial crises. In particular, a key advantage of the inflation-targeting framework is that it induces policy-makers to automatically adjust interest rates in a stabilizing direction in the face of asset price instability or other financial disturbances. The logic is straightforward; since asset price increases stimulate aggregate demand and asset price declines reduce it, the strong focus of inflation targeters on stabilizing aggregate demand will result in “leaning against the wind” - raising interest rates as asset prices rise and reducing them when they fall.

Bernanke and Gertler define non-fundamental fluctuations as arising from two factors: financial reforms that dramatically increase access by households and firms to credit markets, and irrational behavior by investors, i.e. a herd mentality originating with excessive optimism. The question for the FOMC participants in June 2005 was whether the “very high level” of housing prices met one or both of these conditions. Were “non-fundamental” factors such as a significant increase in access to mortgage financing underlying the rise in housing prices, and could the rise in housing prices significantly impact the rest of the economy? If both of these conditions were met, then Bernanke and Gertler’s conclusion would suggest that Greenspan and other Fed policymakers should consider these price rises as an independent source of economic instability and take them into account in formulating monetary policy.

THE PRE-CRISIS HOUSING MARKET

While real house prices in the U.S. rose by only 3.7% between 1985 and 1995, they increased by 46% between 1995 and 2005. Real rents, however, remained steady during the run-up in house prices and by 2006 the house price-rent ratio peaked at approximately 40% above its level in 2000 indicating an overvaluation in the housing market (Sommer et. al, p. 1). Moreover, over the 1995-2005 period, the real interest rate and minimum down payment required to buy a house reached historically low levels. Alternative mortgage products, such as adjustable-rate mortgages tied to short-term interest rates, became increasingly available and popular. Sommer et. al. have estimated that market fundamental factors such as rising incomes, low interest rates, and weak down payment requirements can explain only about half of the increase in U.S. house prices over the 1995-2005 period. In general, as incomes rise across wage groups, as mortgage interest rates fall, assisted by adjustable rate loans, and as creditors weaken down payment requirements, homeownership becomes more affordable. The demand for housing rises as new homeowners enter the market, many with limited funds for down payments, while existing homeowners seek larger homes. Given a relatively fixed supply of housing, housing prices rise (Sommer et. al., pp. 2-3).

As a result of the move from renting to homeownership and the rise in the demand for larger homes, household debt in the U.S. rose relative to household income. According to data compiled by the Federal Reserve Board, over the 1995-2005 period, household debt service on mortgage payments, i.e. the ratio of household debt service payments on mortgages as a percentage of disposable personal income, rose faster than household debt service payments on consumer debt, increasing from 5.64 in 1995 to 6.47 in 2005. Both household debt service payments on mortgages and total household debt service payments shown in Exhibit 2 peaked in 2007 at 7.20 and 13.18 respectively. Households with high debt levels relative to income have a higher probability of default when faced with a job loss or debilitating illness. Thus, as unemployment rises, lenders may respond to the potential for rising default rates by curtailing the availability of credit which results in a decline in the level of spending on goods and services in the economy (Dynan, Johnson & Pence, 2003, p. 417). The economy then falls into a recession.

Exhibit 2: Household Debt Service

(Selected years, fourth quarter date, seasonally adjusted)

Year	Total	Mortgage	Consumer
1995	11.25	5.64	5.61
2000	12.09	5.73	6.36
2005	12.59	6.47	6.11
2007	13.18	7.20	5.98
2013	9.96	4.82	5.19

Source: Federal Reserve Board

WHAT WERE THEY SAYING?

A reading of the post-FOMC meeting announcements and many of the speeches given over the pre-crisis period by FOMC participants provides a window into the evolution of their thinking on the economy, the impact of changes in asset prices, the innovation in mortgage financing, the buildup of excessive risk-taking in the financial system, and the appropriate policy response. The FOMC statement from the committee's May 6, 2003 meeting expressed the concern that inflation might fall too low. A portion of the statement reads:

... the Committee perceives that over the next few quarters the upside and downside risks to the attainment of sustainable growth are roughly equal. In contrast, over the same period, the probability of an unwelcome substantial fall in inflation, though minor, exceeds that of a pickup in inflation from its already low level. The Committee believes that, taken together, the balance of risks to achieving its goals is weighted toward weakness over the foreseeable future.

This could partially explain the committee's decision at their next meeting on June 25, 2003 to lower the federal funds rate to 1% and maintain the rate at that low level over the next four quarters.

In a September 4, 2003, New York City speech to the Bloomberg Panel for the Outlook on the U.S. Economy, Ben Bernanke discussed inflation and its implication for monetary policy. He said:

The FOMC has made clear in its new statement, as introduced after the May 6 meeting, that it has an acceptable range for inflation, consistent with its mandate for maintaining price stability. The current policy of ease results from concerns that inflation will fall below that acceptable range.

In a November 6, 2003 speech on the jobless recovery from the 2001 recession at the Global Economic and Investment Outlook Conference at Carnegie Mellon University, Bernanke provided a broader perspective on prevailing economic conditions vis-a-vis the path of monetary policy:

Of course, the Fed's policies must also be consistent with ensuring price stability --the other half of the dual mandate. As I noted in earlier talks, I believe that the current low level of inflation, the expansion of aggregate supply by means of ongoing productivity growth, and the high degree of slack in resource utilization together leave considerable scope for a continuation of the currently accommodative monetary policy without undue risk to price stability.

In an October 19, 2004 speech on the mortgage market and consumer debt at the America's Community Bankers Annual Convention in Washington D.C., Fed Chairman Alan Greenspan acknowledged the "especially steep" rise in the ratio of household debt to disposable income over the prior five years, the "precipitous" decline in the household saving rate, and the "exceptional" run-up in home prices. He goes on, however, to downplay these concerns and make the case that only a "significant" or "historically most unusual" fall in home prices, which he believed at the time was not likely, would push household debt to unsustainable levels. He states:

Housing price bubbles presuppose an ability of market participants to trade properties as they speculate about the future. But upon sale of a house, homeowners must move and live elsewhere. This necessity, as well as large transaction costs, are significant impediments to speculative trading and an important restraint on the development of price bubbles.

Some of the rise in the ratios of household debt to income may not be evidence of stress. The dramatic increase during the past decade in home purchases by previous renters has expanded both the assets (that is, owned homes) and the liabilities (mortgages) of the total household sector without significantly affecting either overall household income or net worth.

In addition, improvements in lending practices driven by information technology have enabled lenders to reach out to households with previously unrecognized borrowing capacities. This extension of lending has increased overall household debt but has probably not meaningfully increased the number of households with already overextended debt. Finally, the pronounced rise in home equity loans, which have been a growing share of home mortgage debt since 1994, likely reflects the recent marked increase in home equity, the consequence of rapidly rising house prices.

To be sure, some households are stretched to their limits. The persistently elevated bankruptcy rate remains a concern, as it indicates pockets of distress in the household sector. But the vast majority appear able to calibrate their borrowing and spending to minimize financial difficulties. Thus, short of a significant fall in overall household income or in home prices, debt servicing is unlikely to become destabilizing.

These concerns cannot be readily dismissed. Debt leverage of all types is often troublesome when one judges the stability of the economy. Should home prices fall, we would have reason to be concerned about mortgage debt; but measures of household financial stress do not, at least to date, appear overly worrisome.

And here, Greenspan is perhaps his most exuberant when it comes to the strength and resilience of the U.S. economy:

...Even though some down payments are borrowed, it would take a large, and historically most unusual, fall in home prices to wipe out a significant part of home equity.

...Overall, while local economies may experience significant speculative price imbalances, a national severe price distortion seems most unlikely in the United States, given its size and diversity.

On April 14, 2005, Bernanke gave a speech on the global savings glut, the U.S. current account deficit and interest rates at the Homer Jones Lecture in St. Louis Missouri. In the speech Bernanke took a global perspective on the deficit and interest rates that focused on events outside the United States. Specifically, he argued that a number of developments contributed to a “global savings glut” that led to both the increase in the U.S. current account deficit and the relatively low level of long-term real interest rates in the world. These developments include high savings rates among countries with aging populations, the rise in oil prices and revenues among oil exporting countries, and financial crises in East Asia and Latin America in the 1990’s that led to rapid capital outflows by investors and the subsequent build-up of foreign currency reserves within these countries as a buffer against further crises. With U.S. productivity rising and the perceived rate of return on U.S. assets rising, much of this funding was channeled into the U.S.’s deep and sophisticated financial markets. The attractiveness of U.S. Treasury securities and other assets led to an appreciation of the dollar and a rise in U.S. equity prices. Bernanke states:

From the trade perspective, higher stock-market wealth increased the willingness of U.S. consumers to spend on goods and services, including large quantities of imports, while the strong dollar made U.S. imports cheap (in terms of dollars) and exports expensive (in terms of foreign currencies), creating a rising trade imbalance. From the saving-investment perspective, the U.S. current account deficit rose as capital investment increased (spurred by perceived profit opportunities) at the same time that the rapid increase in household wealth and expectations of future income gains reduced U.S. residents' perceived need to save. Thus the rapid increase in the U.S. current account deficit between 1996 and 2000 was fueled to a significant extent both by increased global saving and the greater interest on the part of foreigners in investing in the United States.

Referring to the period after the 2001 recession, Bernanke goes on to say that it was low real interest rates rather than rising stock values that kept the U.S. savings rate low, with profound consequences for the housing market.

In particular, during the past few years, the key asset-price effects of the global saving glut appear to have occurred in the market for residential investment, as low mortgage rates have supported record levels of home construction and strong gains in housing prices. Indeed, increases in home values, together with a stock-market recovery that began in 2003, have recently returned the wealth-to-income ratio of U.S. households to 5.4, not far from its peak value of 6.2 in 1999 and above its long-run (1960-2003) average of 4.8. The expansion of U.S. housing wealth, much of it easily accessible to households through cash-out refinancing and home equity lines of credit, has kept the U.S. national saving rate low--and indeed, together with the significant worsening of the federal budget outlook, helped to drive it lower.

Months later, in an October 19, 2005 review of the outlook for the U.S. economy, Fed Governor Donald Kohn summarized the considerable uncertainties and risks facing the economy going forward. While commenting on Hurricane Katrina related disruptions and rising oil prices,

Kohn seems to be reflecting the increasing concern expressed by FOMC participants at their June 29-30, 2005 meeting regarding the steep rise in housing prices. He states:

Another source of uncertainty is the housing market. It is possible that the rapid increases in house prices could simply be a reflection of fundamental forces such as an increase in land use restrictions and other legal restraints on building, innovations in mortgage finance, changes in tax laws and low interest rates. But it could also be the case that much of the very rapid increase in prices very recently has been based on the expectation that the pace of past increases will extend into the future. Or perhaps the increases also have been fueled by eased lending standards that could well be tightened in response to slower price appreciation. ...Economists, including those at central banks, simply are not very good at understanding, much less predicting, the dynamics of asset price adjustments; and I would guess that our ignorance is especially profound when those dynamics may be in the process of shifting.

It appears that FOMC participants over the 2001-05 period were mindful of the factors affecting economic conditions prevailing at the time: the monetary policy accommodation, the low cost of borrowing, the decline in household savings rates, the steep rise in house and equity prices, the rise in household disposable income and net worth, the steep rise in household debt to income, the global forces pushing U.S. interest rates lower, and the financial innovation in the residential mortgage market that led to weaker lending standards and shifted households into riskier types of mortgages. Yet, two concerns appear to have been uppermost in the minds of FOMC participants. One was the fear that deflation could drive the country into a Japanese style “lost decade” and the other was the concern that tighter monetary policy to address rising house prices could send the entire economy into a recessionary spiral.

MONETARY POLICY AND THE HOUSING BUBBLE

Looking back at the financial crisis, Bernanke gave a speech at the annual meeting of the American Economic Association in Atlanta, Georgia on January 3, 2010 in which he attempts to outline the lessons of the housing crisis for monetary policy looking forward. He discusses the role played by the increasing use of alternative types of variable-rate mortgages, including interest-only adjustable rate mortgages (ARM's), long-amortization ARM's, negative amortization ARM's in which the initial payment does not cover interest costs, and pay-option ARM's which give the borrower flexibility in choosing the size of monthly payments in the early stages of the contract. These mortgages, tied to low short-term policy rates, enabled borrowers to reduce initial monthly payments. Bernanke states:

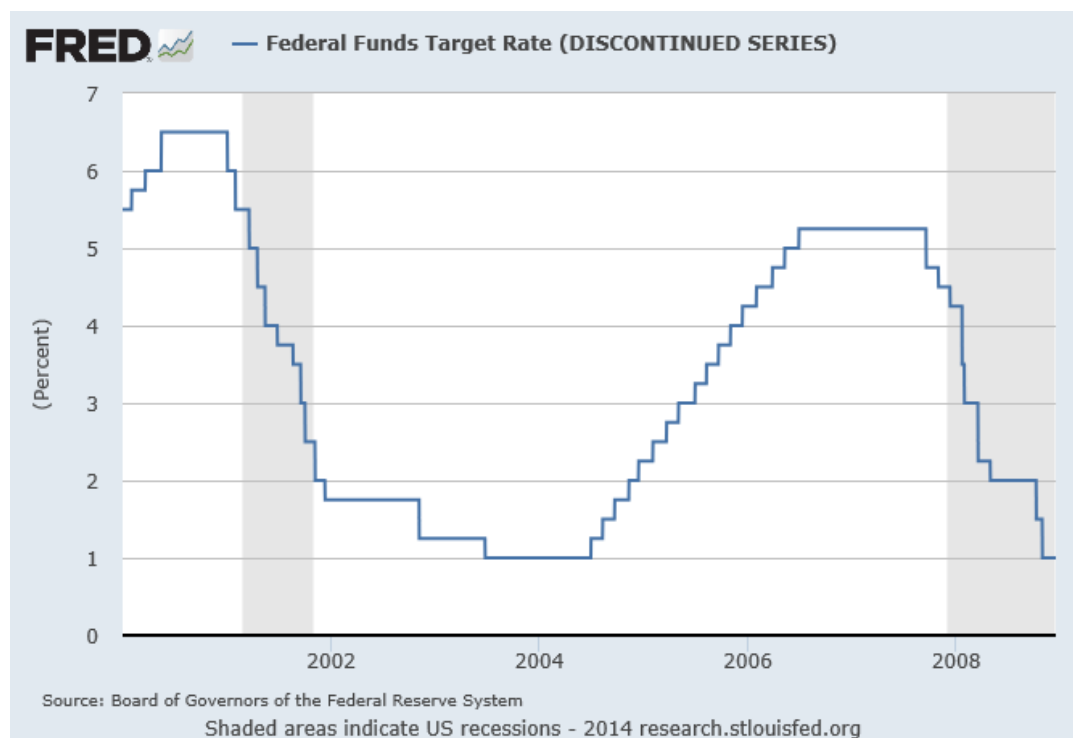
The availability of these alternative mortgage products proved to be quite important and, as many have recognized, is likely a key explanation of the housing bubble. ...the use of these nonstandard features increased rapidly from early in the decade through 2005 or 2006. ...was further exacerbated by practices such as the use of no-documentation loans. The picture that emerges is consistent with many accounts of the period: At some point, both lenders and borrowers became convinced that house prices would only go up. Borrowers chose, and were extended, mortgages that they could not be expected to service in the longer term. They were provided these loans on the expectation that accumulating home equity would soon allow refinancing into more sustainable mortgages. For a time, rising house prices became a self-fulfilling prophecy, but ultimately, further appreciation could not be sustained and house prices collapsed.

He goes on to state:

Some observers have assigned monetary policy a central role in the crisis. Specifically, they claim that excessively easy monetary policy by the Federal Reserve in the first half of the decade helped cause a bubble in house prices in the United States, a bubble whose inevitable collapse proved a major source of the financial and economic stresses of the past two years. Proponents of this view typically argue for a substantially greater role for monetary policy in preventing and controlling bubbles in the prices of housing and other assets. In contrast, others have taken the position that policy was appropriate for the macroeconomic conditions that prevailed, and that it was neither a principal cause of the housing bubble nor the right tool for controlling the increase in house prices.

In an attempt to resolve this dilemma, Bernanke reviews the economic conditions existing during the critical 2001-6 period: the recession between March and November 2001, the terrorist attacks of September 11, 2001, the corporate scandals of 2002, and the invasion of Iraq in March 2003. For Bernanke, all of these events created a level of economic uncertainty that was evident in the path of the federal funds rate over the period. The target was lowered rapidly in response to the economic slowdown that preceded the 2001 recession, from 6.5 percent in late 2000 to 1.75% in December 2001 and to 1 percent in June 2003. The target rate remained at that level for a year when in June 2004 the FOMC began raising the rate in measured fashion, by 25 basis point increments at each meeting and reaching 5.25 percent in June 2006 (Figure 2).

Figure 2: Federal Reserve Fed Funds Target Rate (2000-2009)



On an inflation adjusted basis, however, the real federal funds rate was slightly negative over the 2001-05 period, an aggressive policy stance. In addition, FOMC statements beginning

in August 2003 provided forward policy guidance indicating that policy was likely to remain accommodative for a "considerable period." Bernanke goes on to say that:

The aggressive monetary policy response in 2002 and 2003 was motivated by two principal factors. First, although the recession technically ended in late 2001, the recovery remained quite weak and "jobless" into the latter part of 2003. Real gross domestic product (GDP), which normally grows above trend in the early stages of an economic expansion, rose at an average pace just above 2 percent in 2002 and the first half of 2003, a rate insufficient to halt continued increases in the unemployment rate, which peaked above 6 percent in the first half of 2003.³ Second, the FOMC's policy response also reflected concerns about a possible unwelcome decline in inflation. Taking note of the painful experience of Japan, policymakers worried that the United States might sink into deflation and that, as one consequence, the FOMC's target interest rate might hit its zero lower bound, limiting the scope for further monetary accommodation. FOMC decisions during this period were informed by a strong consensus among researchers that, when faced with the risk of hitting the zero lower bound, policymakers should lower rates preemptively, thereby reducing the probability of ultimately being constrained by the lower bound on the policy interest rate.

This still leaves the question of whether monetary policy was easier than necessary and what, if anything, monetary policy or regulatory action could have done to retard the rise in house prices and the buildup of financial risk during the period.

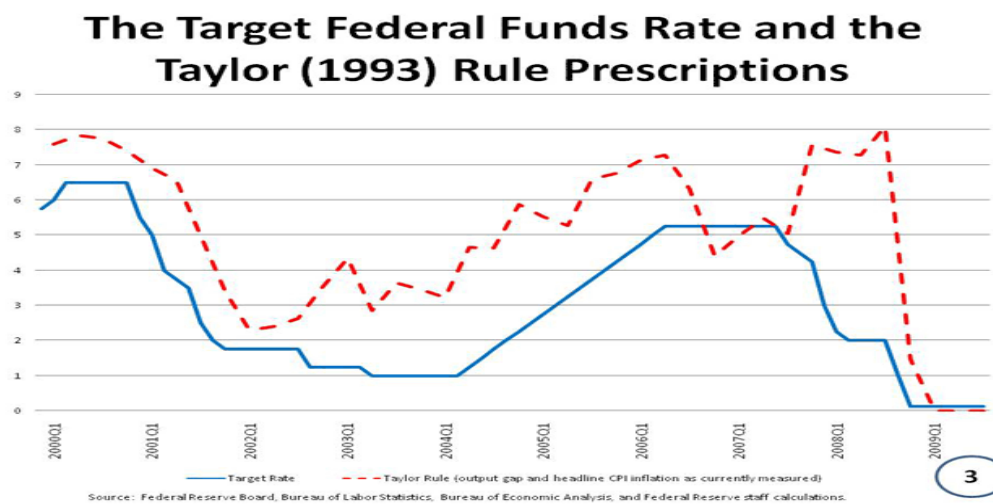
IS THERE A ROLE FOR MONETARY POLICY IN RESPONDING TO ASSET BUBBLES?

One approach used by economists and policymakers is to compare Federal Reserve monetary policy during the 2001-6 period to the recommendations derived from the rule originally developed by John Taylor of Stanford University in 1993. The Taylor rule proposes that the target policy rate, i.e. the federal funds rate be set relative to two factors: the percentage deviation of the current inflation rate from policymakers' longer-term inflation goal, and the percentage difference between current output (real GDP) and the potential level of output. Thus, if inflation is above target or if output is above potential, the rule specifies that interest rates should rise.

The general form of the Taylor rule is: $i = r + \pi + a(\pi - \pi^*) + b(y - y^*)$; where i = the nominal policy rate, r = the long-run real federal funds rate which Taylor estimated to be about 2%, π = the current inflation rate, π^* = the target inflation rate which the Fed has set equal to 2%, y = current real GDP, y^* = potential GDP, and a and b = response coefficients originally estimated by Taylor in 1993 to be equal to 0.5. (Note: in 1999 Taylor specified the output gap coefficient as 1.) If output were to rise 1% relative to its potential, then the rule tells policymakers that, ceteris paribus, the policy rate should rise by 0.5 %, or 50 basis points (Bernanke, 2010).

Figure 3 shows the values of the federal funds rate implied by the Taylor rule against the actual path of the federal funds rate target over the 2000-9 period. The comparison suggests that monetary policy was too easy during the 2002-6 period, with the actual federal funds rate about 200 basis points, on average, below the values implied by the Taylor rule.

Figure 3

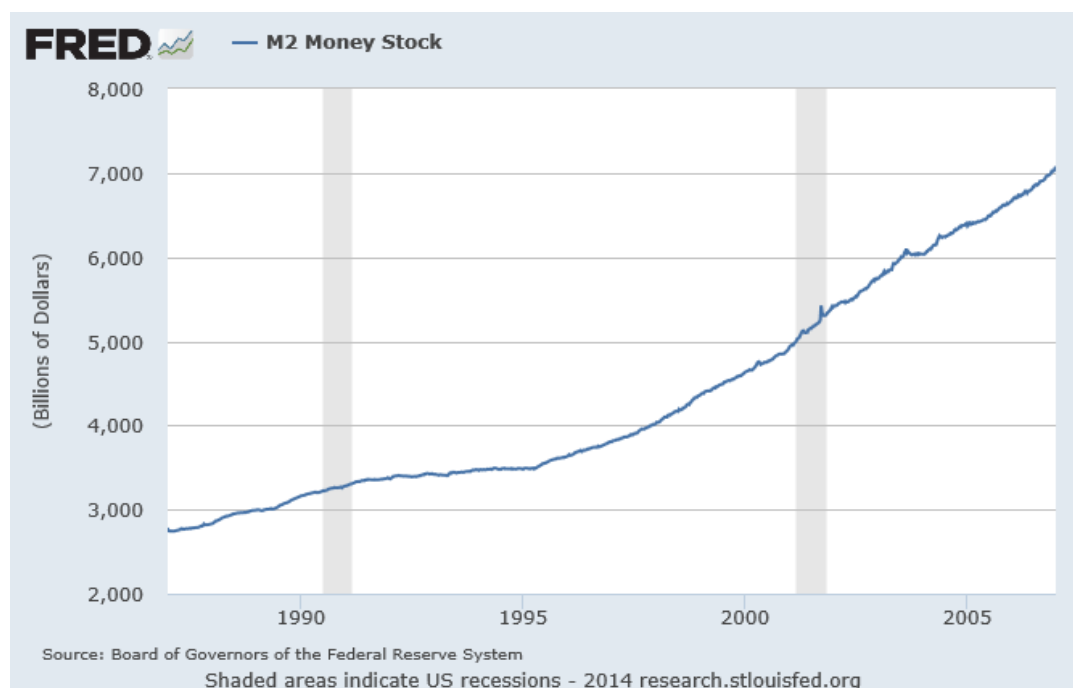


Moreover, Taylor and other critics of monetary policy during this period cite the rise in the money supply over Greenspan's tenure as Fed Chairman shown in Figure 4, in addition to his low interest rates, as contributing to bubble type investments.

The view that monetary policy was too loose gained acceptance over time in some academic and policy circles. For example, Robert J. Gordon, the Stanley G. Harris Professor of Economics at Northwestern University, writes that it is widely acknowledged that the Fed maintained short term interest rates too low for too long in 2003-04. He and others believe that the use of a Taylor Rule type function would predict substantially higher short-term interest rates during this period than actually occurred. Thus, given the large cumulative increase in house prices over the 2001-06 period and the path of the actual federal funds rate target over the same period, Gordon concludes that, indirectly, the Fed's interest rate policies contributed to the housing bubble (Gordon, 2009, p.6).

This conclusion would seem to favor a more activist approach to monetary policy. According to this view, central bankers should tighten monetary policy when they detect the formation of an asset bubble, in the hope of limiting its size and the consequences of its deflation. This was the approach taken by the FOMC during the two previous U.S. housing bubbles, 1976-79 and 1986-89, as shown in Figure 5. The resulting price declines were not as precipitous as the decline after the 2006 peak in prices, thus moderating the downward impact on overall economic activity.

Figure 4: M2 Money Stock (1988-2006)



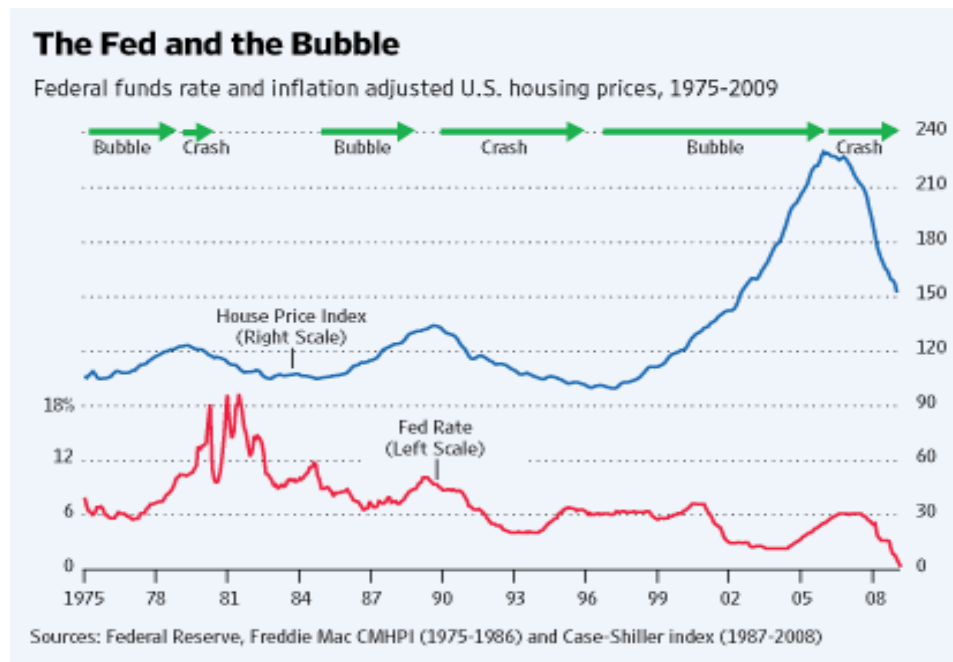
In an April 6, 2009 *Wall Street Journal* article entitled “From Bubble to Depression”, Steven Gjerstad and Vernon L. Smith support the conclusion that monetary policy over the 2001-05 period contributed, at least partially, to the housing bubble. They write:

During the 1976-79 and 1986-89 housing price bubbles, the effective federal-funds interest rate was rising while housing prices rose: The Federal Reserve, “leaning against the wind,” helped mitigate the bubbles. In January 2001, however, after four years with average inflation-adjusted house price increases of 7.2% per year (about 6% above trend for the past 80 years), the Fed started to decrease the fed-funds rate. By December 2001, the rate had been reduced to its lowest level since 1962. In 2002 the average fed-funds rate was lower than in any year since the 1958 recession. In 2003 and 2004 the average fed-funds rates were lower than in any year since 1955 when the rate series began.

By the time the Federal Reserve began to slowly raise the fed-funds rate in May 2004, the Case-Shiller 20-city composite index had increased 15.4% during the previous 12 months. Yet the housing portion of the CPI for those same 12 months rose only 2.4%.

The activist view, however, is not universal. According to Kohn, conventional central bank strategy with regard to asset price movements, whether they arise from fundamental factors or not, is to do nothing unless policymakers believe that the price movements will affect future inflation and output. That is, the central bank does not use monetary policy to influence the speculative component of asset prices, on the assumption that it has little ability to do so and that any attempt will only result in higher unemployment and lower inflation in the medium run (Kohn, 2008).

Figure 5



THE FED'S DILEMMA

Would the high leverage borrowing and global financial interconnectedness inflict such great pain in the next global financial crisis that the activist approach would have been worth attempting? Should Greenspan's Fed have taken a more activist approach to monetary policy in order to subdue the sharp rise in house prices? Should Greenspan have moved beyond his free-market ideology and Bernanke beyond his conservative principles to advocate for a more rigorous approach to regulatory and supervisory oversight to deal with the excessive risks taken by financial institutions and households? To take action or not, this was the Fed's dilemma in the face of steeply rising asset prices, so soon after the bursting of the dot com bubble, that could sink the U.S. economy and take the global economy down with it.

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THE MOGADOR TRUST: APPLYING INVESTMENT CONCEPTS TO PRIVATE FOUNDATIONS

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This case examines decision making within a private trust. Many of the issues for this small trust are immediately applicable to larger trusts, as well as local and state pension funds. Taking the perspective of finance expert Paula Douglas, students must address asset allocation and the selection of investment managers. Critically, decisions must be made in a realistic environment, where the investment management team has real biases, and limited investment knowledge. In their role as Paula, students will need to navigate political and ethical obstacles.

In early January of 2014, Paula Douglas walked into the private dining room at the Calusa Pines Golf Club near Naples, Florida; Frank Sides rose to greet her. Paula had met Frank six months prior at a fund-raising luncheon at the university where Paula taught finance. Frank was very impressed by Paula's education (a PhD in finance from Wharton) and prior work experience (eight years with Goldman-Sachs). Frank had built the investment committee for his family foundation and thought a finance professor would offer a valuable complement to the other members.

Frank introduced the current committee members. Edmund Baker was a retired banker Frank had known for five years; Ivor Campbell was an elder at the church Frank attended---after a career in real estate, Ivor now managed his personal portfolio; Fred, Frank's brother, had retired from a career in insurance and was now becoming interested in investing. Fred and Ivor lived in Colorado but had Florida condos on nearby Marco Island. This would be the first meeting of the new five person (including Paula) investment committee. The committee's role was to be advisory to the trustees; the two brothers maintained their status as the only Trustees.

PRIVATE FOUNDATIONS

In the U.S., private foundations are a significant part of the nonprofit sector. Their income is essentially tax free, but they must spend five percent of their assets in grants to other nonprofits each year. The five percent is generally computed based on average investment assets held during the previous calendar year. Private foundations generally do not operate their own charitable activities but rather support such endeavors financially. This type of private funding has served as the catalyst behind programs such as the 911 emergency response system and public broadcasting.

Like many private foundations associated with high-net-worth individuals, the Mogador Trust had a significant position in "founder's stock," a concentrated equity position in a large publicly-traded company contributed by a major donor. By some estimates, donor stock represents over 30% of the equity allocations at large foundations. By reducing overall diversification, founder's stock often significantly increases portfolio risk.

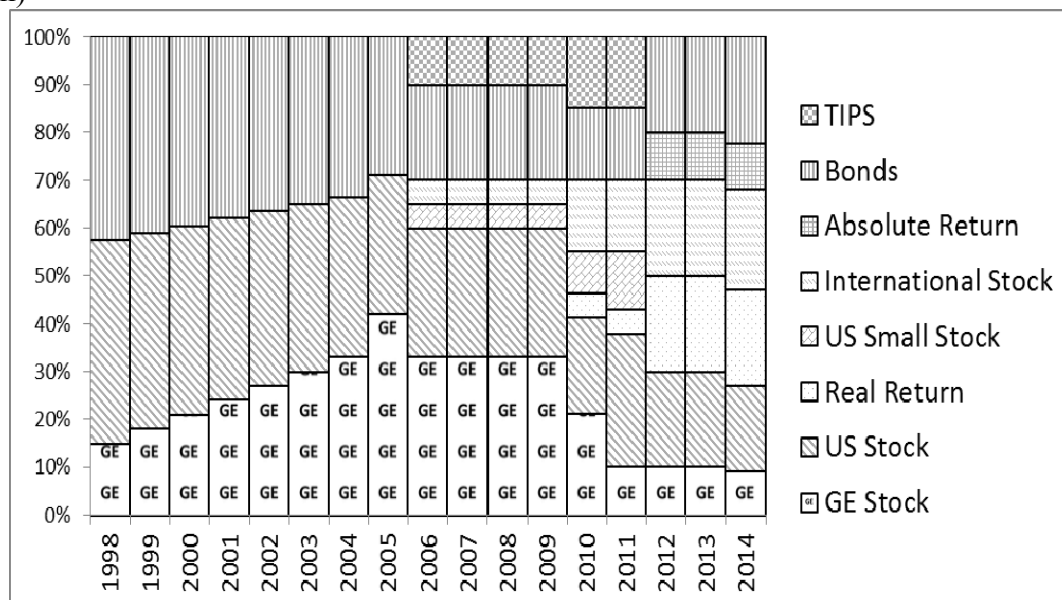
MOGADOR TRUST--HISTORY

The Mogador Trust had its beginnings in another nonprofit, the Sides Foundation, started by Frank and Fred's father, David Sides. David, a professor and inventor, funded the Sides Foundation with royalties from his patents. The Sides Foundation was a small-scale operation until David Sides' death in early 2002 when most of his personal portfolio was bequeathed to the Foundation. This portfolio included a significant allocation to General Electric (GE) stock that David Sides had received when his company was acquired by GE. He held onto his GE shares because he was wary of the possible tax consequences of selling what was a very low-basis stock.

Professor Sides had three children, Frank, Fred, and Chloe. In his will Professor Sides named all three children as Trustees of the Sides Foundation. Initially, the Trustees relied on a local bank's trust officer to handle the investments. After Professor Sides' death in 2002, the Foundation's portfolio consisted of—in almost equal parts—large cap U.S. equity, investment grade bonds, and General Electric stock. The asset allocation policy—specified in a brief letter to the bank—was to split the portfolio between stocks and bonds in a 50:50 mix. This asset allocation policy ignored the GE allocation. In 2006, the Trustees began addressing the need for diversification in two ways—by adding additional asset classes and by reconsidering the GE stock position. After much debate, the Trustees agreed to establish toehold positions in three new asset classes or subclasses—Treasury Inflation-Protected Securities (TIPS), small cap stocks, and international stocks. Discussion about the GE stock continued without much resolution. The overall allocation was to be a 70/30 stock/bond mix. This time, the equity allocation included the GE stock.

Trustee comfort with the additional asset classes increased over the following years. They were aided, no doubt, by attractive relative returns for international equity, small-cap U.S. equity, and TIPS. After protracted discussion, the Trustees were, in 2009, able to agree to a partial solution to the problem of the large founder's stock allocation—using covered calls to ultimately reduce the position to no more than 10% of the portfolio. They also added a toehold allocation to real estate. They counted real estate as a stock allocation but the overall target allocation remained a 70/30 stock/bond mix. The historical asset allocation for the Trust is depicted in figure 1.

Figure 1: Mogador Trust: Historical Asset Allocation (prior to 2012, allocation is for the Sides Foundation)



Disappointed with the performance of the bank trust officer managing their portfolio, the Trustees switched, in 2009, to a manager-of-managers approach. They engaged an “investment consultant” from the local office of a national brokerage firm to select “best of breed” managers for each of the asset classes. This investment consultant was a squash buddy of Chloe Sides’ husband, who was becoming highly interested in the management of the portfolio.

The national brokerage firm employed by the Sides Foundation restructured in 2012. During the transition, portfolio performance data was hard to obtain and the Trust’s “investment consultant” left the firm to start his own company. When Frank and Fred Sides finally obtained reliable performance data from the national brokerage firm, they learned the Foundation had underperformed its benchmark by an average of four percent a year over the previous three years. To put that performance in context, they left the bank trust manager for underperforming by one percent per year.

While the three trustees agreed that the national brokerage firm should be “fired,” they were unable to find common ground in terms of who should be retained to manage the Foundation’s assets. For example, Chloe Sides’ husband strongly advocated using his squash buddy, who had established a new investment firm. Frank and Fred found this untenable. They believed this manager was at least partly responsible for the Trust’s poor performance during the prior three years. In addition, they were uneasy about their brother-in-law’s increasing involvement in the Trust’s portfolio management. While on a joint vacation with their spouses in Morocco, the three Sides siblings settled on a solution. The two brothers would establish a new nonprofit which would receive two-thirds of the assets of the Sides Foundation. Chloe and her husband would become the trustees of the original Sides Foundation and could invest as they wished. Because they arrived at the idea at dinner in Essaouira, Morocco, they called this approach “the Mogador plan.” Although Chloe instantly accepted the proposal, the legal arrangements took some time. Through repeated use of the phrase “Mogador plan” with the lawyers, when it came time to name their new nonprofit, “The Mogador Trust” seemed a natural choice. Legal arrangements were finalized at the end of December 2012 when The Mogador

Trust was funded with \$12 million.

The legal documents creating the Mogador Trust included a number of new spending agreements. For example, ninety percent of the required five percent annual payout was to be spent on education—including scholarships in science and business at the Florida university where Paula Douglas taught. Each Trustee (Frank and Fred) could also spend five percent of the required payout (approximately \$2,500 per million of trust assets) on personal causes without having to consult with one another.

THE CURRENT PORTFOLIO

After joining the Mogador Trust investment committee, Paula Douglas discovered that the asset allocation, Investment Policy Statement, and asset manager choices had all been made by another finance professor, previously hired as a consultant for the Trust. Unfortunately, this professor lost interest in working for the trust before completing the work. The approach taken was a broadly diversified one, but some previous categories (small stocks and TIPS) were subsumed into others. Despite all the materials being labeled “DRAFT,” Frank and Fred had adopted the investment program and purchased the mutual funds on 31 December 2012. Unfortunately, during the past year no one had been monitoring the portfolio. As a result, all of the income and capital gains distributions from the Trust’s investments had been accumulating in the cash account. The investment committee was formed to remedy the situation. The draft Statement of Investment Philosophy and Investment Policy Statement can be found in appendix 1; the current portfolio is outlined in appendix 2.

GOVERNANCE—FIRST INVESTMENT COMMITTEE MEETING

As their first investment committee meeting got started, Paula learned about the committee members’ different points of view. The two brothers, Frank and Fred Sides, were committed to the current asset allocation but seemed a little unsure of the rationale behind some of the asset classes and investments. After their experience with the national brokerage firm, they disliked the idea of ever returning to a single manager for the entire portfolio. However, rather than being focused on investment details, they were most interested in preserving the family patrimony. Ivor Campbell liked the degree of diversification in the portfolio, disliked index funds (“guaranteed mediocrity”), thought there were too many managers and firmly believed in growth stocks (“value has had a good run since 2010—it’s time to switch to growth”). Edmund Baker complained about the asset allocation—“There’s too much crazy stuff in this portfolio—in my day, you just invested 60% in stocks and 40% in bonds.” He was firmly convinced that active management was a losing proposition. Baker would begrudgingly acknowledge that a small allocation (“5 percent at most”) to international stocks made sense.

After the wide-ranging discussion that revealed these preferences, Frank Sides spoke: “We have an immediate and a longer-term problem to solve. First, we need to raise the level of cash to \$600,000 so we can make our grant payments by March. Second, we need to review the portfolio and build a long-term investment program.”

APPENDIX 1:**STATEMENT OF INVESTMENT PHILOSOPHY (Draft: July 2012)**

1. The underlying goal of the Investment Policy is to preserve the assets necessary to provide cash flows or otherwise meet the goals supported by The Mogador Trust. The secondary goal is to provide cash flows that grow faster than inflation.

2. Time is the great lever in investing, and since the portfolio is invested for perpetuity, investment policy should be geared toward long-term results.

3. Historically, stocks have produced the highest total returns and, consequently, have been the best inflation hedge. Historically, bonds have provided higher current income, reduced portfolio volatility, and provided incremental growth. More recently, best foundation investment practice has included alternative assets as diversifiers. We assume this will continue in the long term.

4. Invest in the highest ratio of stocks and high-return alternative investments to bonds consistent with return objectives, spending policy, and risk tolerance.

5. Diversification across liquid asset classes will be fundamental to the Trust's Investment Policy.

6. We should take advantage of the strength of a small Investment Committee. Delegate to portfolio managers with strong records and (notionally) commit to them for 3-5 years. If not indexing, expect benchmark-beating returns. Seek the lowest fees consistent with high-quality portfolio management.

7. This philosophy will require constant discipline and tolerance of interim market fluctuations.

INVESTMENT POLICY STATEMENT (Draft: July 2012)**Purpose**

The purpose of this Investment Policy is to assist the Trustees in effectively supervising, monitoring, and evaluating the investment of the Trust's portfolio. This Investment Policy follows the principles outlined in the Trustees' Investment Philosophy.

To articulate an effective Investment Policy, an organization must understand the relationship between its investment funds and operating activities. The Trust's investment funds are central to the current operations of the Trust. Long term, these investment funds enhance the operational stability of the Trust.

The Trustees seek to balance current needs and opportunities with those of the future—to preserve intergenerational fairness in managing perpetual and long-horizon endowments.

Statement of Objectives

The underlying goal of the Investment Policy is to preserve the assets necessary to provide cash flows or otherwise meet the goals supported by The Mogador Trust. The secondary goal is to provide cash flows that grow 5 percent faster than inflation as measured over rolling 5-year periods. The Trustees understand that this policy will require constant discipline and

tolerance of interim market fluctuations. Total return is emphasized over income.

Guidelines and Investment Policy

Time Horizon: The Trust's portfolio is managed with a perpetual investment horizon.

Spending Policy: This Investment Policy Statement covers investment funds; operating and liquidity funds are segregated from investment funds. Annually, the Trustees authorize transfers from the investment funds to the operating funds. In doing so, the Trustees must consider the effect of the transfer upon the continuing viability of the funds; because of reinvestment, a lower spending rate in the short-term leads to higher after-inflation payouts in the long-term. The Trust will spend only the statutory 5 percent required of U.S. private foundations.

Risk Tolerance: The Trustees broadly characterize risk tolerance in terms of failure to meet the Investment Policy objectives. The Trustees view tolerance for investment-loss risk as moderate. Given the long investment horizon, the Trust will invest at the highest ratio of stocks to bonds possible, consistent with return objectives, spending policy, prudent diversification (subject to donor constraints) and risk tolerance. For given risk levels, the Trustees seek the highest return.

Performance Expectations: The Trust is adopting a multi-manager approach where the Trustees, with input from non-Trustee Investment Committee members, select managers. The multi-manager approach is in contrast to our prior manager-of-managers approach where a single outside manager was responsible for selecting and monitoring specialty managers. For non-indexed funds, the Trustees expect benchmark-beating returns as measured over 3-5 year horizons at risk levels comparable to the evaluation benchmark. There are no specific tracking error constraints. The Trustees seek the lowest fees commensurate with performance.

Asset Allocation Policy, Constraints & Rebalancing: The asset classes considered for the funds reflect the Trustees' overall investment philosophy, risk tolerance, and oversight capabilities. Additionally, we provide the following rationale:

Asset Class	Rationale for Holding
Domestic Equity	Enhanced inflation-adjusted returns
GE Common	Trust's interests; preserve patrimony
International Equity	Diversification; enhanced inflation-adjusted returns
Real Return	Diversification; inflation-hedge; current income
Absolute Return	Diversification; enhanced returns
Fixed Income	Diversification; deflation hedge; current income

Overall asset allocation guidelines are as follows:

Asset Class	Target Allocation	Allowable Range
Domestic Equity	20%	$\pm 3\%$
GE Common	10%	Never bought; sold down to 10% if $\geq 11\%$
International Equity	20%	$\pm 5\%$
Real Return	20%	$\pm 10\%$
Absolute Return	10%	$\pm 6\%$
Fixed Income	20%	$\pm 1\frac{1}{2}\%$

Expected return	7.3%
Expected risk	10.4%

To the extent that these asset allocation guidelines differ from current allocations, the guidelines will be implemented expediently.

The expected returns in the preceding table and the spending policy combine to imply that the Trustees desire, on average, a portion of the investment returns be reinvested. To reiterate, total return is emphasized over income.

Rebalancing will occur at least semi-annually. The asset allocation expressed above is a target allocation; some deviation around the target is expected. Significant tactical asset allocation (or any market timing) is not part of the Trust's Investment Philosophy. To the extent possible, cash outflows for expenditures will be used to adjust the asset mix because they incur only one-way transaction costs. In general, the desirability of rebalancing will be evaluated in light of transaction costs; the allowable ranges were computed to reflect transaction costs.

Security Guidelines

Domestic Equities: For all capitalization U.S. stocks, the evaluation benchmark is the Dow Jones Wilshire 5000. For large capitalization stocks, the evaluation benchmark is the S&P500. For other stocks, the evaluation benchmark is the Dow Jones Wilshire 4500. The domestic equity subportfolio will be split 60/40 between large and smaller stocks; the Trustees acknowledge that the policy asset allocations represent intentional over-weighting of small stocks relative to the total US equity market.

GE Common: The investment manager will sell GE shares down to the point that they represent 10% of the Trust portfolio. The timing and implementation of this divestment will be decided by the Senior Trustee, but the divestment should be completed by May 2017.

Fixed Income: The fixed income subportfolio will be divided 50/50 between an all-Treasury portfolio and a diversified portfolio. International and high-yield bonds are authorized for the latter. Average portfolio duration will be less than 8 years (with no duration or maturity restriction on individual bonds). The evaluation benchmark is the Barclays US Aggregate Bond Index.

International Equities: The international equity subportfolio will be divided 50/50 between a core portfolio and an all-emerging markets portfolio. The core international portfolio may include international small cap stocks. The evaluation benchmark is a 50/50 blend of the unhedged MSCI ACWI ex-US index and the unhedged MSCI Emerging Markets index.

Real Return: The real return approach represents a diversified approach to inflation hedging. At least 25 percent of the real return subportfolio will be invested in inflation-linked bonds. At least 25 percent of the real return subportfolio will be invested in marketable real estate (e.g., REITs). The evaluation benchmark is Consumer Price Index plus 4 percent.

Absolute Return: The goal of the absolute return subportfolio is to generate stock-like returns at minimal risk. The evaluation benchmark is Consumer Price Index plus 4 percent.

Diversification: To assure a prudent degree of diversification and avoid excessive risk, actively-managed investment accounts shall not exceed the following limits: 1) No more than 10% of the Trust's investments will be in the securities of any one issuer or affiliated group; 2) No more than 4.9% of the outstanding stock of any one issuer.

The GE common stock is not actively-managed and is the exception to this diversification policy. Additionally, fixed income securities issued or guaranteed by the full faith and credit of the United States or AAA-rated securities issued by government-sponsored enterprises are also not subject to this diversification policy.

Permissible Investments: The Fund may be invested in publicly-traded common stocks, mutual funds (including exchange-traded funds), convertible bonds and fixed income securities, whether interest bearing or discount instruments, including money market instruments, subject to any restrictions specified in this Investment Policy. Commingled funds may be used, provided that securities held in the commingled fund are permissible investments. Investments in bank or thrift deposit instruments are limited to amounts insured by the appropriate deposit insurance fund. No other securities are permissible investments.

The preceding sentence makes this paragraph redundant, but listing certain prohibited investments may avoid misunderstanding. Absent written permission of the Trustees, explicitly forbidden investments include: common stock in nonpublic corporations, short sales of any type, letter or restricted stock, other non-marketable securities, non-FDIC insured deposits, buying or selling on margin, tax-exempt bonds, private placement bonds, master notes, commercial paper not rated at least A1/P1, obligations rated below investment grade, unrated corporate bonds, direct placement of mortgages on real property, CMO IO or PO strips, inverse floaters, other floating-rate notes whose coupon does not vary directly with market rates, repurchase agreements against securities which are not permitted to be held in the portfolio, options contracts (other than call options written/sold with the express approval of the Trustees), futures contracts of any kind, commodities, direct investment in real estate (*versus* liquid real estate securities), limited partnerships, and master limited partnerships.

Absent written permission of the Trustees, securities owned by the Funds will not be lent to any other party for any purpose.

Selection, Duties and Responsibilities of Money Managers

The Trustees are responsible for prudently selecting the investment managers, which may include banks, investment management firms, insurance companies and mutual funds. Each investment manager must adhere to the objectives and policies detailed in all sections of this investment policy and accept fiduciary responsibility. The Trustees seek the lowest fees consistent with high-quality investment management. Subject to this Investment Policy, the investment managers are to have full discretionary security selection authority over the assets assigned. If specialist investment managers are selected, such discretion may be limited by the Trustees to the specialist's asset class; further, the Trustees may designate appropriate evaluation benchmarks for specialist managers. Money managers hired directly will agree to this

Investment Policy and their specific investment mandate in writing; mutual fund managers are expected to abide by their prospectus.

Control Procedures

The Funds shall be invested consistent with generally accepted standards of fiduciary responsibility. The safeguards that would guide a prudent expert will be observed. All transactions undertaken for the Fund will be for the sole benefit of the Trust.

Brokerage Policy: Brokerage arrangements shall be conducted for the sole benefit of the Trust.

Custodial Policy: Custodial arrangements shall be conducted to assure the security of and ensure the best interests of the Trust.

Performance Monitoring: Performance is monitored against the appropriate benchmarks and considers risk. The Trustees expect active advice and input from the non-Trustee members of the Investment Committee.

Clarifications: In the event of any confusion, users of this Investment Policy Statement should obtain clarification from the Trustees.

Periodic Review: The Investment Committee shall review the portfolio at each of its regular meetings. The Investment Committee shall review this document annually.

APPENDIX 2: THE CURRENT MOGADOR PORTFOLIO

			PRICE			PRICE			
	ORIGINAL ALLOCATION	TICKER	31 DEC 2012	SHARES	ORIG VALUE	28 MAR 2014	CURRENT VALUE	CURRENT ALLOCATION	DEVIATION
DOMESTIC EQUITY	20.00%							23.46%	3.46%
LARGE CAP US STOCKS	12.00%							14.15%	2.15%
SPDR ETF	12.00%	SPY	142.41	10,111.65	\$1,440,000	185.49	\$1,875,610	14.15%	2.15%
MID CAP US STOCKS	3.00%							3.39%	0.39%
JANUS ENTERPRISE	3.00%	JAENX	65.95	5,458.68	\$360,000	82.26	\$449,031	3.39%	0.39%
SMALL CAP US STOCKS	3.00%							3.45%	0.45%
SOUTHERNSUN SMALL CAP	1.50%	SSSFX	22.55	7,982.26	\$180,000	28.87	\$230,448	1.74%	0.24%
DREMAN CONTRARIAN	1.50%	DRSVX	18.36	9,803.92	\$180,000	23.14	\$226,863	1.71%	0.21%
MICRO CAP US STOCKS	2.00%							2.48%	0.48%
BRIDGEWAY ULTRA	2.00%	BRSIX	12.5	19,200.00	\$240,000	17.11	\$328,512	2.48%	0.48%
FOREIGN EQUITY	20.00%							19.77%	-0.23%
CORE INTERNATIONAL STRATEGY	6.00%							6.42%	0.42%
DRIEHAUS INTERNATIONAL DISCOVERY	2.00%	DRIDX	27.85	8,617.59	\$240,000	31.83	\$274,298	2.07%	0.07%
OAKMARK INTERNATIONAL	2.00%	OAKIX	20.93	11,466.79	\$240,000	26.39	\$302,609	2.28%	0.28%
ARTIO INTERNATIONAL	2.00%	JETIX	10.82	22,181.15	\$240,000	12.34	\$273,715	2.06%	0.06%
EMERGING MARKETS STRATEGY	10.00%							8.66%	-1.34%
EMERGING MARKETS ETF	5.00%	EEM	44.35	13,528.75	\$600,000	40.74	\$551,161	4.16%	-0.84%
EATON VANCE STRUCTURED EMERGING MKTS	5.00%	EIEMX	14.96	40,106.95	\$600,000	14.89	\$597,193	4.51%	-0.49%
INTERNATIONAL SMALL CAP	4.00%							4.69%	0.69%
VANGUARD INTNL EXPLORER	4.00%	VINEX	14.71	32,630.86	\$480,000	19.04	\$621,292	4.69%	0.69%
REAL RETURN	20.00%							17.29%	-2.71%
INFLATION LINKED BONDS	7.00%							5.77%	-1.23%
VANGUARD INFLATION PROT SECURITIES	7.00%	VAIPX	28.54	29,432.38	\$840,000	25.97	\$764,359	5.77%	-1.23%

GLOBAL REAL ESTATE	6.00%							5.05%	-0.95%
COHEN AND STEERS INTERNATIONAL	3.00%	IRFIX	11.36	31,690.14	\$360,000	11.17	\$353,979	2.67%	-0.33%
PIMCO REAL ESTATE REAL RETURN	3.00%	PRRSX	4.92	73,170.73	\$360,000	4.31	\$315,366	2.38%	-0.62%
COMMODITIES	4.00%							3.32%	-0.68%
PIMCO COMMODITY REAL RETURN	2.00%	PCRIX	6.64	36,144.58	\$240,000	5.91	\$213,614	1.61%	-0.39%
POWERSHARES DB COMMODITY INDEX	2.00%	DBC	27.78	8,639.31	\$240,000	26.14	\$225,832	1.70%	-0.30%
ENERGY STOCKS	3.00%							3.15%	0.15%
VANGUARD ENERGY	3.00%	VGELX	111.16	3,238.58	\$360,000	129.13	\$418,197	3.15%	0.15%
ABSOLUTE RETURN	10.00%							8.95%	-1.05%
HUSSMAN STRATEGIC GROWTH	2.00%	HSGFX	10.71	22,408.96	\$240,000	10	\$224,090	1.69%	-0.31%
MERGER FUND	2.00%	MERFX	15.82	15,170.67	\$240,000	16.07	\$243,793	1.84%	-0.16%
ARBITRAGE FUND	2.00%	ARBFX	12.55	19,123.51	\$240,000	12.53	\$239,618	1.81%	-0.19%
PIMCO ALL ASSET ALL AUTHORITY	2.00%	PAUIX	11.09	21,641.12	\$240,000	10.03	\$217,060	1.64%	-0.36%
ALPHA HEDGED	2.00%	ALPHX	10.58	22,684.31	\$240,000	11.57	\$262,457	1.98%	-0.02%
FIXED INCOME	20.00%							17.22%	-2.78%
TREASURY STRATEGY	10.00%							8.57%	-1.43%
ISHARES 7-10YR TREASURIES	10.00%	IEF	107.49	11,163.83	\$1,200,000	101.72	\$1,135,585	8.57%	-1.43%
CONVENTIONAL BOND STRATEGY	10.00%							8.65%	-1.35%
HARBOR BOND	6.00%	HABDX	12.48	57,692.31	\$720,000	12.04	\$694,615	5.24%	-0.76%
HARBOR HIGH YIELD BOND	2.00%	HYFAX	11.11	21,602.16	\$240,000	11	\$237,624	1.79%	-0.21%
FIDELITY NEW MARKETS INCOME	2.00%	FNMIX	17.8	13,483.15	\$240,000	15.95	\$215,056	1.62%	-0.38%
SINGLE STOCK	10.00%							11.16%	1.16%
GENERAL ELECTRIC	10.00%	GE	20.99	57,170.08	\$1,200,000	25.88	\$1,479,562	11.16%	1.16%
CASH	0.00%							2.14%	2.14%
CASH	0.00%	CASH			\$0		\$284,332	2.14%	2.14%
					\$12,000,000		\$ 13,255,869		
	100.00%							100.00%	

VULTURE FUNDS AND SOVEREIGN DEBT THE ARGENTINE DILEMMA¹

Mark Griffiths, Miami University

In November 2014, Jeremy Martin, a junior partner at Mentours, Imbroglioni and Vory was preparing to meet with his major client who represented the majority of his 'billable hours,' the basis on which his annual bonus was based. In 2000, this group of Socially Responsible bond investors (SRI) had invested millions of dollars in Argentina's dollar-denominated debt with the objective not only of gaining a reasonable rate of return, but also to help fund the development of the Argentine economy and thus, the living conditions of its people. Argentina defaulted on these bonds in 2001 and, in 2010, SRI agreed to a restructuring deal where the debt was revalued at approximately 30 cents on the dollar. A crucial element in Jeremy's presentation had to be a discussion of why a group of holdout bondholders had won the right to be paid in full, while his client along with other institutional investors holding 93% of the outstanding bonds could not be paid. Further, he had to be prepared to address the implications of recent court decisions on other non-holdout bondholders, as well as the Argentine economy and people, since this would be a major decision criterion of his clients in their decision on how to proceed. A major problem was that the case was in media res, that is, 'in the middle of things' and, since his client relied on his expert legal opinion, Jeremy had to present the facts and likely outcomes in the context of his client's best interests.

HOW DID THINGS GET TO THIS POINT?

Argentina, a country of approximately 43 million people covering an area roughly the size of the United States east of the Mississippi River, is the second largest economy in South America. The country is rich in natural resources, has a highly literate population of which just over 92% live in cities, an export-oriented agricultural sector and a diversified industrial base. Although the national unemployment rate was estimated (2013) at 7.5%; unemployment among younger workers (15-25) was estimated to be in excess of 18%.²

Agriculture in Argentina is somewhat more labor-intensive than in the United States. More importantly, both raw and processed agricultural goods while accounting for roughly 10% of GDP, account for over half of the country's foreign exchange.³ Other major exports include petroleum and natural gas, and automobiles. Thus, Argentina is principally a primary extractive economy which is still trying to develop exportable higher value-added goods or services in the secondary

(manufacturing), tertiary (retail and services) and quaternary (knowledge and information processing) sectors.

From 1998 to 2002, Argentina's economy experienced a severe recession and depression.⁴ See Figure 1. It began as a side-effect of the Russian and Brazilian financial crises but soon took on a life of its own due to weak governments, poorly implemented policies and huge budget deficits. The depression led to wide-spread unemployment, across-the-board salary and pension cuts, nation-wide strikes, salaries paid in I.O.U.'s instead of money and violent riots in the streets.

On December 26, 2001, Argentina defaulted on a total of \$93 billion of its external debt; approximately \$82 billion of which had been issued in the previous three years.⁵ As a result of this failure to pay, foreign investment left the country, international capital inflows evaporated, the currency exchange rate which had previously been pegged at 1-to-1 with the US dollar was allowed to float and subsequently devalued to roughly 4-to-1 resulting in a 40% rate of inflation and the real GDP fell 11% in 2002 alone. It was estimated that, at this time, 60% of all Argentines were living below the poverty line.⁶ After the default, NML Capital, a hedge fund and subsidiary of Elliot Capital Management purchased some of Argentina's debt on the secondary market at a deeply discounted price.⁷

The economy hit bottom in 2002 and then started to recover over the next six years. Real GDP grew by roughly 8.5% per year due to the use of previously idled industrial capacity and labor, debt restructuring and the associated reduced interest charges, improved international financial conditions for corporations as well as expansionary monetary and fiscal policies. Unfortunately, inflation also increased. Price controls along with export taxes and restraints were imposed in an attempt to constrain unwanted demand. See Figure 2. The unemployment rate in Argentina averaged 9.8 percent from 2002 (earliest recorded date) until 2014. The recorded high of 20.8 percent occurred in the fourth quarter of 2002 and the low of 6.4 percent was recorded in the fourth quarter of 2013.

On January 14, 2005, Argentina began a debt restructuring process to resume payment on the majority of the \$82 billion in defaulted bonds. Initially, 76% of the defaulted bonds (\$62.5 billion) were exchanged for longer-term par, quasi-par and discount bonds with a much lower nominal value – only 25-35% of the original face value. SRI was originally a holdout to the restructuring choosing not to participate because of the position taken by the International Monetary Fund (IMF).

The IMF had been working actively with Argentina since the early 1990's, when the Argentine peso was fixed at parity with the U.S. dollar. When the 1998 recession hit, partly because of the restrictions involved in pegging the peso, the country became constrained in its ability to use standard macroeconomic policy tools to engineer a recovery. Nonetheless, for most of the 1990's, Argentina had been praised for its achievements in economic stabilization and growth as well as its market-oriented reforms under IMF-supported programs. During the decade preceding the crisis, there were four IMF financing agreements with Argentina although the amount of outstanding IMF credit rose most sharply after 2000.

At first, the IMF had lobbied in favor of the holdouts but, on January 3, 2006, Argentina made a lump-sum repayment for the full amount owed to the IMF. During the previous three years, Argentina had managed to reduce its debt to the IMF from \$15.5 billion to the point where about \$9.5 billion remained outstanding. The payment canceled the debt payments that were originally scheduled for 2006 (\$5.1 billion), 2007 (\$4.6 billion), and 2008 (\$432 million). The payment represented 8.8% of the total Argentine public debt and decreased the Central Bank's reserves by one third. According to the official announcement, it also saved about a billion dollars in interest.

Although the payout was lauded by both the IMF and the then US Secretary of the Treasury, it was not without its critics. Nobel Economics Prize laureate Joseph Stiglitz who had repeatedly criticized the IMF for imposing restrictive policies as a condition for receiving loans, supported the Argentine strategies on the debt restructuring but opposed the IMF payout decision, believing that the IMF should have received the same treatment as the other creditors. Internal Argentine criticism centered on the opportunity cost of the payment which made funds unavailable for productive domestic purposes or to come to terms with other creditors. A second popular argument was that the government had traded cheap IMF credits for new issues of public debt at much higher interest rates. Nonetheless, the Argentine stock index (MERVAL) grew more in January 2006 than in all of 2005. See Figure 3.

On April 15, 2010, the opportunity to restructure additional debt was offered to bondholders who had rejected the 2005 swap; two-thirds of the outstanding bonds were tendered at this time, leaving only 7.3% as holdouts. Approximately \$12.86 billion of the eligible debt, including those bonds held by SRI, were tendered.

Because the 2001 default had created a crisis of confidence, Argentina again decided to issue the restructured debt in the US to provide additional credibility to the country's desire to repay its debts. The issuance in the US required Argentina to draft agreements in which repayments would be handled through a New York corporation and governed by US law. The holdout bondholders soon realized that Argentine lawyers had omitted to document how holdout investors would be handled and had instead required all bonds to be repaid on a *pari passu* (equal) basis to prevent preferential treatment among bondholders. That is, attorneys for Argentina failed to include a *Collective Action Clause* (CAC) which outlined the rules governing what percentage of a bond issue would have to agree to a restructuring for it to be possible to force that restructuring on any hold-outs. As a result, the holdouts, under the *de facto* leadership of NML Capital realized that, while Argentina could not force the holdouts to accept the terms in the 2005 or 2010 restructurings, they could use the *pari passu* clause to force Argentina to choose between paying all its bondholders (including NML) or none of them.

In 2014, the holdout bondholders won an injunction to prohibit Argentina from repaying the interest on the restructured bonds, unless they simultaneously paid the 7% holdouts their *full amount* due as well. Together with the bond agreement's *Rights Upon Future Offers* ("RUFO") clause, this created a deadlock in which the 93% of renegotiated bondholders could not be paid without paying the 7% holdouts and any payment to the holdouts would potentially (according to Argentina) trigger the 93% being due repayment in full as well. That is, the clause stated that, if a later settlement (after the 2005 and 2010 restructuring dates) paid more, or on better terms, all existing settlements would be repaid on the improved terms.⁸ Representatives for Argentina indicated that should the RUFO clause be invoked, it would add approximately \$100 billion to the country's current external debt.⁹

The US courts ruled that because Argentina had drafted the agreement and chosen the terms it wished to impose, it could not now claim the terms were unreasonable or unfair. Further, the courts decided that the RUFO clause could not be avoided or ignored by asserting sovereign status since the injunction did not affect sovereign assets, but simply ruled that Argentina must not give preferential treatment to any group of bondholders over any other group when making repayments.

Hence, although Argentina wanted to pay the interest on the New York issued bonds and had sent the funds to their US agents, the judgment prevented Argentina from authorizing the agent to disburse the money. The country was therefore deemed to be in selective default by Standard &

Poor's and in restricted default by Fitch.¹⁰ The US ruling affected only New York Law Argentine bonds; Argentine bonds issued under Buenos Aires and European Law were not affected.¹¹

Proposed solutions to this impasse included seeking waivers of the RUFO clause from restructured bondholders, or waiting for the RUFO clause to expire at the end of 2014. However, in the broader international context, the dilemma raised concerns about the ability of a small group of speculative bond investors to subvert an otherwise-agreed debt restructuring of an insolvent country.

Argentina has still not been able to raise financing in the international debt markets since there was a concern that any money raised would be impounded by holdout lawsuits. Further, the Argentine borrowing cost remains in excess of 10%, much higher than that charged to comparable countries. As a result, Argentina has been paying debt from central bank reserves, has banned most retail purchases of dollars, limited imports, and ordered companies to repatriate money held abroad. Despite the economic difficulties, between 2003 and 2012 Argentina met debt service payments totaling \$173.7 billion. The inability to borrow internationally has led to a shortage of foreign currency required for the purchase of crucial imports. For example, on October 21, 2014 the Argentine Chamber of Importers asked the government for \$5.5 billion in US dollars to purchase needed supplies primarily for the automotive industry.¹²

WHY SOVEREIGN CRISES ARE DIFFERENT FROM CORPORATE BANKRUPTCIES

A sovereign government, by definition, controls its own affairs, and thus, cannot be forced to pay back its debt. Nonetheless, governments may face severe pressure from lending countries. In extreme cases, a creditor nation may declare war on a debtor nation for failing to repay debt in order to enforce creditor's rights. For example, Britain invaded Egypt in 1882; the United States exercised 'gunboat diplomacy' in Venezuela in the mid-1890s and occupied Haiti beginning in 1915.¹³ In recent years, the courts have been the preferred option of last resort.

Individual and Corporate bankruptcy in the United States is governed by the 1978 Bankruptcy Code and its amendments. There are 6 basic types of bankruptcy that are named after the chapters in the legislation that describes them:

Chapter 7: Liquidation

Chapter 9: Municipalities

Chapter 11: Reorganisation

Chapter 12: Farmers and Fishermen

Chapter 13: Individuals with a regular income

Chapter 15: Cross border and other cases

Of these work-out procedures, the most familiar are generally Chapters 7 and 11 although all operate in a similar fashion. In the case of a Chapter 7 filing, the business ceases operations and the company is wound up under the supervision of a trustee who is responsible for selling the company's assets and distributing the proceeds to creditors. This distribution of funds is based upon a specific priority ordering with secured creditors. Filing a petition under Chapter 7 automatically stops collection actions against the bankrupt.

A Chapter 11 bankruptcy filing involves an attempt at a corporate restructuring under the protection of the court. In these cases, a committee of creditors is established which works with the company to develop a plan to reorganize the company and its debts to reshape it into a profitable entity. Although the management of the company continues to run the day-to-day business operations, any significant decision must be approved by the court. Existing shareholders

are normally wiped out or severely diluted with creditors often being given shares in exchange for wiping out debt.

Neither of these methods applies to sovereign debt crises. In particular, no committees or trustees are appointed to oversee the process, there is no prioritization of claims and all disagreements must generally be litigated in the appropriate jurisdiction.

In the Argentine case, the holdout bondholders initially attempted to use lawsuits to seize Argentine government assets abroad – notably Central Bank deposits in the Federal Reserve Bank of New York, the presidential airplane, and the ARA *Libertad*.¹⁴ The *Libertad*, an Argentine Navy training frigate, was forbidden to leave the port of Tema, Ghana for 10 weeks in 2012 as a result of Ghanaese court decision instigated by NML Capital. Ultimately, the International Tribunal for the Law of the Sea ruled that it be released. The holdout bondholders eventually discovered that due to a number of sovereign immunity laws, it was impossible to actually enforce their judgments by seizing any Argentine assets still within the reach of U.S. jurisdiction.

JEREMY'S CHALLENGE

Jeremy decided that the best way to proceed was to anticipate his client's questions and then determine how best to respond to them. The most likely questions to begin were:

1. What is the situation in which Argentina finds itself?
2. Was the decision to pay off the IMF in full in January, 2006 wise?
3. What are the implications of the NML Capital decision to force Argentina to pay all or none of its debts? If NML gets paid in full, should SRI sue for full payment also?
4. Since this situation is on-going, have there been any recent developments in the case?
5. Whether, NML succeeds or not and whether the RUFO expires or not, how should SRI as a socially responsible investor proceed? What will be the effect on the Argentine economy and its people?

The last question was potentially the most difficult as it went directly to the issue of Jeremy's credibility as a lawyer. That is, the fashion in which he phrased the answer would likely affect whether his client would remain with his firm or seek counsel elsewhere. Accordingly, Jeremy decided to use a version of a concept known as political ecology to frame his answer.

First, what would happen if Argentina were forced to repay all of the holdout bondholders in full? At a minimum, this would suggest that Argentina would have to reopen negotiations with all re-structured bondholders and some would also require full payment. Was there any basis to suppose that full payment to the holdout bondholders could be avoided?

Second, if even some of the restructured bondholders were to be paid in full, what were the implications for Argentina in terms of external debt, foreign exchange and the cost of imports and exports? What effect would such changes have on the viability of the different sectors of the Argentine economy?

Third, what effect would the changes on the different sectors of the Argentine economy have on inflation and unemployment rates? What effect would this have on the domestic economy and how it operated? And given, these potential changes what options did the Argentine government have in offsetting their impact?

Finally, should SRI take these potential effects and ramifications into account when deciding whether or not to continue its investment?

NOTES

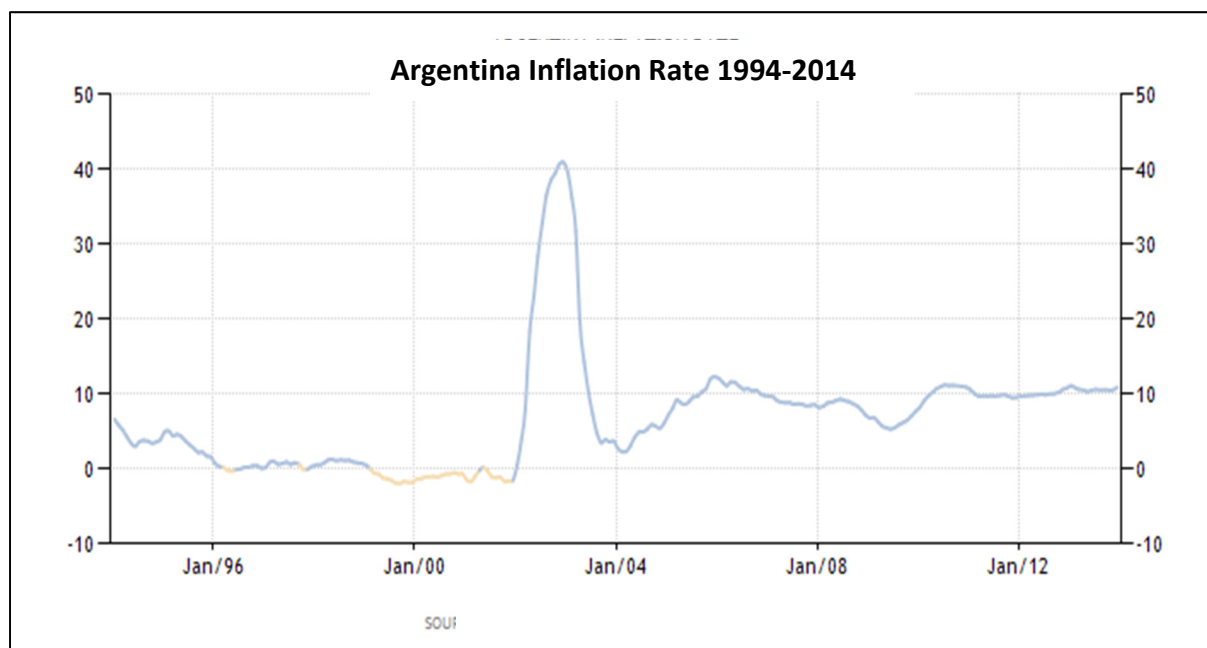
- ¹ This case was prepared for the purpose of classroom discussion and not as an endorsement, a source of primary data, or an illustration of effective or ineffective management. This case, although inspired by real events is fictionalized and, any resemblance to actual persons or entities is coincidental. There are occasional references to actual persons and companies in this narration.
- ² CIA World Factbook available at www.cia.gov.
- ³ Ministerio de Economía y Producción – República Argentina. Economists often refer to this problem of having an extractive primary industry accounting for a large portion of the country's exports as the "Dutch Disease." The Netherlands discovered large gas reserves in 1959 and, as a result, Dutch exports soared. However, from 1970 to 1977 Dutch unemployment increased from 1.1% to 5.1% and corporate investment fell dramatically while the guilder, then the Dutch currency increased in value. Gas exports created an influx of foreign currency, which increased demand for the guilder making it stronger and other parts of the economy less competitive in international markets. Further, gas extraction like agriculture is a capital-intensive business, which generates few jobs. To stop the guilder from appreciating too quickly, the Dutch intentionally kept interest rates low which also resulted in investment rushing out of the country.
- ⁴ A recession is a period of temporary economic decline generally identified as a decline in GDP in two successive quarters. A depression is an extreme recession that can last two or more years.
- ⁵ ["El detalle del proyecto para el nuevo canje de deuda"](#). *InfoNews*. August 28, 2013. The economic crisis also created a political crisis. After declaring the default, Interim President Adolfo Rodríguez resigned a few days after taking office. His successor, Eduardo Duhalde, announced the abandonment to the currency peg and dealt with the immediate effects of the default.
- ⁶ J.F.Hornbeck (February 6, 2013). ["Argentina's Defaulted Sovereign Debt: Dealing with the 'Holdouts'"](#). *Congressional Research Service*. Based upon private estimates, Global Edge sets the number of Argentines living below the poverty line in 2014 at 30 percent. At the time of writing the case, the Argentine peso was trading at 8.52:1 against the US dollar.
- ⁷ NML paid \$49 million in the secondary market for bonds worth \$832 million by 2014. Funds engaging in this type of speculative investment strategy are generally known as "Vulture Funds." See ["Talons Out: Argentina Desperately Fighting 'Vulture Funds' Over Debt"](#). *Vice News*. June 18, 2014. NML is currently suing for \$1.33 billion representing unpaid interest and compound interest thereon. In 1995, Elliot Capital Management bought defaulted Peruvian bank debt for \$20 million and successfully sued for \$58 million. (<http://www.theguardian.com/global-development/2011/nov/15/vulture-funds-key-players>) In an earlier case, a division of Elliot Capital bought \$30 million of Congolese sovereign debt for less than \$20m and was ultimately awarded \$100m in the UK High Court. (<http://www.independent.co.uk/news/business/analysis-and-features/can-you-make-an-ethical-case-for-vulture-funds-9561122.html>)

- 8 The insertion of this clause in the Restructuring Agreement was intended to reassure
bondholders that it was safe to settle early and thereby reduce the incentive to hold out
for a better later offer.
- 9 [“Argentina accuses US of judicial malpractice for triggering needless default,”](#) The
Telegraph, 31 July 2014. Based data obtained from
www.tradingeconomics.com/argentina/government-debt-to-gdp, in 2014 Argentina’s
external debt was estimated at \$147,853,000,000 or 45.8% of GDP.
- 10 [“Everything you need to know about Argentina’s weird default”](#). *Washington Post*. 3
August 2014. [“Argentina blames US for debt woes, denies default”](#). *Yahoo! News*. 31
July 2014.
- 11 [“The Muddled Case of Argentine Bonds”](#). *New York Times*. 24 July 2014. [“New York
judge allows payment to bondholders in Europe”](#). *Buenos Aires Herald*. 2 August 2014.
- 12 [“Argentine foreign currency crunch delays import payments”](#). *Business Insider* 21
October 2014. At the time, the Argentine Central Bank had only about \$27.3 billion in
reserves. The shortage of dollars resulted in great domestic uncertainty and wide
discrepancies between what the peso was worth at the official exchange rate and what
it cost to buy dollars on the black market.
- 13 Reinhart, Carmen M.; Rogoff, Kenneth S. (2009). *This time is different: Eight
Centuries of Financial Folly* (p. 54ff). [Princeton University Press](#). ISBN 0-691-14216-
5.
- 14 [“The real story behind the Argentine vessel in Ghana and how hedge funds tried to
seize the presidential plane”](#). *Forbes*. 5 October 2012.

Figure 1

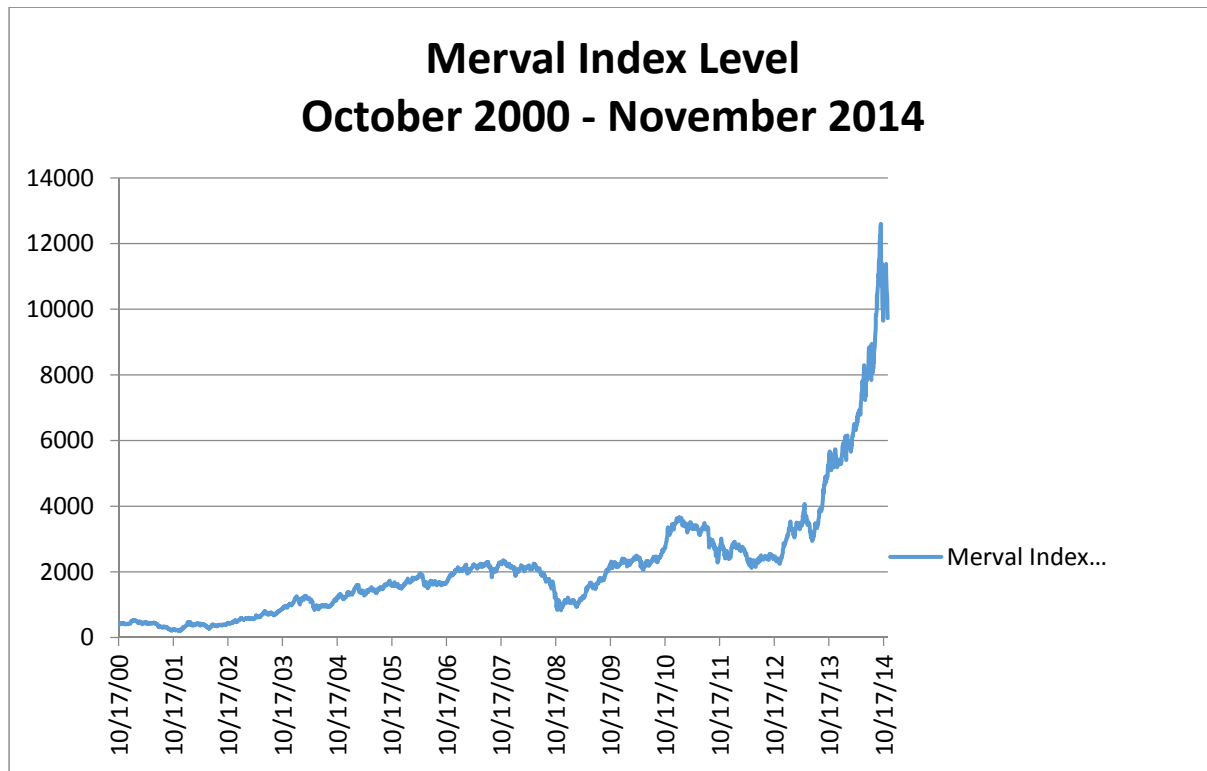


Figure 2



Data Source: www.tradingeconomics.com | Instituto Nacional de Estadística y Censos

Figure 3



Data Source: www.bloomberg.com

CHANGE LEADS TO CHOICES: NEWLYWEDS PLAN FOR RETIREMENT

Jan Serrano and Marie DeVincenzo, Francis Marion University
Erica Hernandez, Bowie State University

Life has been a whirlwind lately for Sophia, who has recently married and moved from her native Miami, taking a new job at a hospital in Virginia to be with her new husband Mike who works in a government job in DC. Sophia has always been a planner and saver, but work and school have given her little time to learn everything she needs to know about saving for retirement. As she and Mike begin their new life together, she turns to her college buddy Ree to help her set a path for a comfortable retirement for the two of them.

STRESSED OUT

Sophia sat looking out of her office window at the beautiful spring vista that lay outside. In contrast to this relaxing site, Sophia had never been more stressed out. She was in the process of changing jobs, moving to a new city, and had just recently married. While these were all exciting events, the uncertainty of the future bothered Sophia because she was a planner. She was only truly happy when she felt like she was in control. As she sat there worrying, her friend Ree called. “Wow, Sophia! I am so excited for you. It must be overwhelming, getting married, moving to a new city, starting a new job. You are such a take charge person, everything you are involved in always seems to fall right into place.” “Thanks Ree, I could use your help with one thing, though, if you have time. Mike and I are looking over our finances and our goals for retirement, and I was wondering if you could help me with my retirement allocations. I am in the process of rolling my old 403-B into an IRA at Vanguard. I am putting it all into the Vanguard Total Stock Market Index Fund. I wanted to ask whether Bogle’s philosophy of owning the whole market does in fact beat other mutual funds in the long run. I need to pick the funds for my new 403-B too. I admit that I haven’t looked at these too closely. For my retirement stuff, I have TIAA-CREF. I am currently contributing to the lifecycle 2045 fund, but I was thinking that I should mix this with some of the other funds in the list so that I am not betting everything on one fund. This was the default option for my age, but I should start to think about allocations. I am not really sure what allocation would be best. I would love any advice you may have. I feel overwhelmed with all of that information, and I am not sure where to start. I know that CREF offers annuities as well. I have heard some terrible things about annuities, so I think I just want to stick with the mutual funds that are available inside the plan. From what I have read, I think I should have a very aggressive portfolio, since it will be a long time before I turn 65.”

Now, Ree and Sophia had known each other for years, and Ree would never have guessed that Sophia would choose an aggressive portfolio. Sophia was always very careful with her money. She used coupons regularly and was a champion comparison shopper. In fact, when Ree and Sophia were in college together, Sophia would plan her meals around the dinner specials offered at the various restaurants around town. Ree knew there was a way to measure a person's actual risk tolerance. "The first thing you should do, Sophie, is to search the internet for the terms "Risk Tolerance Quiz" or "Risk Tolerance Questionnaire." Several different choices will come up. Some of these sites are more thorough than others, so use more than one. The quizzes will calculate how much risk you can comfortably accept, and the results will help me evaluate your allocations." Sophia thought that it sounded fun to explore her risk tolerance and was excited that Ree may be willing to help her. "If you could just look at my portfolio and see if I have the right investment mix that would be awesome! I am sure glad that one of us studied Finance in college!"

Ree was swamped with work herself at the time, but she wanted to help her friend because she knew how important it was to make a retirement plan that would provide a reasonable standard of living. "I would be happy to do that for you, Sophia. I will miss you. I'll miss walking the dogs and eating out with the gang. I tell you what, I can look over your current allocation and your choices and make some suggestions for you. I can't really make any recommendations for you unless I have more information though. I need to get more information on your specific goals, your risk tolerance, time horizon, etc. Have you ever tried to estimate how much you would need at retirement? To do a good job helping you select the best choices, this should be part of a plan for both you and Mike. If you would like, I can help you estimate your target retirement savings. Then we can evaluate your current portfolio allocations and estimate how much you should be putting away to be able to reach your retirement goals. It may take me a few weeks because I am bogged down with projects right now, but if you would like for me to do that for you, I can send you a list of questions to fill out to help me get started. What do you think? We really should include Mike's as well, since you two are going to be a team going forward. This will give you a starting point for saving for a comfortable retirement together."

Sophia had not been thinking about how Mike's financial planning would impact her choices and goals, and her stress level increased. "I don't know how much Mike has saved for retirement nor how much his social security and pension will be. He works for the government now, but I would like to move back to Miami once we start a family of our own. You know, I miss my brothers and sisters. I miss my mom. I miss the food and the nightlife! Mike has looked at jobs there. The salaries are comparable, but they are all in the private sector. Do you think that it would be bad for our retirement if he made a move now?" Ree knew that government pensions could be invaluable to their retirement plan and that many private corporations were eliminating pensions from their benefits packages. She did not want to add to Sophia's anxiety, so she just reiterated that Sophia and Mike should gather their information and get back to her.

FORMULATING A PLAN

Sophia felt relieved that at least one thing on her long list of things to do had been addressed. "That would be great Ree. I really appreciate it, and I will have to check with Mike to see if he would like to include his information and do this together. I don't want to vouch for

him without asking.” “OK, check with him, and if you would like to work on this together, both you and Mike should take the risk tolerance quizzes separately and send me the results.”

After her conversation with Sophia, Ree continued to think about Mike’s government benefits. She was not very familiar with the specific retirement benefits offered by the government nor the TIAA CREF plan because most of her previous clients were employed in the private sector. Ree had been a financial advisor for the last 5 years since she and Sophia had graduated from college and had recently changed jobs herself, switching to a career in banking. In her previous position, she had helped many people just like Mike and Sophia plan for their eventual retirement. She decided to do a little research of her own while she waited to hear back from Sophia, so she got on the computer and began searching for information. The next week Sophia emailed the information to Ree.

Exhibit 1. Email from Sophia

Hi Ree! Here are the answers to the question you sent, and I have copied the responses to four different online quizzes and sent them too. I have included our current investments in our retirement plans. We also have an emergency fund equal to about 25% of our combined salary in a savings account earning .85%. We really didn’t intend to apply this to our retirement savings, but could if necessary. As an FERS employee, Mike contributes 5% of his salary to the government Thrift Savings Plan and receives matching dollar for dollar contributions from his agency. I just added these together to estimate his annual savings amount. Also, I copied some information for my fund choices for you to take a look at. There was a lot more information, so I can send you more, if you need it. Thank you so much for looking over this for me! Hope you are doing well, and I look forward to hearing from you soon! – Sophia

Results of risk tolerance quizzes:

Quiz 1: Results (Sophia and Mike): “You have an above average tolerance for risk.”

Quiz 2: Results (Sophia and Mike): “Moderate”

Quiz 3: Results: (Sophia) “Suggested allocation 100% stocks”; (Mike) “Suggested allocation 20% bonds and 80% stocks”

Quiz 4: Results (Sophia and Mike): “Your risk tolerance is moderate to aggressive...”

Questions for Retirement data:

(1) Current Age: Sophia 35; Mike 36

(2) At what age do we wish to retire? when Mike turns 65

(3) Desired retirement income (in today’s dollars after tax or as a percent of your gross income—please specify): A comfortable goal for both of us would be about \$8750 per month or \$105,000/year after tax. That’s about 70 percent of what we currently make.

(4) How long should retirement income last? 30 years

(5) Current retirement savings:

Sophia:

Traditional IRA	
Vanguard REIT Index Fund (VGSIX)	\$ 3,169
Vanguard Small-Cap Index Fund (NAESX)	\$ 3,826
Vanguard Total Bond Market Index Fund (VBMFX)	\$ 4,962
Vanguard Total International Stock Index Fund (VTIAX)	\$11,180
Vanguard Total Stock Market Index Fund (VTSAX)	\$36,647
Total	\$59,784

Roth IRA - Vanguard Total Stock Market Index (VTSAX) \$12,316

Mike:

US Government Thrift Savings Plan (TSP)	
Fund I - International Stock Index	\$68,100
Fund L2040	\$55,470
Fund L2050	\$12,630
Total	\$136,200

Roth IRA - Vanguard Total Stock Market Index (VTSAX) \$6500

(6) What are your current contributions to retirement accounts including company Match?

Sophia: \$929.4 per month to 403-B +5500 per year to Roth IRA

Mike: \$12,220 per year to TSP + 5500 per year to Roth IRA

(7) Estimate social security benefits: (Per month today's Dollars) Sophia: \$1752 Mike: \$2338

(8) Estimate Pension Benefits at retirement:

Sophia: None

Mike: \$39,601 today's dollars (\$72,805 future dollars if he remains with the agency until retirement and retires at age 65)

Choices available in my (Sophia's) new 403-B:

Name (Fund/Benchmark)	3-Year Avg Return	5-Year Avg Return	Return in 2008	Full Cycle 10/07- 3/14	Up Mkt 3/09- 3/14	Down Mkt 10/07- 2/09
Vanguard 500 Index ***	14.62	21.15	-36.97	41.53	183.87	-50.14
<i>S&P 500 Index</i>	<i>14.66</i>	<i>21.16</i>	<i>-37.00</i>	<i>41.49</i>	<i>183.93</i>	<i>-50.17</i>
American Funds Washington Mutual *	15.34	20.57	-32.96	40.84	174.13	-48.62
<i>Russell 1000 Value TR USD</i>	<i>14.8</i>	<i>21.75</i>	<i>-36.85</i>	<i>32.47</i>	<i>190.4</i>	<i>-54.38</i>
Vanguard Total Int'l Stock Index Inv	4.35	15.36	-44.1	-1.86	123.3	-56.05

American Funds Europacific Growth*	6.69	15.89	-40.38	16.37	124.36	-48.13
<i>MSCI EAFE GR</i>	<i>7.72</i>	<i>16.56</i>	<i>-43.06</i>	<i>3.72</i>	<i>128.86</i>	<i>-54.68</i>
TIAA-CREF Small-Cap Equity Retire	12.58	23.99	-32.9	58.34	216.78	-50.02
TIAA-CREF Small-Cap Blend Idx **	13.37	24.35	-33.54	60.36	223.39	-50.41
<i>Russell 2000 TR</i>	<i>13.18</i>	<i>24.31</i>	<i>-33.79</i>	<i>59.52</i>	<i>223.37</i>	<i>-50.67</i>
TIAA-CREF Mid-Cap Growth **						
	12.49	24.71	-46.25	58.02	228.2	-51.85
<i>Mid-cap Growth Average</i>	<i>11.78</i>	<i>22.22</i>	<i>-40.92</i>	<i>51.41</i>	<i>196.03</i>	<i>-48.49</i>
TIAA-CREF Mid-Cap Value **	13.73	23.6	-40.59	49.3	213.66	-52.4
<i>Mid-Cap Value Average</i>	<i>13.48</i>	<i>24.54</i>	<i>-36.37</i>	<i>60.54</i>	<i>228.05</i>	<i>-51.16</i>
Vanguard Total Bond Mkt Index***	3.71	4.71	5.15	36.98	27.77	7.21
<i>Barclays US Agg Bond TR</i>	<i>3.75</i>	<i>4.8</i>	<i>5.24</i>	<i>37.19</i>	<i>28.18</i>	<i>7.04</i>
Black Rock Inflation Protected Bond **	3.13	4.74	.42	39.14	33.15	4.5
<i>Inflation Protected Bond Avg</i>	<i>2.8</i>	<i>4.67</i>	<i>-2.95</i>	<i>33.15</i>	<i>32.98</i>	<i>0.2</i>
TIAA-CREF Lifecycle 2045	10.79	18.47	-38.92	na	151.56	na
<i>Average</i>	<i>9.67</i>	<i>18.3</i>	<i>-37.79</i>	<i>27.44</i>	<i>149.53</i>	<i>-48.88</i>

* R5 shares, ** Inst'l shares, *** Signal

Source: Data generated with STEELE Mutual Fund Expert Software, Copyright (c) Steele Systems, Inc. 1992-2014. All rights reserved. Data through March 30, 2014.

When Ree looked at it, she was very impressed with how much Mike and Sophia had already saved for retirement. In her experience, people in their thirties did not spend much time thinking about retirement let alone sacrificing their lifestyles now in order to save for it. Mike and Sophia were obviously serious planners with future orientations. Ree discovered that, in addition to his pension, Mike was eligible for a special Government Thrift Savings Plan or TSP. She researched the TSP and TIAA-CREF to refresh her memory on the specifics of each. Ree examined the results of the risk tolerance quizzes to see if they agreed with the couple's current behavior. She also examined the couple's current allocations across their retirement accounts.

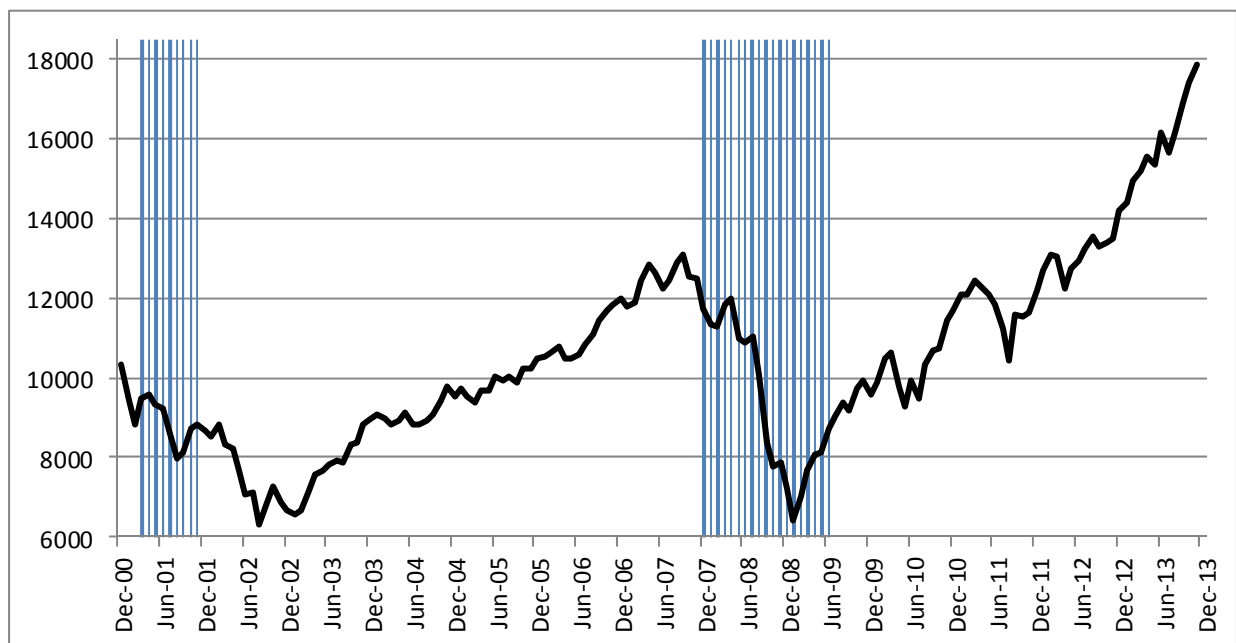
BACKDROP

Ree thought about the recent movement in stock prices and interest rates and the implications that those trends had in forming a well thought out portfolio. It was now the spring of 2014. It had been five years since the worst of the market crash caused by the financial crisis of 2008. As a result of the crisis, the Federal Reserve embarked on a program of "quantitative easing" involving the purchase of mortgage backed securities as well as long term government bonds in an effort to keep interest rates low and provide liquidity to financial markets. Indeed, rates hit lows during this time not seen since the 1950's. In recent months, as economic activity

began to slowly improve, there had been increased speculation that the Federal Reserve would cut back on their bond buying. Such talk seemed to give the stock market jitters, as any hint of tapering the bond buying program sent the major stock market indexes into the red. In January of 2014, Janet Yellen was appointed as the new head of the Federal Reserve. The Fed announced that they would slowly taper the amount of bond buying in coming months. Minutes of Fed meetings as well as remarks made by Yellen over the last few months indicate that while it may be months or even years away, the Fed was studying the impact of how best to wean the economy off of the QE program altogether.

It seemed that unlike many of the previous economic downturns in the US, this most recent recession brought with it a much slower job recovery, with many simply dropping out of the workforce, and others underemployed relative to their pre-recession jobs. Even with the dramatic comeback in the stock market, particularly 2013, returns on various asset classes over the past 10 years had been disappointing relative to longer run results, leading many experts to revise their estimates of asset class returns going forward. While inflation over the past several years had been very low, many economists were warning of the inflationary effects of the massive bond buying program instituted by the Fed over the past 5 years. While Ree knew that historically, the inflation rate had averaged around 3%, inflation rates in coming years could be much higher, which would have a dramatic impact on funds needed to support a comfortable retirement. She also realized that, while the couple is currently in the 28% tax bracket for income, there was a distinct possibility that these rates would be higher when the couple reached retirement age. She decided, however, that this would be a good starting point to use in her calculations. Ree considered all of these factors as she formulated a response for her friend.

Figure 1. Growth of \$10,000 in SPDR S&P 500 ETF (Blue Indicates Recession)



Sources: Recession data from the National Bureau of Economic Research, *U.S. Business Cycle Expansions and Contractions*, <http://www.nber.org/cycles.html> Growth of \$10,000 data calculated using monthly returns on the

SPDR S&P 500 ETF from the STEELE Mutual Fund Expert Software, Copyright (c) Steele Systems, Inc. 1992-2014. All rights reserved.

Figure 2. Interest Rate 10 year Treasury Bonds (Jan 1962 to April 2014)



Source: Economic Research, Federal Reserve Bank of St. Louis, FRED® Economic Data, <http://research.stlouisfed.org/fred2/graph/?id=DGS10>

Figure 3. Average Returns on Various Asset Classes

	US Stocks	Int'l Stocks	Bonds	T-Bills
10 Year Average Return 2004-2013	7.4%	7.4%	4.5%	1.7%
36 Year Average Return 1978-2013	11.8%	10.5%	7.8%	5.5%

Source: Data generated with STEELE Mutual Fund Expert Software, Copyright (c) Steele Systems, Inc. 1992-2014. All rights reserved. Averages calculated from monthly returns for the 30-Day T-Bill, Barclays Aggregate Bond Index, MSCI EAFE Index, and S&P 500 Index.

Figure 4. Current Portfolio Asset Allocation for Retirement Funds

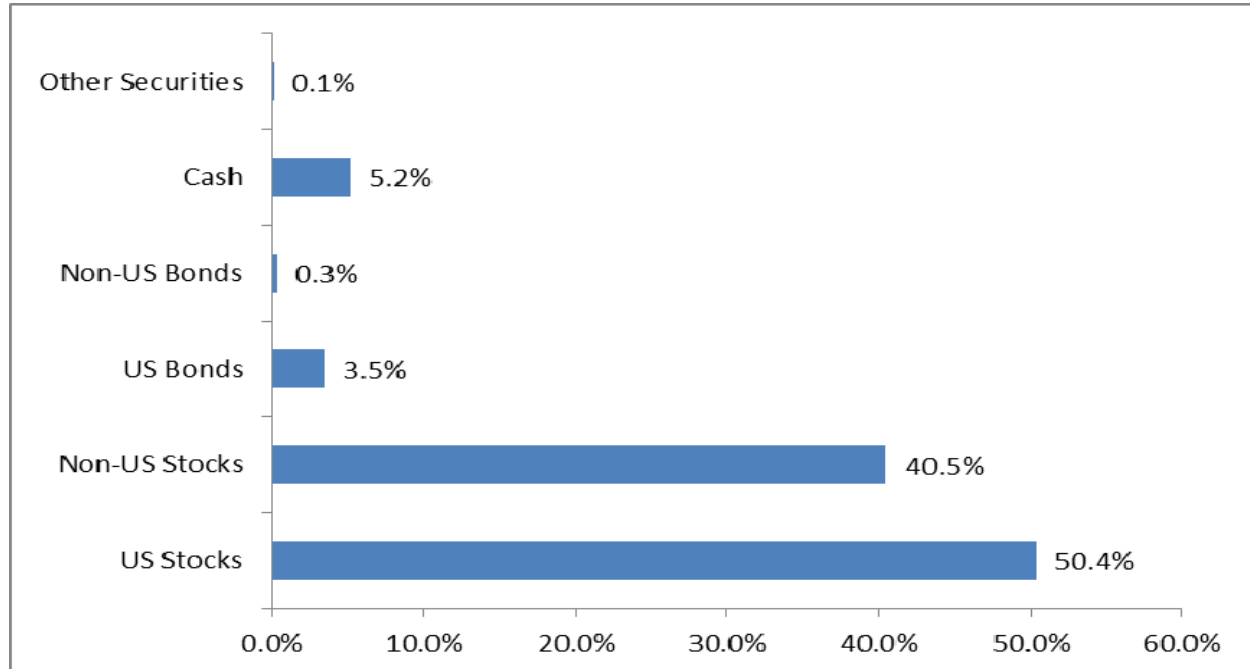


Figure 5. Sophia and Mike's Current Equity Allocation by Region

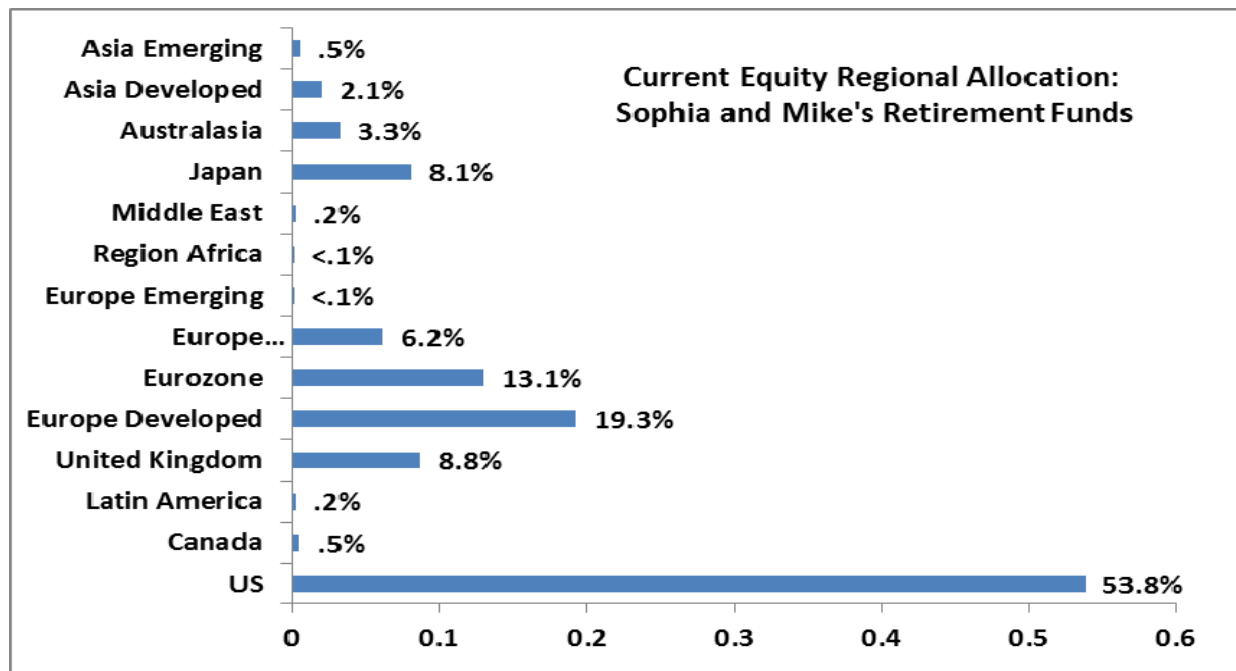


Figure 6. Current Portfolio Equity Allocation by Sector

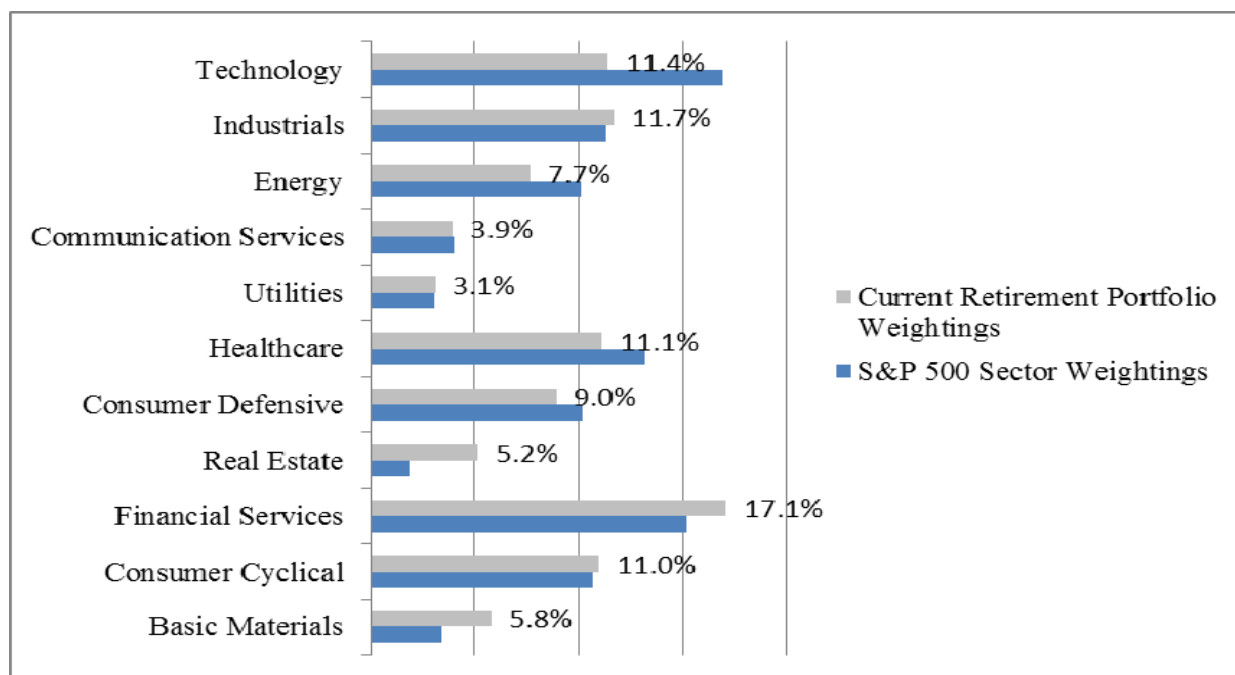


Figure 7. Current Portfolio Equity Allocation by Size

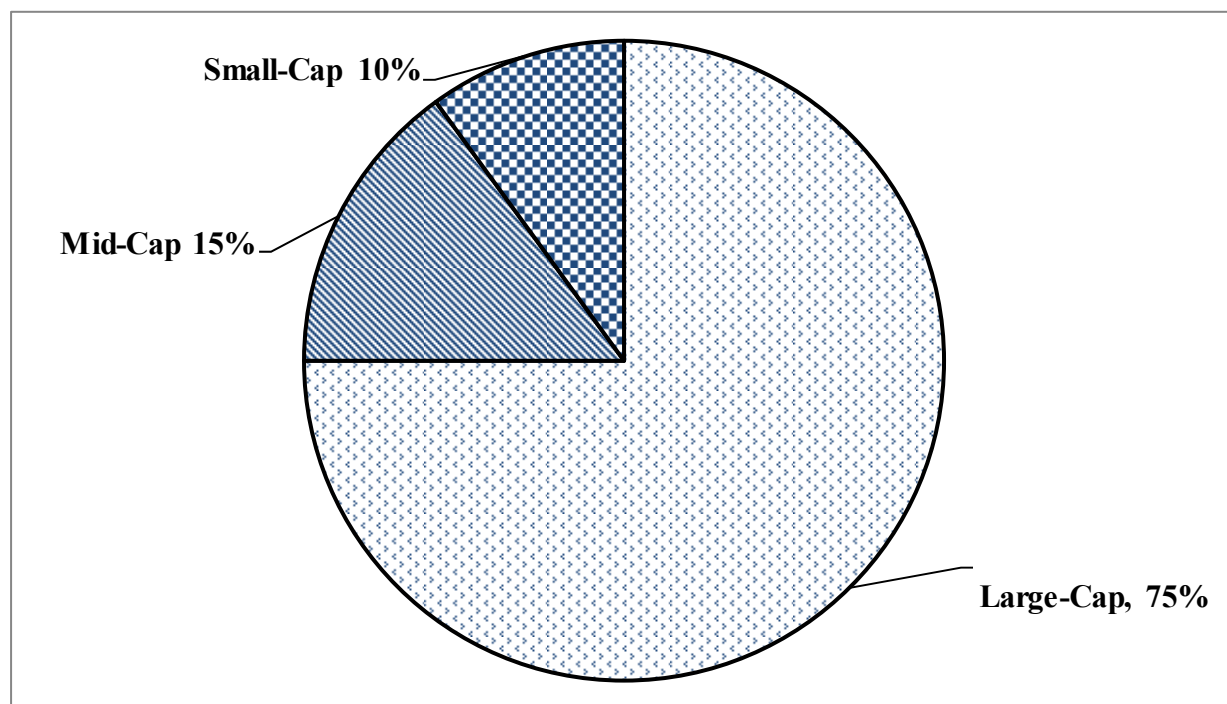


Figure 8. Current Portfolio Equity Allocation by Style

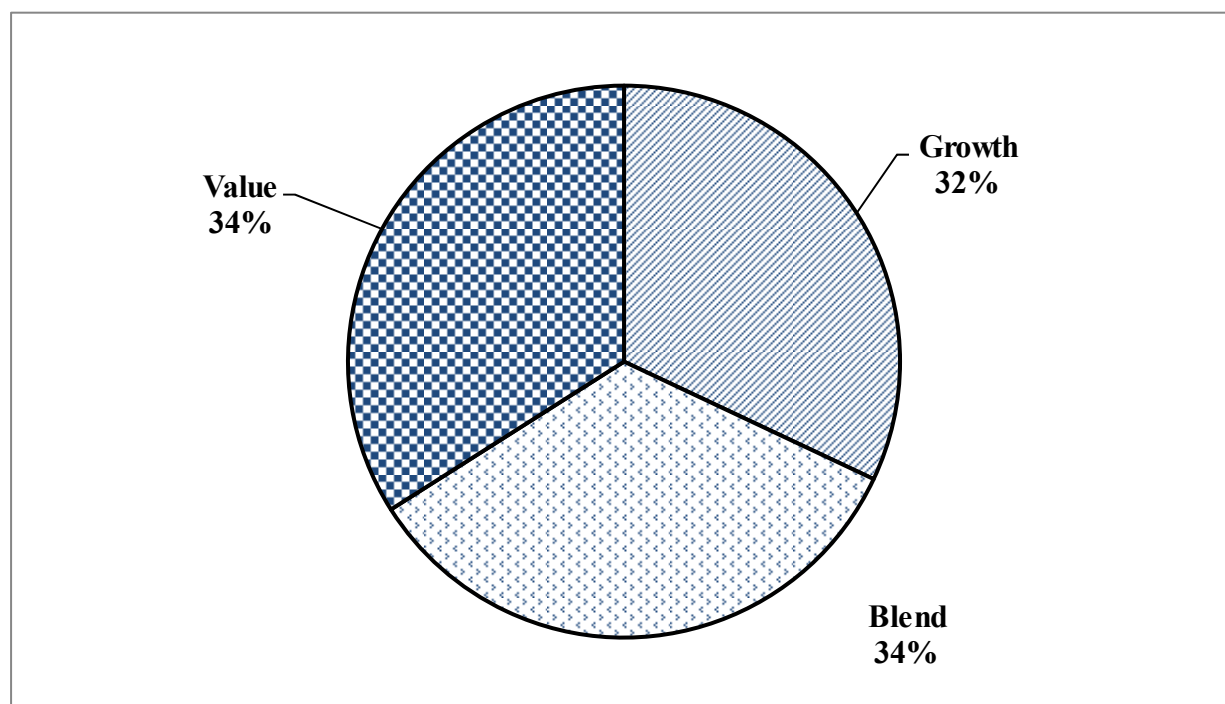
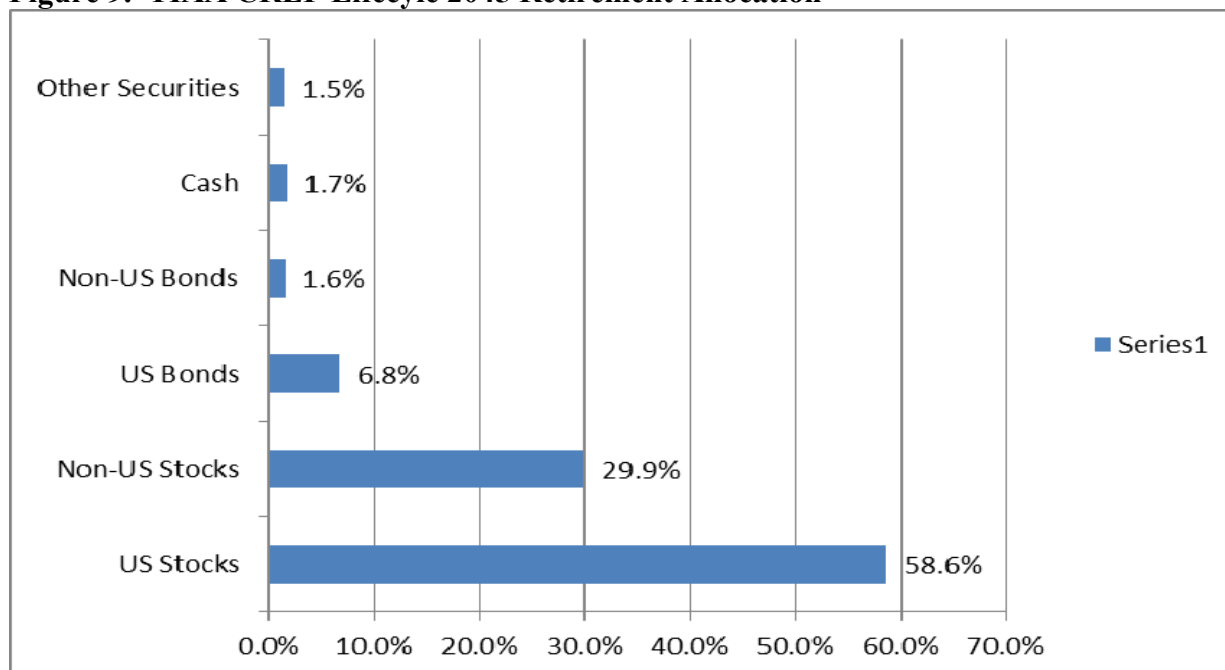


Figure 9. TIAA CREF Lifecycle 2045 Retirement Allocation



FINTECH: MEASURING CUSTOMERS' UTILITY AND RISK PREFERENCES

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Payoffs that are subject to uncertainty can be assessed using expected value (EV). People evaluating choices using EV are said to be risk-neutral. However, most individuals show some degree of risk aversion, and thus the EV analysis is incomplete. Through the case of Fintech, an electronic service provided for the alcohol industry, we illustrate an approach for treating consumers according to their risk preferences. Using a risk-averse utility function, we demonstrate that expected utility is much less than expected values among risk-averse small liquor retailers, explaining their hesitation to implement Fintech technology. This case represents a pedagogical tool to introduce the concepts of risk preference, risk aversion, and utility functions.

Keywords: Case study; alcohol industry, expected utility, utility functions, risk preferences.

INTRODUCTION

Chris Harris was reviewing the latest report from the Sales & Marketing department. Overall, he was satisfied with the results, although a bit discouraged by the following note: "The system is highly effective in terms of time and cost savings; however, 24% of small liquor stores are not operating under Fintech services." Chris knew that small-scale businesses are less profitable than larger firms; however, these potential customers represent an expansion in the coverage of the Fintech system.

Chris Harris is the senior vice president of sales and marketing at Fintech, an electronic payment service provider for retailers and distributors in the alcohol industry. Every month, Fintech moves over 1 billion dollars in transactions, and so far, it is the only provider in the US Southeast region.

While reviewing the report, Chris found that the firm had achieved the targeted market penetration, but wondered why his sales force had not been able to capture 24% of the small liquor stores. Each store could save up to \$12,558 in the first year by using Fintech services (Table 1). In addition, the Fintech system is a more secure and convenient form of payment that conforms to state regulations.¹ The only risk factor is that the success in reducing costs is predicated on adequate system coverage. If only a few businesses embrace Fintech, the investment in equipment and training might not ensure cost savings. Over the years, Fintech has assured its customers that operational success has improved from 40% in 1993 to about 75% in recent years.²

When Chris discussed the issue with his staff, one sales manager suggested a strategy of price differentiation. However, Chris knew that retailers would need to be compartmentalized through a specific feature such as territory, size, or mission, which was difficult to accomplish without current customers resenting the price differentiation. Chris was determined to find out the factors affecting the retailers' decision process, including their utility structure and risk preferences.

Table 1. Retailer's Annual Cost Savings in Adopting Fintech System

	Using Fintech	Not Using Fintech
Startup costs	\$150	-
Maintenance costs	\$100	-
Transaction costs ¹	\$192	-
Personnel running analytics ²	\$62,200	\$76,400
Training ³	\$1,200	-
Total costs	\$63,842	\$76,400
Total cost savings		\$12,558

¹The average number of transactions per year in a small-scale liquor store is 48 (average of four transactions per month). Fintech charges \$3 per transaction, totaling \$192 of transaction costs per year.

²Average yearly wages for personnel running paperwork, record keeping, managing deliveries, etc.

³Learning the system requires training provided by Fintech at an average cost of \$1,200.

THE ALCOHOL INDUSTRY

Traditionally, manufacturers in the alcohol industry, known as vintners and brewers, could produce their alcohol beverage, bottle it, and distribute it through their own retail stores. Following the 'Repeal of Prohibition', the majority of states enacted a three-tier system (TTS) to restrict and control the sale and exchange of alcohol beverages which were categorized as "socially sensitive products" (Sibley and Srinagesh, 2008). The TTS is a highly regulated chain in which distillers, vintners, and brewers (first tier) can trade with designated wholesalers and distributors (second tier), who are the only ones authorized to sell alcohol to individual retail stores, bars, and restaurants (third tier). The system serves as a control device allowing the state and federal governments to monitor and tax the transactions between the tiers.

FINTECH

Since 1933, alcohol payments between distributors and retailers have been carried out in cash, check, or money orders. In 1991, Florida and Virginia approved electronic funds transfers (EFTs) as an alternative form of payment. The same year, Fintech developed an EFT software system to serve the distributors and retailers of the alcohol industry in the state of Florida. Over the years, all 50 states have approved the usage of EFTs as a form of payment in the industry.

When a retailer requests an order to be delivered, the distributor coordinates a delivery day. Without an EFT system, the owner or manager of the retail store must be present to confirm the transfer and make the payment in cash or check. The Fintech system works as a communicator between distributors' and retailers' bank accounts. Once the delivery is completed, the system records the transaction, and the banks debit the retailers and credit the distributor. The software offers statistics on what was delivered, how much was delivered, and the frequency of the deliveries to individual retailers, enabling a sort of inventory management system.

As the company has grown, Fintech has earned numerous high-praise accolades. Especially noteworthy achievements include winning the Tampa Bay Business Journal's *Best Places to Work Award*, the U.S Chamber of Commerce's *Blue Ribbon Small Business Award* as well as the *Dream Big Business of the Year Award* in 2010 for exemplary business practices and its commitment and leadership in the Tampa Community (Fintech.net).

THE DISTRIBUTORS

Distributors have anywhere between a dozen to hundreds of retailers under their delivery chain. They prefer that retailers use some type of EFT system for two reasons. First, financial transactions in the alcohol industry are highly regulated and monitored; this is expensive as it requires the employment of personnel to manage the paperwork and ensure conformance with regulations. This cost is reduced by about 18% when a retailer uses the Fintech system (see Table 2). Second, distributors can reduce delivery time by an average of 15 minutes per stop, saving \$21,000 on fuel and wages among small distributors (\$12,800+\$8,200, Table 2), and \$50,100 among large ones (\$28,300+\$21,800, Table 2).³ Distributors using the Fintech system must pay an initial setup fee, but the benefits of efficiency and quicker delivery clearly outweigh the costs (Table 2). As a consequence, almost every alcohol and spirits distributor in the state of Florida is currently using Fintech.

Table 2. Distributor's Annual Cost Savings in Adopting Fintech System

	Using Fintech	Not Using Fintech
Startup costs ¹	\$299-\$499	-
Maintenance costs	\$150-\$350	-
Transaction costs ²	\$2,592-\$8,640	-
Personnel running analytics	\$62,200	\$76,400
Overtime wages	-	12,800-28,300
Additional fuel	-	8,200-21,800
Total costs	\$65,241-\$71,689	\$97,400-\$126,500
Total cost savings		\$32,159-\$54,811

¹There are two types of distributors. Large distributors (LD) are those with annual revenues of at least \$50 million and/or more than 200 employees, and pay an initial fee of \$499. Small distributors (SD) are those with less than \$50 million of annual revenues and pay a startup fee of \$299.

²Fintech charges a \$0.50 fee per transaction. The average number of transactions per year for a SD is 5,184 (average of 6 trucks and 108 deliveries per week). The average number of transactions per year for a LD is 17,280 (average of 20 trucks and 360 deliveries per week).

THE RETAILERS

Two months ago, Chris created a market research team in charge of gathering information among 80 retailers outside the system (Group B in Table 3). On average, owners of businesses in Group B are eight years older than those in Group A (Fintech customers). Businesses in Group B employ about four people and the owners have been sole proprietors for over 16 years. Owners in Group B have an average of 11 years of education compared to 14 years among owners in Group A (Table 3). Now, Chris is ready to determine the utility structure and risk preferences of retailers in Group B.

Table 3. Retailers Demographics in the Southeast Region

	Group A: Fintech Customers	Group B: Retailers not using Fintech
Age (*)	44	52
No. of employees (*)	7	4
Years of ownership (*)	12	16
Years of education (*)	14	11
Computer confidence and ability (*)	High = 18% Medium = 73% Low = 9%	High = 6% Medium = 31% Low = 63%
Owner's Approximate Income (*)	Less than \$75,000 = 45% 75,000-125,000 = 30% 125,000-175,000 = 15% More than 175,000 = 10%	Less than \$75,000 = 70% 75,000-125,000 = 15% 125,000-175,000 = 10% More than 175,000 = 5%
No. of observations	112	80

Note: Group A's information was gathered from 112 Fintech's retail customer forms. Group B's information was collected by a market research team using a sample of 80 non-users of Fintech. The asterisk indicates that the difference between Group A and B is statistically significant at 95%.

UTILITY FUNCTIONS AND RISK PREFERENCES

While completing his MBA degree, Chris was particularly intrigued by how economists can determine a utility function and the attitudes toward risk by examining individuals' demographics. The report from the market research team concluded that: *"Studies on decision-making behavior have found that, in general, most individuals are risk averse. That is, they prefer to avoid risky choices. Older adults are more risk averse than the younger population when facing potential losses or uncertainty in outcomes. Moreover, there is strong evidence that income and education are positively correlated with attitudes toward risk (Halek and Eisenhauer, 2001; Albert and Duffy, 2012)."* With this information, Chris intends to calculate

utility functions, evaluate retailers' attitudes toward risk, and determine the adequate compensation to be offered to those retailers outside the Fintech system.

NOTES

¹ The "National Federation of Independent Businesses" indicates that on average small businesses spend \$48.72 dollars per hour to keep up with record keeping items such as taxes, financial, licenses and permits, government information, data collection, and data analysis (Dennis, 2003).

² Fintech's customer base includes more than 90% of distributors and 76% of retailers. Adjusting for the size of the businesses, Fintech financial department calculated a 75% success rate in the application of the system.

³ A frequent complaint among distributors is that the delivery staff must wait until the owner or the manager of the retail store is present or available during the cash transactions, delaying delivery time for the rest of the day. Refrigerated trucks need to be running during the waiting time and if the number of deliveries requires more than the estimated eight hours, the distributor must incur in overtime payment to the truck drivers (interview with Buck Jones, CFO of Fintech, November 2013).

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THOMAS TRUCK TRIM, INC.

Robert Stretcher and Mary Funck
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Thomas Truck Trim, Inc. (TTT) is a producer and seller of truck, SUV, and off-road utility vehicle enhancement products. The company operates in eastern Texas, with facilities located in and around Dallas, Houston, and Austin. Devon Hearne is the founder of the company and is still a major shareholder, owning 12 percent of company shares. Devon started the firm in 2001 on a shoestring budget, using his Dad's old metal fabrication equipment that had been given to Devon when his Dad retired. Devon found that he could manufacture products made from steel sheet metal, diamond plate, and square or round pipes, adding a significant amount of value from not only the fabrication process, but also from his own innovative designs. Devon was able to produce truck add-ons that augmented the style and increased the functionality of truck, SUV, and off-road vehicles. These add-ons included front brush guards, rear bumpers, and heavy-duty rails and trim.

The firm experienced an increasing demand for their products from customers desiring stylish customizations. This demand created both individual sales and sales through truck dealerships in the Dallas area. Eighteen dealerships had even added TTT kiosks promoting TTT products as add-ons to new vehicles prior to their delivery to dealership customers. By 2009, the firm had grown into a major nationwide producer of their own products, as well as an efficient marketer of their own and other companies' products. The firm had established a significant online presence, which resulted in rapid sales growth. In 2012, the firm went public, retaining Devon as product manager and allowing him to sell a large portion of his ownership in the firm. The current Chief Executive Officer of TTT is Connor Givens, who was hired as the firm went public. Connor has previous manufacturing management experience.

TTT continues to provide a wide variety of products, some of which are produced by TTT under the TTT brand name, and some of which are purchased from other vendors and either sold under the TTT brand name or sold under the brand name of the vendor. The firm provides heavy-duty bumpers, brush/cattle/game guards, undercarriage guards, towing gear, bed liners and covers, camper shells, roof racks, "headache" racks, toolboxes, suspension kits and lift kits, floodlight bars, and custom wheels, as well as other minor products. The firm manufactures most of its formed metal products, and outsources all powder-coating and chroming processes. The company has retail outlets as well as wholesale and internet sales. On its branded products, the firm also sells warranties, which have proven to be a high-margin service, since few service claims are filed on the firm's heavy-duty products (the warranties cover defects, not damage).

The firm's continuing success has convinced both Devon and Connor to consider several substantial capital budgeting projects for the current fiscal year to support continued growth into

the future. TTT has five independent projects available for capital investment consideration. The first potential investment project, building a production facility to produce parts currently outsourced, has a 32-year useful life. The second project, which involves re-tooling a current production facility, has a useful life of five years. The third project, the creation of a distribution center to improve distribution efficiency, has a 32-year life span. The fourth project, the development of a new retail location in a growth area that will allow TTT to tap into a new market, has a 34-year life. The fifth project, a new retrofitting facility for new vehicles from dealerships, has a 30-year life. The firm's financial analysts have estimated the net operating cash flows (NOCF's) for each year of the five potential projects; these cash flows are listed in Table 1.

The firm has established relationships with several banks in eastern Texas, and has negotiated loan terms with them. Additionally, TTT can raise funding through bond and stock issues, and they have limited funds available from retained earnings. The firm's maximum capital budget is \$10 million. TTT's financial analysts have calculated the company's marginal cost of capital schedule, which is shown in Figure 1. This schedule increases in a stepwise manner as cheaper funding sources are used first, and when cheaper sources are exhausted, the firm utilizes increasingly more expensive forms of financing. Although the proposed projects are independent, TTT's allocation of available funding forms a connection between the projects; if one project consumes a cheaper source of funding, then alternate projects can only be funded and evaluated at higher costs of capital. TTT's financial analysts have been charged with the task of evaluating the potential projects in relation to the various sources and costs of available financing and then determining (1) which project(s) should be accepted and (2) the rank-order in which projects should be accepted so that the firm can maximize cash benefits to the firm's shareholders.

At a meeting with Devon and Connor, TTT's financial analysts discussed how the firm has traditionally used two separate methods for its capital budgeting analysis. In the first, the Internal Rate of Return (IRR) method, the firm ranks its potential projects from highest to lowest IRR and accepts projects whose IRR is greater than the associated cost of capital. With the IRR method, the Investment Opportunity Schedule (IOS) overlays the IRR for each project onto the marginal cost of capital schedule (shown in Figure 2.). The IRR of each project is then compared to the corresponding weighted cost of capital, and if the project is accepted if its IRR is greater than the associated average cost.

The second method involves calculating the Net Present Value (NPV) for each project using an assumed constant cost of capital. The firm's CEO selects a constant cost (discount rate). For this capital budgeting cycle, the CEO has suggested calculating the NPV of each project using rates of 11% 13% and 15% as constant discount rates to determine which projects should be accepted (positive NPV) or rejected. In addition, he has suggested using the weighted average across all MCC levels as a discount rate.

During the meeting, Connor mentioned that he attended a business luncheon whose speaker presented an alternate method for capital budgeting. The speaker suggested that assuming a constant discount rate, using the weighted average for the cost of capital, or use of the IRR are not

analytically justified and that using these methods could result in significant and costly estimation errors because they ignore the firm's actual MCC. In place of the traditional methods, the speaker suggested that firms use a non-constant cost of capital approach to reflect the firm's actual cost of raising capital. This approach involves first identifying all possible permutations of project ordering, and then calculating the NPV for each project and permutation utilizing a cost of capital based on where the project falls along the marginal cost of capital schedule.

Your task is to apply the non-constant cost of capital method to the capital budgeting decision, and compare the result to each of the five methods above. The goal is to determine the overinvestment/underinvestment errors (any different investment level from the speaker's suggested method), inclusion (projects that should be rejected but were instead accepted) and exclusion (projects that are rejected but should have been accepted) errors, and the wealth destruction (reduction in net present value from the optimal decision) that would occur under each of the other five methods.

Table 1. Projected Net Operating Cash Flows per Project.

Year	Production Facility (PF)	Re-Tooling (RT)	Distribution Center (DC)	Retail Center (RC)	Retrofitting Facility (RF)
0	-\$2,691,319.98	-\$2,157,164.87	-\$2,300,975.86	-\$1,407,293.27	-\$1,443,246.02
1	\$305,648.53	\$749,038.35	\$296,386.46	\$162,108.48	\$188,345.00
2	\$423,151.63	\$823,004.41	\$354,425.27	\$229,324.80	\$232,872.93
3	\$439,397.79	\$576,620.86	\$327,469.38	\$224,992.74	\$233,047.52
4	\$419,432.50	\$500,250.75	\$331,224.82	\$224,260.89	\$220,832.35
5	\$379,208.45	\$435,682.59	\$324,208.75	\$214,224.50	\$219,804.60
6	\$403,180.28		\$310,105.23	\$181,495.32	\$192,214.18
7	\$385,145.90		\$333,012.80	\$191,908.39	\$191,478.88
8	\$327,467.44		\$325,829.67	\$196,829.01	\$183,022.70
9	\$376,441.24		\$295,422.95	\$181,694.82	\$182,953.68
10	\$342,702.16		\$289,394.84	\$188,748.68	\$188,435.41
11	\$352,562.50		\$283,413.89	\$183,815.77	\$182,953.68
12	\$366,578.95		\$283,390.80	\$184,507.14	\$180,583.94
13	\$325,874.51		\$307,432.02	\$182,401.81	\$193,161.40
14	\$356,747.33		\$295,398.89	\$179,558.67	\$196,286.89
15	\$349,753.24		\$295,422.95	\$180,987.84	\$193,161.40
16	\$339,893.13		\$311,009.40	\$177,437.90	\$200,212.63
17	\$358,181.03		\$291,820.23	\$171,090.07	\$182,168.47
18	\$359,556.37		\$306,206.16	\$176,024.05	\$184,509.68
19	\$337,111.56		\$285,815.70	\$197,955.45	\$197,087.44
20	\$338,488.61		\$284,591.61	\$171,075.59	\$191,576.00
21	\$303,422.37		\$248,605.61	\$146,812.14	\$156,240.19
22	\$235,128.01		\$178,094.81	\$111,756.47	\$119,665.30
23	\$227,081.81		\$189,560.14	\$114,396.39	\$128,358.93
24	\$241,386.17		\$204,082.90	\$108,236.58	\$131,938.66
25	\$238,704.10		\$183,445.30	\$113,956.40	\$125,801.98
26	\$213,671.46		\$200,261.12	\$109,996.53	\$118,642.52
27	\$230,657.90		\$187,267.08	\$116,596.32	\$129,381.71
28	\$241,386.17		\$184,209.66	\$115,276.36	\$123,756.42
29	\$214,565.49		\$204,082.90	\$108,236.58	\$124,779.20
30	\$224,399.74		\$194,910.63	\$122,316.14	\$125,290.59
31	\$209,201.35		\$194,910.63	\$117,036.30	
32	\$241,386.17		\$188,795.79	\$114,396.39	
33				\$112,636.44	
34				\$107,356.61	

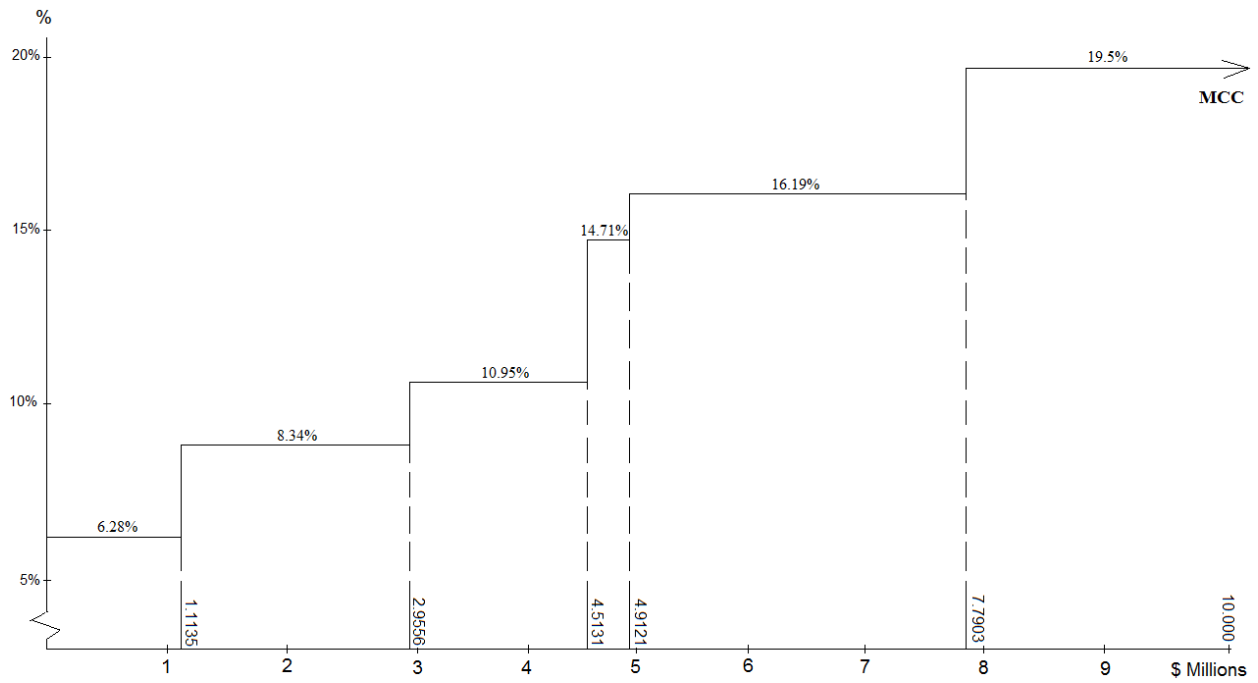
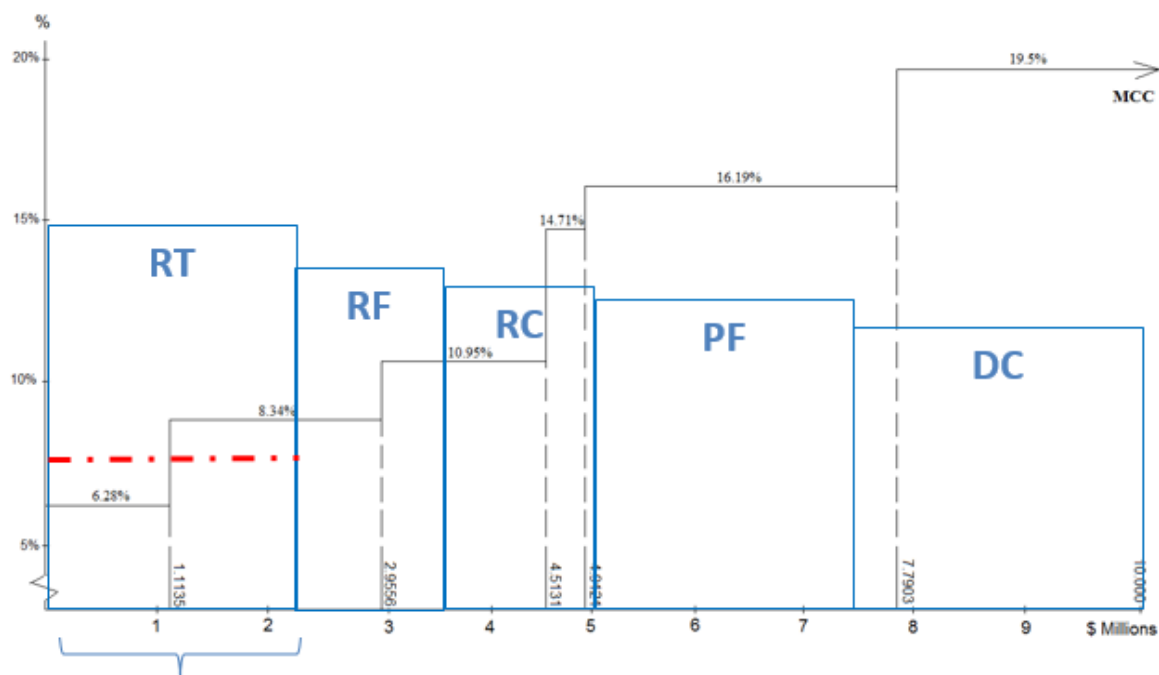
Figure 1. TTT Marginal Cost of Capital Schedule.

Figure 2. TTT's Investment Opportunity Set.



Project RT's Weighted Average Cost of Capital Calculation:

	Amount	Cost	Dollar Cost
Level 1 Funding	\$1,113,500.00	6.28%	\$69,927.80
Level 2 Funding	\$1,043,664.87	8.34%	\$87,041.65
Total Funding \$	\$2,157,164.87		\$156,969.45

Weighted Average Cost of Capital: 7.28%

Project	IRR	CF ₀
RT	14.96%	2,157,164.87
RF	13.48%	1,443,246.02
RC	13.41%	1,407,293.27
PF	13.38%	2,691,319.98
DC	13.09%	2,300,975.86

ENHANCING CENTRAL BANK COMMUNICATION: THE CASE OF THE FEDERAL RESERVE'S FIRST TWO-STAGE MONETARY POLICY ANNOUNCEMENT

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This note examines minute-by-minute reactions of the US interest rate and stock markets to the first Federal Open Market Committee press conference on monetary policy. Market volatility and volume effects during the press conference are shown to be less pronounced but more lasting than those observed immediately after the release of the monetary policy statement. Market responses during the press conference are found to be deterministic and originate from questions and answers pertaining to future monetary policy and the state of the economy. These findings are in line with the clarification objective of the Fed's new communication framework.

A DESCRIPTION OF THE CASE

In April 2011, the Federal Open Market Committee (“FOMC”) of the United States' Federal Reserve System (“Fed”) introduced a new strategy for monetary policy communication. An essential feature in the new strategy is a press conference that is held four times per year to provide additional context for the monetary policy statement. The press conference comprises two elements: first, the chairman of the FOMC delivers a detailed statement of the Committee's monetary policy stance and presents the latest economic projections. Then, the members of the media are allowed to ask clarifying questions about monetary policy. According to the Federal Reserve, the new strategy is adopted in order to enhance the clarity and timeliness of monetary policy communication, since communication has become an increasingly important aspect of monetary policy (see Blinder, Ehrmann, Fratzscher, De Haan, & Jansen, 2008, for a review). In financial markets, better communication by the central bank tends to resolve uncertainty about future monetary policy and improve the price discovery process.

Using a wide set of intraday financial data, this note aims to provide the first piece of evidence on the form of market adaptation to the FOMC's changed communication. Specifically, the way market participants respond to the new communication strategy is inferred from intraday patterns in money, bond, and stock index futures markets. Two avenues of research are explored. First, the press conference that aims to explain the FOMC's monetary policy stance is held approximately two hours after the release of the monetary policy statement. The time lapse gives potentially enough time to find new market equilibrium on the basis of the statement, which makes the press conference seem pointless if the statement already delivers all the relevant information about the monetary policy stance. Thus, the extent to which the FOMC's press conference initiates new price discovery processes can be viewed as a measure of effectiveness of the new communication tool. Second, the press conference is broadcasted live, which makes

the chairman's words subject to a real-time rhetorical analysis by the market participants. The participants may draw different price implications from the bits of information forwarded by the chairman, which would induce trading and possible price revisions. Therefore, mapping the topics discussed in the press conference onto synchronous transaction data would allow to identify the exact issues in the press conference that are perceived to be the most relevant from the market viewpoint.

DATA AND METHODOLOGY

The Fed scheduled the implementation of the new communication strategy for the FOMC meeting in April 2011. The publication of the new strategy received considerable media attention; investment banks, for example, circulated speculations about the content of the forthcoming press conference that were later reported in the financial press. The uniqueness, investor awareness, and media coverage of the event put it into a special context that guides the design of the empirical analysis.

The analysis focuses on one particular day, April 27th 2011, when the FOMC executed its new communication strategy for the first time. The monetary policy statement (released at 12:30 PM EST) and live footage of the press conference (held at 2:15 PM) were obtained from the [Federal Reserve's Web site](#). Traded volume and prices from the Chicago Mercantile Exchange's Globex system were collected at one-minute frequency for the whole maturity spectrum of three-month Eurodollar, ten-year Treasury note, and S&P 500 E-mini futures contracts. These data span from 9:00 AM to 5:00 PM, capturing the most active trading period of the day with a total of 480 observations per contract.

The market responses to the FOMC communication are gauged by price volatility and trading volume, which both are highly sensitive to the arrival of new information. The intraday volatility in a specific futures market at minute t , V_t , is measured by the absolute one-minute change in the log of volume-weighted average price ("VWAP"), $\{\bar{p}_t\}$:

$$V_t = 100 \times |\bar{p}_t - \bar{p}_{t-1}|, \quad \text{Equation 1}$$

where

$$\bar{p}_t = \ln \left(\sum_i p_{i,t} q_{i,t} Q_t^{-1} \right) \quad \text{Equation 2}$$

In a similar fashion, aggregate trading volume in specific market, Q_t , is the total of individual contract i volume in that market, $q_{i,t}$. Aggregated series are used in an effort to reduce the effects of microstructure noise, and to better capture the market-wide responses to new information. For illustrative purposes, a video of the intraday evolution of volatilities, volumes, and cumulative returns is available on [Youtube Web site](#).

In the European context, Ehrmann and Fratzscher (2009) find that the market responses to the press conference by the European Central Bank ("ECB") are related to the novelty of the preceding policy statement. For this reason, it is necessary to evaluate the information content of

the FOMC statement released on the day of the press conference, before turning to the empirical findings. As expected, the statement noted no change in monetary policy: the FOMC announced to keep its target range for the federal funds rate at the minimum level, and to complete the second round of quantitative easing (QE2) as scheduled. Although the FOMC downgraded slightly its general assessment of the economy, the overall impact of the statement on asset prices was mildly positive.

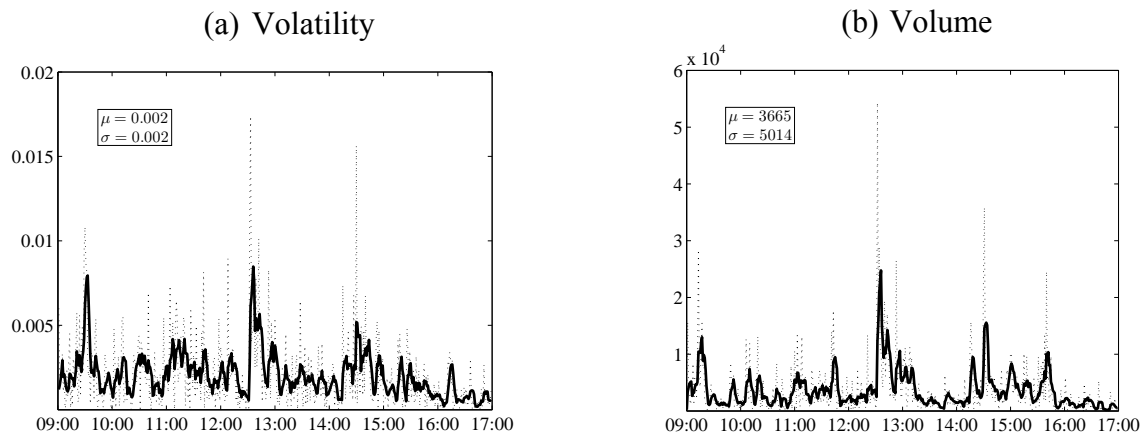
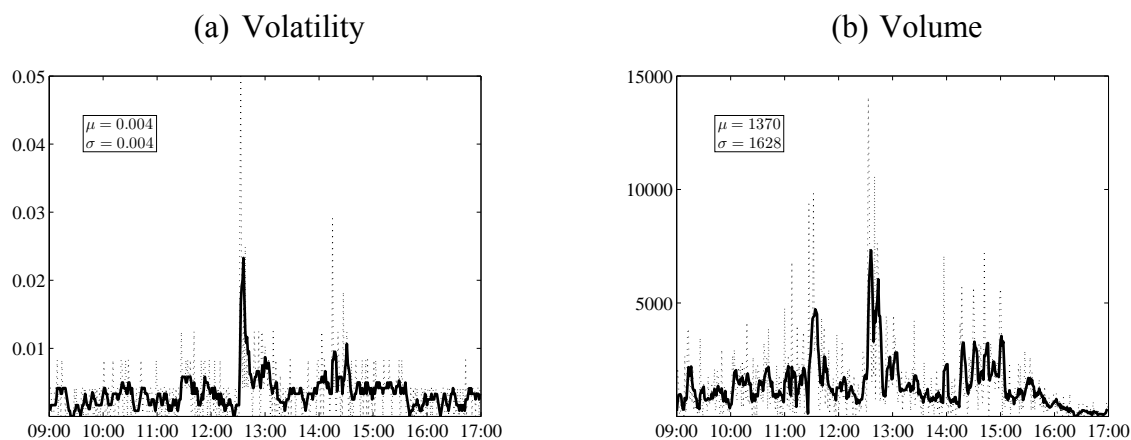
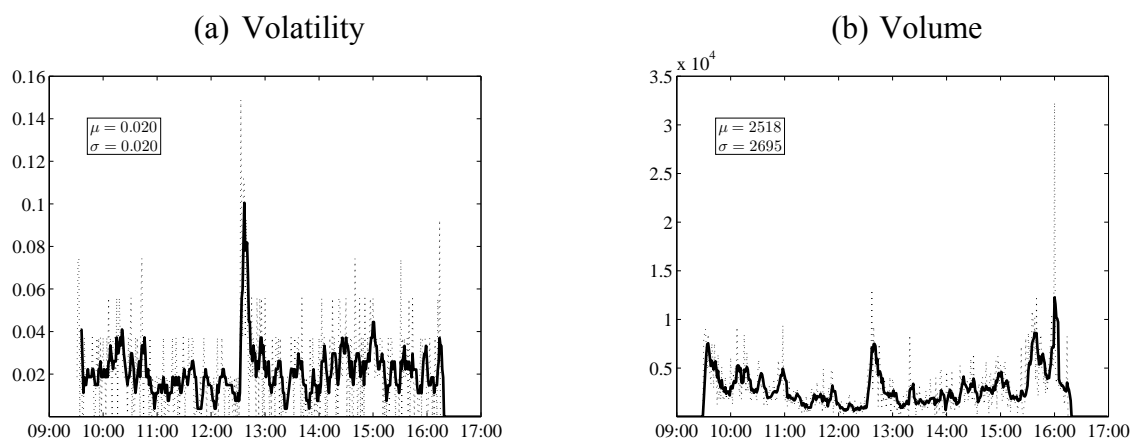
THE RESULTS

Figures 1-3 show the intraday evolution of trading volume and price volatilities. In each frame, the box in the upper-left corner shows the market average and standard deviation, and the thicker line represents a five-minute moving average.

Focusing first on volatilities on the left, all markets experience a jump after the monetary policy statement is released at 12:30 PM. Immediately after the release, volatilities are 8 to 12 times the market average but fall in half within few minutes. Volatilities remain elevated for another 30 to 45 minutes, depending on the interest-rate sensitivity of the market. The post-release decay of volatilities seem to be consistent with the speed of information revelation rule proposed by Vives (1995), which postulates that market participants trade on their private information so that market prices converge to their new equilibrium levels as an inverse square-root function of trading rounds. For example, the Vives (1995) rule implies that three (thirty) minutes of trading on new information reduces volatility by 50 (82) percent, which roughly corresponds to the patterns observed here.

Volatilities rise again after the beginning of the press conference at 2:15 PM, but this time they rise differently: sudden peaks are absent, and volatilities just shift up to a higher regime and remain there approximately until the end of the conference. Trading volume seem to follow a similar intraday pattern, peaking at 12:30 AM and then remaining above the market average for 30 to 45 minutes. In addition, volume seems to rise after 2:15 PM as do volatilities, although this increase is indistinguishable for the E-mini market after taking the normal U-shaped intraday pattern into account. Positive correlation between volatility and volume is a well-established empirical finding after public news events. It is often associated with a noisy rational expectation environment, where investors trade informatively on the basis of their own interpretations of the news as well as past prices (He & Wang, 1995).

Table 1 confirms the findings of the Figureical analysis. It presents the results of regressing the logs of volatilities and volumes on intraday dummy variables. Each dummy variable represents a phase in the FOMC communication process: the release period ("RLSE") extends from 12:30 PM to 1:00 PM, the intermediate period ("INTERM") from 1:00 to 2:14 PM, the press conference period ("PRESS") from 2:15 to 3:12 PM, and the post-conference period ("POST") from 3:13 to 5:00 PM. The morning period from 9:00 AM to 12:30 PM is set as a baseline level. With this specification, a regression coefficient can be interpreted as a mean percentage change in the dependent variable relative to its level in the morning.

Figure 1. Eurodollar futures.**Figure 2. 10-year Treasury note futures****Figure 3. S&P 500 E-mini futures.**

The coefficients in Table 1 indicate that volatility and volume levels increase after the release of the policy statement and during the press conference, subsequently returning to the baseline levels or below. This finding is statistically verified by using a Wald test for the null hypothesis that a sum of a set of coefficients is zero. The Wald statistics on the bottom line show that the sum of RLSE and PRESS coefficients are in fact well above zero (positive effect on volatility and volume), whereas INTERM and POST are zero or below (no or negative effect on volatility and volume).

Table 1. Volatility and volume regressions on intraday dummy variables.

In Variable (N)	RLSE (t-stat)	INTERM (t-stat)	PRESS (t-stat)	POST (t-stat)	F-stat DW
Eurodollar V_t (478)	0.63 (2.78)	-0.29 (-2.06)	0.10 (0.56)	-0.77 (-4.54)	13.87 1.83
Eurodollar Q_t (479)	1.15 (4.82)	-0.25 (-1.23)	0.61 (3.19)	-0.89 (-3.22)	24.06 1.36
T-note V_t (453)	1.59 (4.63)	0.66 (2.49)	1.04 (4.35)	-0.13 (0.51)	7.31 1.91
T-note Q_t (478)	1.06 (4.12)	0.03 (0.19)	0.57 (2.83)	-1.33 (-3.75)	26.13 1.64
E-mini V_t (405)	1.23 (1.88)	-0.12 (-0.22)	1.03 (2.03)	0.37 (0.88)	1.66 2.09
E-mini Q_t (405)	0.39 (1.66)	-0.46 (-3.15)	0.23 (1.74)	0.64 (2.87)	15.61 1.48
Sum(β) Wald test	6.87 [18.37]	0.39 [0.19]	4.38 [23.09]	-3.62 [6.48]	

Note: constant terms included but not tabulated. Heteroscedasticity and autocorrelation ("HAC") robust standard errors.

The F -statistics indicate that the strongest intraday effects are seen in the Eurodollar market, where the statement and the conference increase volatility, respectively, by 63 and 10 percent, and volume by 115 and 61 percent. The volatility effects are at least partly attenuated by high volatility in the morning, and may be better measured by *changes* in the coefficients; expressed this way, the Eurodollar volatility increase by 92 and 87 percent during the statement and the conference, respectively.

The effects of FOMC communication are equally significant in T-note and E-mini markets; both show strong variation in volatility and volume levels according to information flow from the Fed. Indeed, the FOMC statement and the press conference at least double the volatility in both markets, with positive but milder effects in volumes as well.

To put these results in context, Andersson (2010) provides a benchmark in his comparison of volatility responses to monetary policy statement under the Fed's former one-stage communication framework and the two-stage framework currently followed by the ECB. Compared to the results of Andersson (2010), volatility responses to the policy statement are now milder in the T-note and E-mini markets than those experienced under the Fed's old framework. In addition, in their pattern and magnitude, the T-note and E-mini volatilities seem like a hybrid of European stock and bond market responses to a statement *with* a policy change, and US market responses *without* one. Specifically, an ECB policy statement is much less informative than the Fed's, and opposite to a Fed statement, only a change in policy rates induces a market reaction. But when it does, the volatility pattern is similar to that observed in the Figures 2a and 3a.

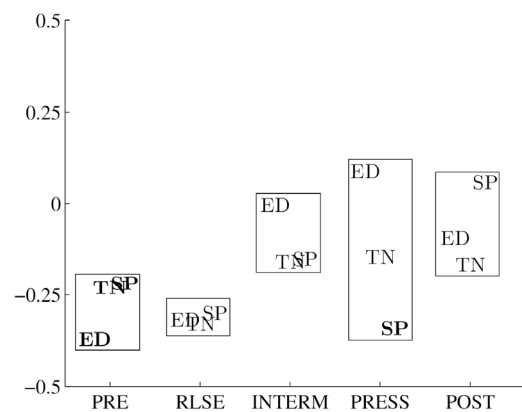
Ehrmann and Fratzscher (2009) study of the volatility and volume effects of ECB communication in the Euribor futures market enables a similar comparison as regards the Eurodollar market. Again, a comparison of the results shows that, with equally peaking volatilities and surging volumes, the two markets remind each other in their responses to policy statements and press conferences. Ehrmann and Fratzscher (2009) identified the market response to the latter event as a product of *clarification* of ECB's monetary policy stance. They hypothesize that the press conference either confirms, reinforces, or causes re-evaluation of the initial market reaction, and show that market turns are indeed more likely during press conferences, especially if the information content of the policy statement is low.

Thus, a logical next step is to find out whether the FOMC's first press conference on its monetary policy served a similar clarification role. Some tentative evidence on this matter can be inferred from first-order autocorrelations of the price changes. Ehrmann and Fratzscher (2009) note that once new information arrives, earlier price changes are either confirmed (no autocorrelation), reinforced (positive autocorrelation), or reconsidered (negative autocorrelation). As can be seen from Figure 4, autocorrelations before and at the time of the policy release are negative across asset classes, indicating partial reversals of earlier prices and hence difficulties in finding a new market equilibrium. Then, some time after the release, autocorrelations reduce and prices behave again more like a random walk. But once the press conference starts, the autocorrelation levels diverge. The instrument having the smallest interest rate sensitivity, namely the Eurodollar contract, exhibits a only small increase in the level of autocorrelation. On the other hand, the E-mini contract (having the largest sensitivity) dips to -0.35 in first-order autocorrelation, indicating quite strong re-evaluation of the past prices. The T-note contract with intermediate sensitivity exhibits, accordingly, a level of autocorrelation in between of the two extremes. After the press conference, autocorrelations converge towards zero again.

The key observation in the autocorrelation analysis is the divergent price-process behavior during the press conference. Supposedly, the observed divergence is not random but reflects different asset-class sensitivities to good and bad news about the economy. In order to investigate this possibility, a closer look is taken on the price and volume reactions to different topics discussed in the press conference. Whether or not the chairman's discourse on economic issues cause price adjustments is identified by the variation in the product of minute-by-minute price changes and volumes. Should any particular content in Chairman Bernanke's answers strike

some market participant as unexpected or important, one would expect him or her to trade on that piece of information, resulting in an increase in traded volume. To the extent that the participant trades at the margin, increased volume is accompanied by a change in price. Negatively correlated trading flow between interest-rate and equity index futures would further affirm the deterministic behavior of the market participants; one would expect to see negative returns for interest-rate futures in response to news indicative of faster economic growth, higher inflation, and future interest-rate hikes, and opposite effects on stock (index) futures insofar as the increased return expectations dominate the higher discount rate effect.

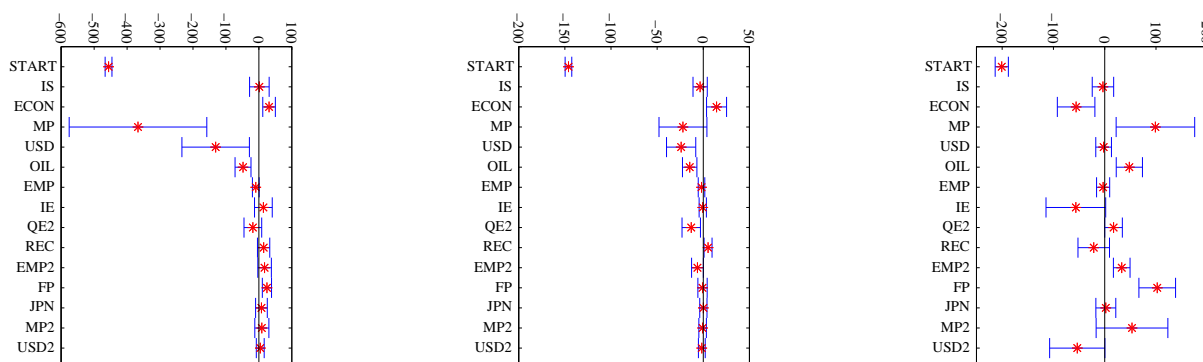
Figure 4. First-order autocorrelations during FOMC's communication process.



Note: boldfaced abbreviations denote statistical significance at the five percent level, based on HAC standard errors. Rectangles are for illustrative purposes.

Figures 5a to 5c present the results for each market. In each Figure, the subjects discussed in the press conference are listed in chronological order on the y -axis, plotted against the mean response in the trading flow (x -axis, scaled by dollar tick size). The trading flow is proxied by the product of the price and volume changes to previous values. Looking at the market responses, there is a clear negative reaction at the very beginning of the press conference. This peculiar and particularly strong reaction is not driven by new information from Chairman Bernanke's talk since he was not yet speaking, but is most likely driven by the excitement of the novel situation. Other strong responses are seen during Chairman Bernanke's answers about the timing of the next interest-rate hike ("MP") and the growth prospects of the US economy ("ECON"), the latter attracting the most attention in the E-mini markets.

Another regularity in the market responses is the support for the hypothesized negative correlation between asset classes. For example, studentized responses to Bernanke's answer about the Fed's future interest-rate hike are -3.51, -1.70, and 2.58 for the Eurodollar, T-note, and the E-mini contracts, respectively. Seemingly, higher perceived likelihood of interest-rate hikes triggered trading that lowered bond prices and increased expected equity prices as a signal of economic recovery. The contrary responses actually reflect the general pattern during the press conference: once the initial reaction ("START") is excluded, the interest-rate/equity correlation of studentized trading flow is negative for both the Eurodollar (-0.16) and the T-note market (-0.54).

Figure 5. The press conference by topic: the trading flow.

Note: START = beginning of the press conference; IS = introductory statement; ECON = economic outlook; MP = monetary policy; USD = US Dollar; OIL = oil price; EMP = unemployment; IE = inflation expectations; QE2 = second round of quantitative easing; REC = economic recovery; FP = fiscal policy; JPN = economic impact of the Fukushima disaster; PRESS = first press conference; ROLE = Fed's role in economic recovery. Stars represent period means in thousands of US dollars and whiskers their 95 percent confidence intervals based on HAC standard errors.

CONCLUDING REMARKS

The purpose of this note is to analyze the market adaptation to the FOMC's new two-stage strategy for communicating monetary policy decisions. In the first stage, the policy statement is released; in the second, the chairman of the Committee provides background information and interacts with the members of the financial press.

A case study focusing on the day of the first two-stage announcement yields interesting insights concerning the market adaptation to the new framework. The findings indicate that both the release of the policy statement and the press conference are important market events but differ in dynamics. Whereas the market response to the former is more short-lived and extreme, the press conference introduces longevity in the adjustment process by stimulating new waves of price discovery after any further clarification of the monetary-policy stance. The chairman's answers pertaining to future monetary policy and economic growth prospects seem to especially trigger simultaneous but opposite reactions in bond and equity futures prices, which is to be expected when discount-rate and cash-flow expectations conflict.

In the light of these findings, it seems that the press conference meets the FOMC's objective for enhanced clarity and timeliness of monetary policy communication. Moreover, the enhanced clarity works both ways; the central bank can now find out which particular topics draw the most attention in financial markets.

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