A SKETCH OF MACRO-BASED ASSET ALLOCATION [1, 2]

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Abstract:

This paper deals with the interaction between the macro-economy and financial markets. Various asset classes behave differently during different phases of the business cycle (or different inflation/growth macroeconomic dimensions) and neither asset class has been a top performer in each macroeconomic environment. We lay down a general case for macro-based asset allocation. The paper proposes that it might be reasonable to rebalance the portfolio based on the macroeconomic regime or a stage of the business cycle in order to produce stable returns with lower volatility than the traditional business cycle-neutral approach. We also claim that, among other things, bank credit growth is an important determinant of asset price fluctuations.

Keywords: *asset allocation, business cycle, credit growth*

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INTRODUCTION

The interaction between the science of macroeconomics and the science of finance has traditionally been vague. Macroeconomics has until recently focused more on the description of economic growth, inflation and the business cycle, without sufficient attention to financial markets dynamics. Finance has been more informed by the achievements of microeconomics rather than macroeconomics. General equilibrium theory and the utility theory have all penetrated finance models but little attention has been paid to the behavior of the business cycle, for example. Macroeconomic practitioners, on one hand, have often had little understanding of ongoing financial markets innovations. Investment professionals, on the other hand, have been focusing on valuations of financial market instruments – rooted in the determination of expected cash flows and their discounting.

It is usually at the peak of or shortly after a major economic crisis that paradigm shifts occur. For example, already since the late 1990s and early 2000s, economists tried to merge standard macroeconomic workhorse models with models of the term structure of interest rates. Their motivation was to better understand the interaction between the yield curve and the macro-economy. The result has been the growing literature on macrofinance models. Also, investment professionals struck by the 2008 global financial crisis re-evaluated their bottom-up approach to investments and began to pay closer attention to the developments of the macroeconomy in their investment decision-making. In general, this paper tries to hint on the bridge between finance and macroeconomics fields of research. The ambition of this paper is not to provide a well-worked theory of macro-based asset allocation, nor to provide a comprehensive empirical analysis, but to provide the contours and building blocks for such approach.

A SKETCH OF THE TRADITIONAL APPROACH TO ASSET ALLOCATION

The first and the most fundamental step in traditional approach to asset allocation is the determination of **strategic asset allocation**.[3] Strategic asset allocation combines capital market expectations with the investor's objectives and constraints. Capital market expectations refer to return expectations of the major asset classes that are determined using historical estimates, simulations and/or current forecasts. Investor's objectives (be it an individual or an institutional investor) refer to return and risk objectives, whereas the investor's constraints comprise time horizon, liquidity requirements, tax considerations, regulatory and legal considerations and unique circumstances as reflected in an investor's investment policy statement. Strategic asset allocation represents the targeted, or "policy" portfolio and the weights of individual asset classes in this portfolio are therefore target weights. Assuming that an investor is not rewarded for non-systemic risk that can be diversified away, the strategic asset allocation represents the investor's desired exposure to systemic risk of individual asset classes. After arriving at a strategic asset allocation, the traditional approach then looks for an appropriate benchmark that is used for actual portfolio evaluation. Strategic asset allocation is long-term in its nature and is re-evaluated in infrequent intervals.

[3] See Maginn, Tuttle, Pinto, McLeavey (2007) on traditional approach to asset allocation.

In practice, the workhorse strategic asset allocation has for long been the so-called **"60/40" allocation**, i.e. 60% of the portfolio allocated to equities and 40% of the portfolio allocated to fixed income securities (bonds).[4] Such allocation between equities and bonds was driven by an assumption of a certain correlation relationship between the market returns of equities and bonds. Particularly, it was argued that the returns of bonds and equities are not significantly correlated and each reacts to a different set of factors. On top of that, over long periods of time, equities tend to systematically outperform bonds. Being a more risky instrument, equity returns tend to command an equity risk premium over bond returns.[5] In sum, the traditional approach to strategic asset allocation was static, long-term embedded, benchmark-based and business-cycle neutral. Later on, more weight was shifted from domestic equities towards emerging market equities/bonds and towards alternative assets (including hedge funds, private equity funds, real-estate funds, and commodities futures).

Strategic asset allocation has been usually accompanied by some degree of **tactical asset allocation**.[6] Tactical asset allocation makes use of active investment management that deviates from the policy portfolio in order to exploit perceived short-term opportunities (disequilibria or mispricing) in the market. Since active management introduces another risk (active risk) it should be justified only by additional extra return (active return). In this respect, tactical asset allocation as such is not a full-fledged investment strategy (even though it can be performed both at infrequent intervals or as a part of a regular program or rule) but serves as a return-enhancer to the strategic asset allocation in times when the investment manager perceives short-term market opportunities that justify short-term deviation from targeted asset-class weights.

There are two main **motivations for performing strategic asset allocation** at all. The first one is the introduction of discipline to investment management. In doing so, the strategic asset allocation constantly and systematically focuses on investor's objectives and constraints as well as the desired exposure to systemic risk.[7] The second reason was put forth by a few empirical papers showing that almost 94% of the variability of total portfolio returns of a segment of U.S. institutional investors over a certain time span was explained by asset allocation as opposed to security selection (or active investment management).[8] Therefore, appropriately selecting asset classes was regarded as the key investment decision. Active management and security selection was claimed to contribute only very little to the variability of total portfolio returns, not justifying their associated extra costs and risks.[9]

In a later attempt to investigate the matter anew, Ibbotson (2010) confirmed the early results but clarified the contributions of individual factors. Market return and asset allocation dominated total return variability but after excluding the market return, the active management could explain as much as 50% of total return variability. Ibbotson

[4] Ilmanen (2011).
[5] See Ilmanen (2011), Ilmanen (2003), Hunt, Hoisington (2003), O'Neill et al. (2002), and Siegel (1999) on equity risk premium.
[6] See Lee (2000), and Maginn, Tuttle, Pinto, McLeavey (2007) on tactical asset allocation.
[7] Maginn, Tuttle, Pinto, McLeavey (2007).
[8] See Brinson, Hood, Beebower (1986), Brinson, Siner, Beebower (1991), Ibbotson, Kaplan (2000), Vanguard (2003), Tokat (2005).
[9] On the criticism of the "policy" portfolio see for example Bernstein (2003), Kneafsey (2003), UBS (2004).

(2010) also emphasized that the results are highly dependent on the fund, the peer group and the period being analyzed. Furthermore, using a normative approach based on bootstrapping simulations, Kritzman, Page (2003) challenged the conventional wisdom and claimed that asset allocation was the least important investment decision and that active management was the most important investment choice. Later on, Assoe, L'Her, Plante (2006) refined the methodology of Kritzman, Page (2003) and showed that asset allocation and active management were equally important and that their relative importance was time dependent and the results were especially sensitive to crisis periods.[10] Finally, as risk premia and asset class returns turned out not be constant over the course of the business cycle (as we will discuss below), the idea of market timing and active investment management became more acceptable than before (Ilmanen, 2011).

ALTERNATIVE APPROACH TO ASSET ALLOCATION: STYLIZED FACTS AND FIRST BUILDING BLOCKS

Ilmanen (2011) highlights the differences between the approach to asset allocation in the 1990s and at present. Before, the approach assumed a world with single risk factor, constant expected returns over time, investors caring only about the means and variances of asset returns, frictionless and efficient markets and rational investors.[11] At present, the emerging consensus approach assumes a more complex world with multiple risk factors, time-varying risk premia, skewness in returns and liquidity preferences, supply and demand effects on asset prices and various market inefficiencies, behavioral biases, irrational investors and market frictions. If there are inefficiencies in the market[12], market prices of securities are not anymore reflecting the fundamental value of asset classes and hence can not be the cornerstone of investment decision-making process. The focus on fundamentals and the relation between value and prices comes in the forefront and the importance of active asset management versus passive asset class allocation becomes obvious.

Compared to the assumptions and framework of the traditional approach to asset allocation, the real world paints a slightly different picture. Before we proceed to the behavior of individual asset classes across the business cycle, let us first pinpoint some of the stylized facts mentioned above.

Equity does not outperform bonds at all times. This is a reasonably straightforward observation but has far-reaching implications to how asset allocation and investment management is done. The U.S. capital markets are the largest and most liquid in the world and therefore are a good laboratory. During more than 200 years, there were a number of occasions where bonds outperformed equities over longer periods of time. For example, during 1874-1894 (by 0.9%); during 1928-1938 (by 5.5%); during 1980-

[10] This suggests that an additional value added of active asset managers might be in risk management, i.e. in lowering the exposure to risky assets in anticipation of crisis periods in order to protect the initial investment, and *vice versa*.

[11] See the pivotal works of Markowitz (1952) and Sharpe (1964).

[12] See Fama (1976) on efficient market hypothesis and Campbell, Lo, MacKinelay (1997) on the use of empirical models that assume market efficiency. On alternative views see Grossman, Stiglitz (1980), Lo (2004), and Bernstein (1999).

1990 (by 0.9%) or during 2000-2009 (by 7.21%).[13] Almost the same results hold for the United Kingdom as well.[14] For an investor to wait almost ten years to recoup his losses might sometimes be very difficult. Over twenty and more years holding periods, however, equities almost always beat bonds[15], but as the holding period shortens, this result ceases to be that straightforward. Barclays (2011) show that since 1899 the U.K. equities outperformed U.K. Gilts in only 69% of times over a holding period of two years, and in 89% of times over a holding period of eighteen years. In U.S. from 1936 to 2006, the equities outperformed bonds in 75% of times over a holding period of 10 years. Also, contrasting different beginning points and endpoints, Ilmanen (2011) shows that the equity-bond premium is highly sample specific.

Risk premia are not constant.[16] This is a more general elaboration that builds upon the previous stylized fact. From 1822 to 2002, the 20-year rolling average equity-risk premium in the U.S. varied from about -2.5% to almost +15%. The estimated bond risk premium, i.e. the return advantage of long-duration bonds over short-duration bonds, in the U.S. during 1982-2010 varied (depending on the estimation technique) from about -3% to about +5%. Credit risk premium of corporate bonds over government bonds of the same maturities in the U.S. from 1920 to 2010 varied (for AAA vs. Treasury spread) from approximately +0.2% to approximately +2.1%. The credit spread between the BAA rated corporate bonds and AAA rated corporate bonds over the same period varied from approximately 0.4% to approximately 5.5%. Proxy for illiquidity premium in the U.S. from 1926 to 2008 varied from approximately 0.05 to almost 0.4.

Asset class returns are correlated more than previously thought. The traditional approach to strategic asset allocation was based on the idea that there is little return correlation between equities and bonds, or between equities, bonds and various alternative assets respectively. The recent global economic and financial crisis not only showed that seemingly unrelated asset classes tend to get correlated, but also weakened the traditional benefit of asset class diversification during a period of stress when the benefit of diversification was most needed. For example, Page, Taborsky (2010) estimated that average correlations among major global asset classes[17] during the period of 1994-2009 was 39% in the full sample, 30% in quiet periods and 51% in turbulent periods. Also, correlation between credit risk premium and equity returns was highest (almost 100%) when equities suffered 10% or more loss in a month.[18] From 1970 to 2008, the correlation between U.S. equities and world ex-U.S. equities was -17% in times when monthly returns exceeded by one standard deviation their full-sample means, and the correlation was +76% in times when monthly returns were less by more than one standard deviation their full-sample mean.[19] Most strikingly, the 24-month rolling correlation between U.S. equity and government bond returns from 1929 to 2009 varied from approximately +70% to approximately -55%, and the 6-month rolling

[13] See Ilmanen (2011), and Hunt, Hoisington (2003). All returns are compounded annual.
[14] Barclays (2011).
[15] Ilmanen (2011), Barclays (2011).
[16] See Ilmanen (2011) for a comprehensive data source on various risk premia. See also Cochrane (2005) on a theoretical justification of risk premia from the perspective of modern finance theory.
[17] In particular U.S. small cap equities, U.S. large cap equities, global equities, emerging market equities, U.S. bonds, U.S. real estate, and commodities.
[18] Page, Taborsky (2010).
[19] Page, Taborsky (2011).

correlation varied from approximately +90% to approximately -90%.[20] Finally, correlation among seemingly diverse hedge fund strategies measured by Hedge Fund Research's indices rose from approximately 30% in 1993 to approximately 80% in 2009. The correlation of hedge funds' returns, or private equity funds' returns, with equity markets has been also increasingly positive since 1990 until present.[21]

Not only are the individual asset classes more correlated than previously thought, and not only are they more correlated during bad times than during good times, it also seems that **equity risk premium penetrates most asset classes (including non-equity asset classes) and this contributes to these correlations**. As Ilmanen (2011) shows, developed markets equity returns from 1990 to 2009 were positively correlated with emerging market equities, U.S. equities, U.S. corporate high-yield and investment-grade debt, emerging market debt, commodity futures, U.S. real estate, and global property stocks. As pointed out by Bender et al. (2010), the U.S. institutional investors' portfolio sensitivity to equity returns accounted for over 90% of their portfolio volatility, and this result holds for the traditional "60/40" portfolios as well as for highly diversified portfolios that include alternative assets.[22] An investor attempting to diversify his portfolio among these asset classes would indeed end up with a portfolio to a large extent driven by equity risk premium.

Risk factors are less correlated than asset classes. The high correlation of all asset classes, the omni-presence of equity-risk premium in most asset classes, and the finding of a higher correlation of asset classes in bad times than in good times led an increasing number of researchers to explore alternative venues, particularly of harvesting returns from risk premia of various risk factors.[23] This avenue of research is based on the notion that "asset class returns are driven by common risk factors, and that risk factor returns are highly regime-specific. Hence, risk factors – as opposed to asset classes – should be the building blocks for portfolio construction." (Page, Taborsky, 2011, p.1) Return on a security or an asset class is, in this approach, proportional to particular risk factors multiplied by the security's or asset class's return sensitivities to these risk factors. Some factors might have different influence on the security's or asset class's returns depending on the economic environment. A factor based approach "is also useful for thinking about the primary function of each asset class in a portfolio as well as for diversifying across economic scenarios". (Ilmanen, 2011, p.6)

As opposed to asset classes, correlations among risk factors are lower; therefore to diversify across risk factors should be more efficient than to diversify across asset classes. Page, Taborsky (2010) show that the average correlations from 1994 to 2009 among key risk factors were 2% for the full-sample, 2% during quiet times and 1.6% during turbulent times. Comparing this to the previously stated correlations for the asset classes shows a reverse picture. Unlike asset class correlations, the correlations among risk factors were in fact lower during turbulent periods versus quiet periods,

[20] Farrell (2011).
[21] Ilmanen (2011).
[22] See also Leibowitz et al. (2010) on this point.
[23] The pivotal works include Bhansali (2011), Bhansali (2007), Page, Taborsky (2010), Page, Taborsky, Pedersen (2010), Bender, Briand, Nielsen, Stefek (2010), Ilmanen (2011), and Clarke, de Silva, Murdock (2005).

albeit the difference is relatively small. Hence, portfolios based on risk-factor diversification, rather than asset class diversification, had less volatility and were less severely affected during extreme market turbulences.[24]

These risk factors include for example asset class sources of return (portfolio sensitivity to equity market, portfolio sensitivity to gold price, credit risk premium, yield curve slope, duration, currency exposure, etc.), macro-risk factors (economic growth, inflation, illiquidity, global macro characteristics, tail risks) or strategy styles (value, momentum, carry trade, volatility). The factor choices are subjective and are guided by both theory and experience.

One approach to harvesting returns associated with these risk factors was suggested by Bender et al. (2010) using long and short trades. For example, earning small-cap risk premium without the equity-risk premium, one needs to long small-cap equities and short large-cap equities.[25] Or, isolating the high-yield risk premium from the government bond return, one needs to be long in high-yield bonds and short in government bonds.

One warning sign for the risk-factor approach, though, from the Bender et al. (2010) analysis is a positive and relatively high correlation among credit/term spread styles on one hand and merger arbitrage, convertible arbitrage and carry trade on the other hand. These premia might be particularly sensitive to periods of market turbulences. Also, among all risk factors, it is particularly the credit spread, merger arbitrage and convertible arbitrage that exhibit correlations with global equities. One might argue, as we try to show below, that the risk-factor approach is not telling the whole story and one might need to incorporate a full-fledged dynamics of the business cycle into the asset allocation process.

TOWARDS MACRO-BASED ASSET ALLOCATION

The recent global economic and financial crisis led an increasing number of economists[26] to put greater emphasis on the behavior of various asset classes across the business cycle. The traditional business cycle-neutral and bottom-up approach to investing seems to be insufficient to protect the investors' wealth across the business cycle.

The behavior of asset classes, risk factors and style strategies across the business cycle

If different asset classes perform differently during different stages of the business cycle, it might be reasonable to rebalance the portfolio based on the stage of the business cycle. The following two tables illustrate the performance of some asset classes during

[24] Bender et al. (2010).
[25] Compare to Fama, French (1992 and 1993).
[26] See Ilmanen (2011), Bhansali (2011), Sheikh, Sun (2011), Page, Taborsky, Pedersen (2010), Page, Taborsky (2010), Bender et al. (2010), Clarke et al. (2005), Farrell (2011), Jakobson, Nuttall (2011), Bhansali (2007), O'Neill et al. (2011), and Blitz, Vliet (2008), Oppenheimer et al. (2009a, 2009b), Panigirtzoglou, Loeys (2005).

different regimes of economic growth and inflation as well as economic growth and volatility.[27]

Table 1: U.S. asset class real annual returns over different growth/inflation dimensions, 1960-2009

U.S. asset class real annual returns over different growth/inflation dimensions, 1960-2009

frequency	regime	stock market return	bond return	housing return	high-yield bond return	commodity return
23%	inflationary boom	-1,83	-1,27	9,91	-1,00	14,89
17%	inflationary stagnation	-1,04	-4,44	0,40	-7,57	4,97
26%	disinflationary stagnation	9,78	12,11	3,16	12,94	0,40
34%	disinflationary boom	15,15	4,14	7,78	7,23	4,64

Source: reproduced from Ilmanen (2011) for quarterly data; own calculations for annual data

Table 2: U.S. asset class real annual returns over different growth/volatility dimensiions, 1960-2009

U.S. asset class real annual returns over different growth/volatility dimensiions, 1960-2009

frequency	regime	stock market return	bond return	housing return	high-yield bond return	commodity return
23%	volatile boom	3,36	3,12	7,06	2,02	9,82
28%	volatile stagnation	-1,43	3,44	1,08	1,61	2,75
15%	stable stagnation	19,16	8,67	3,90	9,65	1,21
33%	stable boom	11,38	1,08	9,78	5,14	7,95

Source: reproduced from Ilmanen (2011) for quarterly data; own calculations for annual data

[27] The data series (in the form of dummy variables) come from Ilmanen (2011) and are defined for the U.S. economy. The economic growth proxy is an equal weighted average of six normalized time series: expected next year real GDP growth, realized past year real GDP growth, real earnings growth, the CFNAI index (a composite of a large number of real activity indicators), the ISM measure of business confidence, and the Conference Board measure of consumer confidence. The inflation proxy comprises inflation level and its annual change (averaging headline and core CPI, the GDP deflator, and a consensus forecast inflation rate). The volatility proxy is an average of realized stock and bond markets historical volatilities based on daily returns over the past quarter. The quadrant classification is based on the sign of the particular dummy variable. The studies quoted in the footnote above used a slightly different data specifications but came to very similar conclusions.

There are a number of patterns to be observed from these tables. **No single asset class dominates under all economic conditions.**[28] Equities perform better during disinflationary periods than inflationary periods. Equities also perform better during stable economic environment than volatile economic environment. All bonds perform best in disinflationary or stable environments. Commodities and housing perform best during inflationary boom periods. Bonds outperform stocks in volatile or disinflationary stagnation environments.

Also, as Bhansali (2011, p. 246) confirms, during the course of the standard U.S. business cycle, early expansions are best for world equities and U.S. high-yield corporate bonds and worst for low duration and long term U.S. bonds; late expansions are best for world equities and commodities and worst for long-term U.S. bonds and global bonds; early recessions are best for commodities and worst for long-term U.S. bonds and world equities; and late recessions are best for long-term U.S. bonds and TIPS and worst for commodities and international equities.

Ilmanen (2011) and Page, Taborsky, Pedersen (2010) also show that the behavior of strategy styles and risk factors as outlined above also reflects recognizable patterns across the business cycle. Ilmanen (2011, pp. 457-465) portrays, using mean excess returns and the NBER-defined business cycle turning points for data from 1927 to 2009, that equity risk premium and credit risk premium is highest during early expansions and late contractions/trough, and performs poorly during early and middle contractions. The bond risk (term) premium is highest during middle contractions and lowest during business cycle peaks. Among the equity risk factors[29], size (i.e. small capitalization stock returns minus large capitalization stock returns) exhibits a similar pattern as equity risk premium; value (i.e. return associated with value stocks minus return associated with growth stocks) exhibits almost no cyclical patterns; momentum returns are highest around peaks and early and middle contractions and worst during late contractions and trough. Among the other risk factors, for example dividend yield and credit spread perform best during contractions and trough, and the yield curve is flattest along the trough and steepest during late expansion and peak. Ilmanen (2011) also illustrates that divided yields are lower during boom periods and higher during stagnations; and the yield curve is steepest during disinflationary stagnation periods; and that corporate credit spreads are widest in volatile stagnations.

Understanding the relevance of macro-economy for asset allocation

As illustrated above, the development of the macro-economy matters for asset allocation. The very fact that the economy goes through cycles and that returns of individual asset classes, strategy styles and risk factors differ across the business cycle makes a very strong case for, at least, a macro-informed approach to asset allocation, which will take the investor's original strategic asset allocation as its starting point. For the duration of each macroeconomic regime or period of business cycle, the investor first calculates the performance of each asset class and determines which asset class(es)

[28] On this point see also Sheikh, Sun (2011).
[29] See also Fama, French (1992 and 1993) for these definitions.

performed best in each regime. This understanding will then form the investor's asset allocation going forward.

Research showed that taking the macro-economy into consideration for asset allocation purposes produced stable returns with lower volatility than traditional business cycle-neutral approach to asset allocation.[30] We are, however, not advocating mechanistic studying of the link between, for example, the GDP growth and the individual asset class returns, because such a link might indeed be tenuous.[31] On the contrary, we advocate a comprehensive (and multi-indicator based) approach to understanding the behavior of asset classes, asset strategies and risk premia across individual stages of the business cycle.[32] This approach is also distinct from attempting to predict expected returns in order to take advantage of tactical asset allocation in return enhancement.

We do not claim that there exist some "business cycle-risk premia" that a rational investor can exploit and that can be arbitraged away.[33] On the contrary, the macro-based approach to asset allocation is a prudent approach that acknowledges the diverse behavior of asset classes and investment strategies and risk premia across the business cycle and with this understanding tries to position the investments across the business cycle in such a way that produces the highest risk-adjusted return and protects the invested capital. Also, the macro-based approach to asset allocation does not propose a framework for market timing that exploits short-term mispricing. On the contrary, the framework is medium-term and attempts to allocate the invested capital across the business cycle in the most efficient way and harvest the returns that come from a varying performance of individual asset classes and strategies across the business cycle. Therefore, the suggested framework is most suited for long-term investors.

How and why does macroeconomic behavior translate into asset-price dynamics? We believe that developments in the macro-economy inform the (current or future) investment decisions of investors and thereby influence liquidity flows into various asset classes. These liquidity flows then move markets and eventually influence asset class valuations.

These liquidity flows are also linked to an inherent principal-agent phenomenon in the investment management industry. Households and institutions usually do not invest directly but delegate this duty to external professional asset managers. Vayanos and Woolley (2011) show the results arising from this principal-agent problem and the accompanying information asymmetries. The principal cannot properly identify the reason of agent's under(over)-performance against the benchmark. For example, after a negative shock to asset class A, the principal tends to gradually withdraw money from under-performing managers managing asset class A and place them with out-performing managers managing asset class B that performs well. These outflows,

[30] Sheikh, Sun (2011), Bhansali (2011), Page, Taborsky, Pedersen (2010), Farrell (2011), Blitz, Van Vliet (2008), and Dopfel (2010).
[31] O'Neill et al. (2011), Ritter (2005), Ilmanen (2011). However, O'Neill et al. find a strong link between the expectations about economic growth and equity returns.
[32] Sometimes, the relationships between asset markets and the macro-economy can become non-linear and the analytical framework needs to reflect that. See Sheikh, Sun (2011).
[33] See also for example Ilmanen (2011) for the discussion of this point.

however, force the under-performing managers to liquidate their holdings of asset class A in order to redeem the principal. This liquidation then pushes the prices of asset class A even further down. Since principals usually withdraw their funds gradually, this leads to a gradual downward pressure on asset class A. As soon as the price of asset class A is pushed down well below what the principals regard as fundamental (or long-term average) value, the reversal occurs and asset class A once again becomes an attractive investment. These momentum and reversal market shifts, informed by macroeconomic developments, can create significant market dynamics.[34]

In the traditional business cycle-neutral asset allocation approach, the process focused on valuation levels to determine which asset class was undervalued or overvalued relative to some fundamentals or historical levels. The position of the economy in the business cycle or the direction of macroeconomic movements was often not taken into consideration. As Page, Taborsky, Pedersen (2010) and Bhansali (2011) argue, this could lead to disastrous investment outcomes "when important macroeconomic shifts take place". This means that an asset class or an asset might not be an attractive investment at all prices, even if it were undervalued according to a standard valuation framework.[35] The decision-making framework needs to incorporate the position of the economy in the business cycle and other macroeconomic developments as well. Therefore, an investment needs to be attractive from both fundamental and macro-economic perspective in order to be included in the portfolio.

Of course, financial markets are jointly driven by macroeconomic, fundamental and other factors and we therefore suggest the use of a complex framework encompassing business cycle analysis, risk premia and strategy styles.[36] A successfully conducted macro-based asset allocation will be rooted in the investor's original strategic asset allocation and will subsequently rotate asset classes and strategies based on the economy's position in the business cycle. We believe that such approach to asset allocation can be rewarded by the market in the form of solid and more stable risk-adjusted returns. As in any other entrepreneurial activity the success in this activity will depend on a number of factors, including (i) the comprehensive empirical analysis of the interaction between the macro-economy and the asset classes; (ii) good theoretical understanding of the working of the business cycle itself; (iii) and on the investment manager's skills. All these three factors will help identify the inflection points in the business cycle and adjust the portfolio accordingly.[37] Sheikh, Sun (2011) show that even imperfect economic insight as defined by forecasting the direction of economic changes rather than their exact magnitude is a sufficient (though not easy to achieve) condition for successfully implementing the macro-based asset allocation approach. We are aware of the fact that including the behavior of the macro-economy into asset allocation framework creates additional analytical layer of complexity by the need of describing and predicting the business cycle and its relation to asset markets, but we believe that this is what successfully conducted macro-finance research (i.e. joint modeling of the macro-economy and financial markets) should accomplish.

[34] See also Berk (2005) on a related point.
[35] See Graham, Dodd (1996), Cochrane (2005) for standard methods of valuation of equities and other financial assets.
[36] See also Ilmanen (2011).
[37] The topic of business cycle theory is beyond the scope of this paper.

A note on the role of credit in the dynamics of the stock market (and other asset markets)

Let us move our approach to macro-based asset allocation one step further and outline the framework for analyzing the dynamics between the macro-economy and the asset markets in the modern economy, where credit plays a central role.

Even though standard textbook business cycle indicators are good equity market predictors, money and credit developments seem to have had mild predictive power with respect to equity risk premium in the short term.[38] However, in medium to long term, "credit and leverage developments appear to be important drivers of asset markets. Positive feedback effects can be important in credit creation and contraction, and in related asset valuation changes over the business cycle, but these patterns also operate at lower frequencies." (Ilmanen, 2011, p. 147). Chava, Park, Gallmeyer (2010) also document the relationship between banks' lending conditions and stock market returns.[39]

Let us illustrate role of credit in the dynamics of asset markets on an example from equity markets.[40] In an ideal world, good prospects for the underlying company (i.e. issuer of the equity shares) invite increased demand for such stock with expectations of further increases in the stock price or of prospects of increased dividend payments. Even without any material and fundamental justification, a general feeling of optimism can turn into increased demand for equities (or any other financial instruments). The rise in an individual equity price can lead to new equity share offerings by the company, making use of higher valuation and lower required return on equity. An increase in the number of equity shares after the new offering will eventually lead to a decrease in the equity price.

However, a general and continuing rise in all equity prices cannot be sustained at any length unless the investors are both willing and able to make increased and continued purchases of all securities. The ability of investors to continue demand for securities, and therefore the continued rise in all equity prices cannot be sustained for long without the support of an increased (and rising) supply of credit. Without the increase in credit and continued rise in profits of the underlying companies, the general and continued rise in equity prices cannot be sustained. It is, however, hardly possible for profits (or prospects for profits) of all or of a majority of underlying companies to rise at the same time without an increase in the effective monetary circulation through the creation of new credit in the economy (unless there is a general and sustained fall in wages and/or taxes across all or a majority of industries – a situation hardly to be imagined).[41]

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[38] Ilmanen (2011).

[39] On the interaction between credit growth and the macro-economy see also Reinhart, Rogoff (2008), Bordo et al. (2001), Mendoza, Terrones (2008), Borio, Drehmann (2009), Ng (2011), and De Nicolo, Lucchetta (2010).

[40] This part was inspired by Machlup (1940).

[41] Major waves of corporate profit growth in United States corresponded with easy monetary/credit conditions. These waves include the post-gold standard era of the 1970s, the internet bubble of the 1990s,

Cycles of market speculation can develop as a result of continual increase in equity prices over a longer period. A single (one-off) rise in profits of the underlying companies cannot produce a continuous rise in their equity prices. Continual rise in stock prices cannot be explained even by better business.

A one-off (or sluggish) increase in savings channeled to the stock market cannot produce a long-lasting upward movement of the market. New supply of equity shares offerings will stop the upward movement of equity prices. It is also hardly conceivable that the total supply of new savings can ever rise to unexpected dimensions, as the supply of savings is fairly inelastic and sluggish.

A sustainable rise in equity prices is only possible because of elastic bank credit. A contraction of credit in the economy has the opposite effect on equity prices, i.e. a general decline in equity prices. It is the dynamics – i.e. expansion and contraction – of the elastic bank credit that influences the dynamics of the stock market.[42] An analysis of the dynamics of credit growth is therefore a key feature of understanding the cyclical behavior of both the macro-economy as well as the financial markets.

We argue that this framework has to work for all asset classes, not just equities. In terms of the effects of newly created bank credit on asset classes (and their interaction), there is no material difference between equities and other asset classes.

It is also perfectly rational that even those investment professionals who realize the effects of credit expansion on asset prices participate in credit-driven waves of optimism on capital markets and do not try to go against the tide. These investment professionals try to forecast the duration of credit expansion and contraction and their effects on various asset classes with the goal to profit from these movements. Given the predominance of portfolio performance evaluation based on a comparison to pre-determined benchmarks, the cost of deviating from the benchmark return in terms of investment managers' career risk is substantial. Therefore, in a credit-driven optimism on capital markets, it does not necessarily pay off to not participate in the boom or even to be a contrarian investor.[43]

We also argue that the link between elastic bank credit and asset markets has even been re-enforced during the recent thirty years. As Warburton (2005) shows, the operation of the credit channel has changed since the 1980s. Relatively less credit is being fueled to the real economy through conventional bank lending and relatively more credit is being recycled within the financial sector. The traditional link between money/credit growth and consumer price inflation has been thereby weakened and the link between money/credit growth and asset price inflation might have been strengthened.[44] The

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the housing bubble after 2001, and the quantitative easing era after 2009. (See St. Louis Fed economic data database, FRED)

[42] Either directly through increasing the purchasing power of investors, or indirectly through its ability to increase output.

[43] This conformist herd investment behavior was also described by Keynes (1973) by claiming that it was always better for one's reputation to be wrong with the rest of the profession than being right on your own. See also Montier (2002), and (2007).

[44] On this see also White (2006), Goodhart (2007), Issing (2005).

ascendancy of financial markets since the 1980s is an accompanying phenomenon, as documented by Ilmanen (2011) and Bogle (2008), who show the growth of the financial sector versus the rest of the economy. Financials' share of the economy's profits and the financials' share of market capitalization almost doubled since the 1980s.

Since credit cycles are a natural phenomenon of the modern economy, long-term investors should have a natural interest in taking these relationships into consideration for their investment decisions. As Bhansali (2011, and 2007) points out, short-term investor does not benefit much from calibrating his model to the big picture of the macro-economy. However, the long-term investor can both harvest profits from adjusting his investments to the behavior of the macro-economy and achieve lower volatility than in the macro-neutral approach if conducted properly and systematically.[45]

CONCLUSION

This paper dealt with the interaction between the macro-economy and financial markets. We pointed out that the traditional approach to asset allocation was static and did not systematically take into consideration the macro-economy and the business cycle. Therefore, we intended to lay down a general case for macro-based asset allocation. We illustrated that various asset classes behaved differently during different phases of the business cycle (or different inflation/growth macroeconomic dimensions) and that neither asset class had been a top performer in each macroeconomic environment. We proposed that a macro-based asset allocation framework would put emphasis on the behavior of various asset classes across the business cycle. If different asset classes, strategy styles and risk factors perform differently during different stages of the business cycle, and if no single asset class dominated under all macroeconomic conditions, it might be reasonable to rebalance the portfolio based on the stage of the business cycle. Various studies showed that taking the macro-economy into consideration for asset allocation purposes produced stable returns with lower volatility than the traditional business cycle-neutral approach.

We also claimed that, among other things, bank credit growth is an important determinant of asset price fluctuations. We argued that the link between the bank credit and the asset markets had been re-enforced during the recent thirty years. Relatively more credit is being recycled within the financial sector than ever before and the link between the money and credit growth and asset price developments might have been strengthened.

In suggesting an avenues for further research in this area, we think that more research would be warranted along the lines of a full-fledge macro-based asset allocation

[45] We need to note, however, that credit growth is not the only important driver of asset market dynamics relevant for long-term investors. The various medium-term factors that we have not discussed and that go beyond the scope of this paper include for example various behavioral biases (see Montier, 2002 and 2007; Keynes, 1973, and Ilmanen, 2011); institutional aspects such as career risk, benchmarking (Keynes, 1936 and 1973), principal-agent problems in the investment management industry (Vayanos and Woolley, 2011; Berk, 2005); regulatory changes and structural brakes; as well as the two-way relationship between asset prices and economic variables (Soros, 2003 and 2008; O'Neill et al., 2011; Bhansali, 2011; Ilmanen, 2011).

approach (both empirical and theoretical) that would be based on a comprehensive analysis of the behavior of all asset classes across the business cycle in a single economy as well as globally.

LITERATURE REFERENCES

Assoe, K., L'Her, J.-F., Plante, J.-F.: "The Relative Importance of Asset Allocation and Security Selection", *The Journal of Portfolio Management, fall 2006*.

Barclays Capital: *Equity Gilt Study*, Barclays Capital, February, 2011.

Bender, J., Briand, R., Nielsen, F., Stefek, D.: „Portfolio of Risk Premia: A New Approach to Diversification", *The Journal of Portfolio Management, winter 2010*.

Berk, J. B.: "Five Myths of Active Portfolio Management", *The Journal of Portfolio Management, spring 2005*.

Bernstein, P. L.: "Are Policy Portfolios Obsolete?", *Economics and Portfolio Strategy, March, 2003*.

Bernstein, P. L.: "Why the Efficient Market Offers Hope to Active Management", *Journal of Applied Corporate Finance, Vol. 12.2, summer 1999*, Morgan Stanley.

Bhansali, V.: "Putting Economics (back) into Quantitative Models", *The Journal of Portfolio Management, spring 2007*.

Bhansali, V.: *Bond Portfolio Investing and Risk Management*, McGraw-Hill, 2011.

Black, F., Scholes, M.: "The Pricing of Options and Corporate Liabilities", *Journal of Political Economy, 81*, 1973.

Blitz, D. C., Van Vliet, P.: „Global Tactical Cross-Asset Allocation: Applying Value and Momentum across Asset Classes", *The Journal of Portfolio Management, fall 2008*.

Bogle, J. C.: "A Question So Important that it should Be Hard to Think about Anything Else", *The Journal of Portfolio Management, winter 2008*.

Bordo, M., Eichengreen, B., Klingebiel, D., Martinez-Peria, M. S.: „Financial Crises: Lessons from the Past 120 Years", *Economic Policy, April 2001*.

Borio, c., Drehmann, M.: "Assessing the Risk of Banking Crises – Revisited", *BIS Quarterly Review, March 2009*, Bank for International Settlements.

Brinson, G. P., Hood, L. R., Beebower, G. L.: "Determinants of Portfolio Performance" *Financial Analyst Journal, Vol. 42/4*, July/August 1986.

Brinson, G. P., Singer, B. D., Beebower, G. L.: „Determinants of Portfolio Performance II: An Update", *Financial Analyst Journal Vol. 47/3*, May/June 1991.

Campbell, J. Y., Lo, A. W., MacKinlay, A. C.: *The Econometrics of Financial Markets*, Princeton University Press, 1997.

Chava, S., Park, H., Gallmeyer, M. F.: "Credit Conditions and Expected Stock Returns", *Working Paper*, 2010.

Clarke, R. G., de Silva H., Murdock, R.: "A Factor Approach to Asset Allocation", *The Journal of Portfolio Management, fall 2005*.

Cochrane, J.: *Asset Pricing*, Princeton University Press, 2005.

De Nicolo, G., Lucchetta, M.: "Systemic Risk and the Macroeconomy", *IMF Working Paper 10/29*, 2010, International Monetary Fund.

Dopfel, F.: "Designing the New Policy Portfolio: A Smart, but Humble Approach", *The Journal of Portfolio Management, fall 2010*.

Fama, E. F. *Foundations of Finance*, Oxford: Basil Blackwell, 1976.

Fama, E. F.: "Efficient Capital Markets: A Review of Theory and Empirical Work", *The Journal of Finance, Vol. 25, No. 2*, May 1970.

Fama, E. F., French, K. R.: "Common Risk Factors in the Returns on Stocks and Bonds", *Journal of Financial Economics 33 (1)*, 1993.

Fama, E. F., French, K. R.: "The Cross-Section of Expected Stock Returns", *Journal of Finance 47 (2)*, 1992.

Farrell, J., Jr.: "Asset Allocation under Extreme Uncertainty", *The Journal of Portfolio Management, winter 2011*.

Goodhart, C. A. E., "Whatever became of the monetary aggregates?", *London School of Economics Special Paper 172*, 2007.

Graham, B., Dodd, D.: *Security Analysis*, McGraw-Hill, 1996.

Grossman, S. J., Stiglitz, J. E.: „On the Impossibility of Informationally Efficient Markets", *The American Economic Review, Vol. 70, No. 3*, June 1980.

Hung, L. H., Hoisington, D. M.: "Estimating the Stock/Bond Risk Premium", *The Journal of Portfolio Management, winter 2003*.

Ibbotson, R. G., Kaplan, P. D.: „Does Asset Allocation Policy Explain 40, 90, or 100 Percent of Performance?", *Financial Analyst Journal, January/February 2000*.

Ilmanen, A., Iwanowski, R.: "Understanding the Yield Curve: The Dynamics of the Shape of the Yield Curve – Empirical Evidence, Economic Interpretations and Theoretical Foundations", *Salomon Brothers, February 1996*.

Ilmanen, A.: "Expected Returns on Stocks and Bonds", *The Journal of Portfolio Management, winter 2003*.

Ilmanen, A.: "Understanding the Yield Curve: Forecasting U.S. Bond Returns", *Salomon Brothers, August, 1995*.

Ilmanen, A.: "Understanding the Yield Curve: Market's Rate Expectations and Forward Rates", *Salomon Brothers, June 1995*.

Ilmanen, A.: *Expected Returns: An Investor's Guide to Harvesting Market Rewards*, Wiley, 2011.

Issing, O., "Monetary policy and asset prices", *Boersen-Zeitung and Barclays Capital Booklet, 2005*.

Jakobson, P., Nuttall, N.: "Think Strategic, Act Tactical: Allocating Capital in the New Reality", *J. P. Morgan Asset Management, Research Summit – Passport to Opportunity, 2011*.

Keynes, J. M.: *Collected Writings, Volume XIV – The General Theory and After*, Macmillan & Cambridge University Press, 1973.

Keynes, J. M.: *The General Theory of Employment, Interest and Money*, Macmillan, 1936.

Kneafsey, K.: "Solving the Investor's Problem: Rethinking Policy Portfolios and Separating Alpha from Beta", *The Investment Research Journal, Vol. 6, Issue 5, August 2003*, Barclays Global Investors.

Kritzman, M., Page, S.: "The Hierarchy of Investment Choice", *The Journal of Portfolio Management, fall 2004*.

Lee, W.: *Theory and Methodology of Tactical Asset Allocation*, Wiley, 2000.

Leibowitz, M. L., Bova, A., Hammond, P. B.: *The Endowment Model of Investing: Return, Risk, and Diversification*, Wiley, 2010.

Lo, A. W.: "The Adaptive Markets Hypothesis: Market Efficiency from an Evolutionary Perspective", *Working Paper, August, 2004*.

Machlup, F.: *The Stock Market, Credit, and Capital Formation*, William Hodge & Company, Limited, 1940.

Maginn, J. L., Tuttle, D. L., Pinto, J. E., McLeavey, D. W.: *Managing Investment Portfolios: A Dynamic Process*, John Wiley & Sons, Inc., 2007.

Markowitz, H. M.: "Portfolio Selection", *The Journal of Finance 7 (1)*, 1952.

Mendoza, E. G., Terrones, M. E.: "An Anatomy of Credit Booms: Evidence from Macro Aggregates and Micro Data", *IMF Working Paper 08/226*, 2008, International Monetary Fund.

Montier, J.: *Behavioral Finance: Insights into Irrational Minds and Markets*, Wiley, 2002.

Montier, J.: *Behavioral Investing: A Practitioners Guide to Applying Behavioral Finance,* Wiley, 2007.

Ng, T.: "The Predictive Content of Financial Cycle Measures for Output Fluctuations", *BIS Quarterly Review, June 2011*, Bank for International Settlements.

O'Neill, J., Stupnytska, A., Wrisdale, J.: "Linking GDP Growth and Equity Returns", *Monthly Insights, May 2011*, Goldman Sachs Asset Management.

O'Neill, J., Wilson, D., Masih, R.: "The Equity Risk Premium from an Economics Perspective", *Global Economics Paper No. 84*, Goldman Sachs, 2002.

Oppenheimer, P., Mueller-Glissmann, Ch., Moser, G., Nielsen, A., Bell, S.: „The Equity Cycle Part 1: Identifying the Phases", *Goldman Sachs Portfolio Strategy, October 2009*.

Oppenheimer, P., Nielsen, A., Mueller-Glissmann, Ch., Moser, G., Bell, S.: „The Equity Cycle Part 2: Investing in the Phases", *Goldman Sachs Portfolio Strategy, October 2009*.

Page, S., Taborsky, M. A., Pedersen, N. K.: "Asset Allocation: Does Macro Matter?", *Viewpoints, December 2010*, Pimco.

Page, S., Taborsky, M. A.: "The Myth of Diversification: Risk Factors vs. Asset Classes", *Viewpoints September 2010*, Pimco.

Page, S., Taborsky, M.: "The Myth of Diversification: Risk Factors versus Asset Classes", *The Journal of Portfolio Management, summer 2011*.

Reinhart, C. M., Rogoff, K. S.: „This Time is Different: A Panoramic View of Eight Centuries of Financial Crises", *Working Paper No. 13882*, National Bureau of Economic Research.

Ritter, J. R.: "Economic Growth and Equity Returns", *Pacific-Basin Finance Journal No. 13*, 2005.

Sharpe, W. F.: "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk", *Journal of Finance, 19 (3)*, 1964.

Sheikh, A. Z., Sun, J.: "Regime Change: Implications of Macro Shifts on Asset Class and Portfolio Performance", *J. P. Morgan Asset Management*, 2011.

Siegel, J. J.: "The Shrinking Equity Premium", *The Journal of Portfolio Management, fall 1999*.

Soros, G.: *The Alchemy of Finance*, John Wiley & Sons, Inc., 2003.

Soros, G.: *The Crash of 2008 and What It Means: The New Paradigm for Financial Markets*, NY: Public Affairs, 2008.

The Vanguard Group: "Sources of Portfolio Performance: The Enduring Importance of Asset Allocation", *July 2003, The Vanguard Group*.

Tokat, Y.: "The Asset Allocation Debate: Provocative Questions, Enduring Realities", *Investment Counseling & Research, April 2005*, The Vanguard Group.

UBS: "An Asset Allocation Revival", *White Paper Series, March 2004*, UBS Global Asset Management.

Vayanos, D., Woolley, P.: "An Institutional Theory of Momentum and Reversal", *FMG Discussion Paper No. 621*, London School of Economics, 2011.

Verstyuk, S.: "Linking the Term Structures of Interest Rates and Macroeconomic Expectations – GS Yield Curve Valuation Model", *The Foreign Exchange Market, November 2007*, Goldman Sachs Economic Research.

Verstyuk, S.: "The Family of GS Curves", *Global Viewpoint Issue No. 08/16*, Goldman Sachs Economic Research.

Warburton, P.: *Debt and Delusion: Central Bank Follies that Threaten Economic Disaster*, Worldmetaview Press, 2005.

White, W. R.: "Is Price Stability Enough?" *BIS Working Papers No. 205*, Bank for International Settlements, April 2006.