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ANALYSIS OF ASSET CLASSES THROUGH THE BUSINESS CYCLE

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Abstract. This study was driven by the dissimilar performance characteristics displayed by asset classes over the business cycle. The authors aim to explore assets classes on the grounds of a scientific literature review and a statistical analysis. Business cycles are divided into four stages to explore broad movements in returns of asset classes and a possible existence of asymmetrical effects of determinants within stages. Six main asset classes were analysed: US stocks, EAFE stocks, Bonds, Gold, Real Estate and Commodities. Monthly data from February 1976 to August 2011 were used for the study. The article combines business cycle and asset allocation theories by adding valuable information about performance of asset classes during different phases of the business cycle. Using the OECD Composite Leading Indicator as a business cycle measure, the authors demonstrate that different assets classes have different return/risk characteristics over the business cycle. The article demonstrates how to use the business cycle approach for investment decision-making. The OECD Composite Leading Indicator can provide significant information on market expectations and the future outlook; hence, results of this study can help every investor improve his/her performance and risk management.

Keywords: asset classes, asset allocation, business cycle, OECD Composite Leading Indicators.

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1. Introduction

Deciding where to put their money is the main challenge for investors these days. Everyone wants to know which asset class will perform the best and help them meet their goals.

Dissimilar performance characteristics displayed by equity versus debt assets over the business cycle is an established phenomenon in financial markets. Typically, total returns on equities rise during expansions while those of fixed income debt instruments do better during downturns. Within this general pattern, however, there exists a wide spectrum of cyclically related return/risk characteristics as determined by unique cash flow and risk premium attributes of each asset.

Most asset allocation studies agree on the importance of strategic asset allocation as a determinant for investment returns. Established investors practice investment diversification across market capitalizations, countries, sectors, and asset classes to enhance the risk-return tradeoff in a portfolio. Brinson, Hood and Beebower (1986) claim that 93.6% of performance variation can be explained by strategic asset allocation decisions. This result implies that characteristics of various asset classes are a very important component of investment results.

As the asset allocation decision is of significant importance, almost all asset managers and financial advisors determine an optimal portfolio for their clients – be they institutional or individual – by performing an asset allocation analysis with the help of a set of asset classes (Fabozzi *et al*. 2002).

The goal of this article is to explore asset classes using the business cycle approach. The article combines business cycle and asset allocation theories by adding valuable information about performance of asset classes in different phases of the business cycle. It demonstrates how to use the business cycle approach in investment decision-making. The authors use 6 asset classes for analysis: US stocks, EAFE stocks, Bonds, Gold, Real Estate and Commodities.

Research methods – the comparison and generalization method and statistical analysis on the basis of the OECD Leading Indicator approach – used in this paper resulted for logical analysis and synthesis of scientific literature.

2. Literature review

The thesis that stock prices mimic rises and falls in the business cycle can be strongly supported. With few exceptions, research shows that stock prices lead the level of economic activity. This phenomenon follows from the belief that current stock prices correctly impound expectations of future economic activity. Moore, for example, shows that 18 of the 23 business cycle peaks (troughs) occurring between 1873 and 1970 are anticipated by the stock market, with an average lead-time of about five to six months. Moreover, from 1948 through 1970 his research shows 100% of peaks and troughs being correctly anticipated (1983). More contemporary research using Granger methods shows bidirectional causality between stock returns and real economic activity (Tunah 2010; Ali *et al.* 2010).

Adjasi and Biekpe (2006) pointed out that stock exchanges can provide quick paths to capital acquisition, due to the ease with which securities are traded. Stock exchange activity therefore plays an important role in helping to determine country's macroeconomic condition. Literature review contains a number of studies that examine stock price changes. Probably one of the most interesting and important subjects that receives increasingly more attention from economists, financial investors and policy makers is dynamic effects of macroeconomic indicators on stock prices.

Ibrahim found that macroeconomic forces influence stock prices through their impact on the expected future cash flows (1999). Mehr noted that the public policy impact

on growth can be measured by stock prices (2001). Chakravarty also stated that stock prices are highly sensitive to key macroeconomic indicators (2005). Frankel stated that international reserves and real exchange rate overvaluation are the top two indicators that stood out as useful leading indicators of the current financial crisis (2010).

Unlike equities, the empirical record shows bond prices moving inversely with the business cycle. In large part this fact is due to the cyclical movement in interest rates and the fixed income nature of bonds. Between 1946 and 1970, Moore (1983) shows corporate bond yields declining and bond prices rising in all but one contraction. Thus, with the exception of periods of stagflation in the post-war U.S. economy, the historical record confirms the business/interest rate cycle moving in reasonably close tandem, such that the business cycle/bond price relationship is inverse (Borcato, Steed 1998).

In numerous papers, using a variety of methodologies and databases, a recurring theme emerges from real estate research. Because of its apparently low correlation with other assets, real estate offers outstanding diversification and return attributes relative to conventional portfolios (Gibson 2008; Black 2004; Sagalyn 1990). Sagalyn study also revealed that relative to the overall stock market, equity REITs exhibited less volatility and higher returns.

Today, gold would be probably the most controversial asset class. Despite it being a commodity in general, it has completely different attributes. Tanzer and Frick (2011) described this asset class as "The latest mania". Unlike other assets, gold doesn't pay dividends. And unlike other commodities, gold has few industrial uses. But gold is a great hedge against political and economic upheaval. Gold provides a hedge against inflation, currency weakness and financial turmoil. Gold doesn't move in sync with stocks or bonds, so it is a good diversifier (Tanzer, Frick 2011).

Diversification and inflation hedging provide the two chief motives for including commodities to a portfolio. Humphreys (2006) stated that adding commodities to a diversified investment portfolio of stocks and bonds provides several benefits for an investor, including positive returns over time and negative correlation to financial assets, such as stocks and bonds. Jarecki (2007) also agree that commodities should be included to every diversified portfolio.

In their study, Bekkers, Doeswijk and Lam (2009) explored asset classes that add value to a traditional asset mix. Their mean-variance analysis suggests that real estate, commodities, and high yield bonds add the most value to the traditional asset mix of stocks, bonds and cash. Basically, adding these three asset classes comes close to an all-asset portfolio. The portfolio with all assets shows a diversification benefit along the efficient frontier. Herold *et al.* (2007) states what traditional balanced portfolios cannot overcome the conflict of various investment horizons. In order to generate capital gains, large allocations in risky asset classes – such as Commodities, precious metals and real estate – are required.

The diversification benefits of a multiple-asset-class approach rest on the dissimilarities in patterns of returns across asset classes in the short run and competitive asset class pricing in the long run. These conditions will likely hold true in the future, even

in the face of risks and opportunities that are unique to the times. The wisest investment strategy is to diversify portfolios broadly in order to mitigate the risks of an unknowable future (Gibson 2008).

3. Business cycle analysis

Business cycles are divided into four stages so that broad movements in stock returns and determinants across the stages can be analysed and the possible existence of asymmetrical effects of determinants within stages can be explored. Based on average returns for the four business-cycle stages, returns are found to decrease throughout economic expansions and into the first half of recessionary periods. Average returns are negative and reach their lowest values during the first half of recessions, yet quickly rebound to their highest levels as the recession concludes. Falling expectations for future earnings and rising long-term interest rates appear to be the driving force behind the falling returns that occur during economic expansions and changes in short-term rates coupled with rising expectations are major contributing factors to the rising returns that occur during economic recessions (DeStefano 2004; Bordo, Helbling 2010).

For many fundamentals-based investors, at least half of their time is spent trying to anticipate the next move in the business cycle. However, forecasting is very difficult. When the economy is in recession, the length of time it will last and the strength of recovery become overriding questions. Moreover, cycles differ in their impact on the major asset classes, thus history never repeats itself. The most common mistake is to forget or to deny that the cycle exists. Investors frequently start believing that the upswing must go on forever or that the recession will never end. This usually proves costly. However, trying to time the cycle precisely can also prove costly if an investor takes a wrong guess. Hence, the approach taken by most investors is to alter asset class weightings, or time purchases and sales with one eye on the cycle, but not to place excessive bets upon timing the cycle correctly (Calverley 2002; Woodford 2010).

The leading indicators approach is one of the best ways to predict a phase of the business cycle. For many years, a system of leading, coincident, and lagging economic indicators, first developed in the l930s by the National Bureau of Economic Research (NBER), has been widely used in the United States to appraise the state of the business cycle (Klein, Moore 1982).

The OECD Leading Indicators approach is among the most popular and comprehensive ones used. During the 1980's the OECD developed its system of leading indicators and business cycle analysis to provide economic analysts with early signals of turning points in economic activity. This information is of prime importance for economists, businesses and policy makers to enable correct analysis of the current economic situation and for the anticipation of economic developments. Data of Composite Leading Indicators (CLI) are compiled and disseminated by the Statistics Directorate of the OECD (Slaper, Cohen 2010; Ozyildirim *et al.* 2010).

The OECD CLIs are aggregate time series, which show a leading relationship with the growth cycles of key macro-economic indicators (the average lead is 6-months). Typically, they are constructed to predict the cycles of total industrial production or gross domestic product in industry, which are chosen as proxy measures for the aggregate economy (Levanon 2010).

4. Data and methodology

Because of its popularity and data availability, we are using OECD CLI as a business cycle measure. This approach focuses on turning points (peaks and troughs), hence four qualitatively different cyclical phases can be identified: expansion – CLI increasing and above 100; downturn – CLI decreasing and above 100; slowdown – CLI decreasing and below 100; recovery – CLI increasing and below 100. The research used monthly data – which was taken directly from the OECD web page (the OECD Leading Indicators) – for the period from February 1976 to August 2011.

The hypothesis that movements in economic indicators of the CLI contain useful information concerning subsequent movements in different asset classes was backtested using 6 assets: US stocks, EAFE stocks, Bonds, Gold, Real Estate and Commodities. In Table 1, we can see data source and representing index for each of the assets.

Table 1. Data of asset classes (Source: created by authors)

Asset Class	Representing index	Source	Time period
US Stocks	S&P 500 index.	finance.yahoo.com	1976.02–2011.08 (monthly)
EAFE stocks (Europe/Japan equity)	MSCI EAFE index	mscibarra.com	
Bonds	Barclays Capital U.S. Aggregate Bond Index	bloomberg.com	
Gold	Gold	World gold council	
Real estate	FTSE NAREIT US Real Estate Index	ftse.com	
Commodities	S&P GSCITM Total Return Index	Bloomberg.com	

Each time period is labelled according to a phase of the business cycle determined by CLI, consequently, monthly return of each asset can be assigned to a specific phase of the business cycle. It enables us to explore assets in different phases by various criteria such as return and risk.

Aniūnas *et al.* (2009) emphasised that investors need to evaluate acceptable risk level during analysis of investment models and before making decisions. Hence, in addition to return rates, standard deviation, Ulcer index (negative volatility) and max

drawdown (biggest fall from the peak) are used to evaluate risk of each asset class during different phases of the business cycle.

Before proceeding with assets analysis through the business cycle, it is informative to consider the statistical characteristics of six assets in isolation through full time period (Table 2).

Table 2. Characteristics of assets (Source: own calculations)

	1976.02.01-2011.08.01	S&P 500	EAFE	Bonds	Gold	REIT	Commodities
Profit	Growth per period	1181%	1265%	1580%	1171%	5127%	1262%
	Mean monthly return	0.7%	0.7%	0.7%	0.7%	1.1%	0.8%
	CAGR	7.4%	7.6%	8.3%	7.4%	11.8%	7.6%
Risk	Ulcer index	15.8%	18.6%	2.0%	38.7%	14.1%	22.1%
	Standard deviation (monthly)	4.4%	4.9%	1.6%	5.6%	4.8%	5.5%
	Max drawdown	-52.6%	-58.2%	-12.7%	-61.8%	-67.9%	-67.6%
	Average drawdown	-10.3%	-12.3%	-0.9%	-32.9%	-7.4%	-15.2%
	Negative returns, %	40.1%	41.3%	30.3%	46.7%	36.2%	42.0%
Ratio	CAGR/Ulcer index	0.5	0.4	4.1	0.2	0.8	0.3
	CAGR/Standard deviation	1.7	1.5	5.1	1.3	2.5	1.4
	CAGR/Max drawdown	0.1	0.1	0.6	0.1	0.2	0.1
	CAGR/Average drawdown	0.7	0.6	8.8	0.2	1.6	0.5
	CAGR/negative returns	0.2	0.2	0.3	0.2	0.3	0.2

For the full period, bonds and Real Estate outperforms other assets. Real Estate has the greatest profitability ratios with average risk ratios, while Bonds with average return ratios outperforms other assets by its low risk ratios.

5. Results

As we can see from the Table 3, separation of full time period to OECD business cycle phases gives us interesting results. As expected, returns on equities, including US and EAFE stocks and real estate are statistically better in the “Recovery” phase, respectively 1.29%, 1.92% and 1.86%. Stocks also show quite good performance in the “Expansion” phase, while this period is the worst for Real Estate. For US and EAFE stocks, the worst periods are the “Slowdown” and the “Downturn”. For bonds, the reverse is true, in the

"Slowdown" – 0.71% monthly return, in the "Downturn" – 1.14%. Gold performs the best in the "Slowdown" (1.74%) and Commodities – in the "Expansion" (1.65%). In fact, "Commodities" perform much better than other assets in that period.

Table 3. Performance of assets through business cycle (Source: own calculations)

	S&P 500	EAFE	Bonds	Gold	REIT	Commodities
Average monthly growth						
Recovery	1.29%	1.92%	0.66%	0.68%	1.86%	1.16%
Expansion	0.62%	0.88%	0.28%	0.60%	0.49%	1.65%
Slowdown	0.48%	0.49%	0.71%	1.74%	1.31%	1.11%
Downturn	0.48%	–0.25%	1.14%	–0.08%	0.70%	–1.03%
Standard Deviation						
Recovery	3.83%	4.43%	1.56%	4.82%	3.45%	4.63%
Expansion	4.10%	4.45%	1.10%	5.06%	4.20%	4.43%
Slowdown	3.85%	4.17%	1.55%	5.98%	3.87%	5.86%
Downturn	5.57%	6.38%	2.13%	6.17%	6.90%	6.71%
Ulcer index						
Recovery	11.8%	11.4%	1.1%	41.8%	2.0%	12.8%
Expansion	12.6%	12.5%	1.1%	15.9%	12.1%	17.0%
Slowdown	11.2%	10.6%	1.3%	33.6%	6.6%	12.7%
Downturn	16.2%	17.7%	1.8%	44.3%	13.1%	18.8%
Max drawdown						
Recovery	–34.6%	–32.0%	–3.6%	–58.7%	–6.0%	–42.3%
Expansion	–32.7%	–40.4%	–4.5%	–44.9%	–42.0%	–46.3%
Slowdown	–32.3%	–40.3%	–7.3%	–59.5%	–20.9%	–62.0%
Downturn	–46.2%	–47.6%	–9.0%	–60.6%	–57.5%	–63.1%
Return/Standard deviation						
Recovery	0.34	0.43	0.42	0.14	0.54	0.25
Expansion	0.15	0.20	0.25	0.12	0.12	0.37
Slowdown	0.13	0.12	0.46	0.29	0.34	0.19
Downturn	0.09	–0.04	0.53	–0.01	0.10	–0.15
Return/Ulcer index						
Recovery	0.11	0.17	0.62	0.02	0.93	0.09

End of Table 3

Expansion	0.05	0.07	0.24	0.04	0.04	0.10
Slowdown	0.04	0.05	0.56	0.05	0.20	0.09
Downturn	0.03	–0.01	0.63	–0.00	0.05	–0.05
Return/Max drawdown						
Recovery	0.04	0.06	0.19	0.01	0.31	0.03
Expansion	0.02	0.02	0.06	0.01	0.01	0.04
Slowdown	0.01	0.01	0.10	0.03	0.06	0.02
Downturn	0.01	–0.01	0.13	–0.00	0.01	–0.02

Not only returns vary over the business cycle as the risk ratios move significantly as well. Specifically, the standard deviations of all asset classes rise for the "Downturn".

The same tendency can be observed with other risk measures. Let's take a closer look at the Ulcer index, which shows negative volatility of a specific asset. The Ulcer index for the Real Estate in "Recovery" is only 2%, while in "Downturn" – 13.1%. For Gold, the least negative volatile period is the "Expansion" with the 15.9% Ulcer index, the most volatile period is the "Downturn" with 44.3%. For US and EAFE stocks, the most volatile period is the "Downturn" as well (16.2% and 17.7%).

Return/risk ratios allow us comparing performance of assets over the business cycle. The bigger the numbers, the higher the returns with lower volatility are generated by a specific asset class. Three best assets in the particular phase of the business cycle are marked in the table. As we can see, the "green" cells vary considerably over the business cycle.

6. Conclusions

The study examined the relationship between asset classes and the business cycle. In particular, the following conclusions can be made:

1. The hypothesis that asset prices rise and fall in the business cycle is strongly supported by previous researches.
2. Asset classes show dissimilar performance characteristics over the OECD business cycle. The risk of all asset classes rise for the "Downturn" phase. Return for bonds are considerably higher than in other phases, while returns of other asset classes are poor.
3. While it is difficult to predict business cycle turning points, the OECD Composite Leading Indicator can provide significant information on market expectations and the future outlook; hence, every investor can improve his/her performance and risk management with the help of results of this study.

4. The article presents the framework for constructing asset allocation policies and the optimal portfolio. It is possible to construct the optimal portfolio for each phase of the business cycle, where decision for reallocation is made according to the phase of the business cycle.

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TURTO KLASIŲ ANALIZĖ VERSLO CIKLO ASPEKTU

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Santrauka

Nevienodos turto klasių savybės ekonominio verslo ciklo metu lėmė šio tyrimo aktualumą, kurio pagrindinis tikslas yra ištirti turto klasių charakteristikas skirtingomis verslo ciklo fazėmis per esamos mokslinės literatūros ir statistinės analizės prizmę. Verslo ciklas yra skirstomas į keturias fazes, taigi turto klasių grąža gali būti analizuojama skirtingais laiko periodais. Tyrimo metu buvo analizuotos šešios pagrindinės turto klasės: JAV akcijos, EAFE akcijos, obligacijos, auksas ir žaliavos. Analizuojant buvo naudojami mėnesių duomenys nuo 1976 m. vasario mėn. iki 2011 m. rugpjūčio mėn. Straipsnyje sujungiamos verslo ciklo bei turto lokacijos teorijos ir gaunama svarbios informacijos apie turto klasių charakteristikas. Naudojant tyrimui OECD aplenkiančius indikatorius kaip verslo ciklo matą, atskleidžiama, kad analizuojamosios turto klasės turi skirtingas grąžos ir rizikos charakteristikas verslo ciklo metu. OECD aplenkiantys indikatoriai gali suteikti reikšmingos informacijos apie rinkos lūkesčius, ateities perspektyvas, todėl tai yra puiki priemonė pagerinti investuotojams rizikos valdymą, o kartu ir pelningumą.

Reikšminiai žodžiai: turto klasės, turto lokacija, verslo ciklai, OECD aplenkiantys indikatoriai.

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