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Who Knew: Financial Crises and Investor Sentiment

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Abstract

It has been argued and empirically documented that with a looming financial crisis, the risk-reward trade-off of market participant changes, resulting in a decrease in market sentiment. Traders flock towards less risky securities which drives the returns of such securities higher. In this paper, based on a methodology developed by Persaud [1996], by correlating the riskiness and returns of securities in various international equity markets, an index to measure the sentiment of market participants is constructed. We use the breaking point of the Lehman Brothers bankruptcy as the onset of the financial crisis in 2008.

We track the market sentiment that we construct in months leading to the bankruptcy. We find that while market sentiment was high at the beginning of the year it started declining drastically many months prior to the bankruptcy, indicating that market participants were behaving as if a financial crises was approaching. Market sentiment remains low in a few months after the crisis, shows some improvement thereafter in anticipation of policies to address the crisis, but still remains depressed as compared to pre-crisis levels as policy makers struggle to formulate regulatory changes.

The findings in this paper are consistent with an emerging strand of finance literature [see, e.g., Bezemer, 2009] which disputes the notion that the financial crisis could not be foreseen. Market participants were convinced of the impending crisis and were behaving in a manner consistent with that, even when policy makers and senior executives the financial services seemed oblivious.

Introduction

On March 16th, 2008 Hank Paulson, the then United States Secretary of the Treasury, declared, "I have great, great confidence in our capital markets and in our financial institutions. Our financial institutions, banks and investment banks, are strong. Our capital markets are resilient. They're efficient. They're flexible." Mr. Paulson was not alone in his optimism - Ben Bernanke, Chairman of the Federal Reserve, speaking at a Federal Reserve conference on June 9th 2008 said, "Despite a recent spike in the nation's unemployment rate, the danger that the economy has fallen into a "substantial downturn" appears to have waned." Of course, events later during the year turned out to be not consistent with the sanguine outlook leaving many observers to question why policy makers and industry experts did not foresee the approaching financial and economic crisis. In their defense leading figures of the industry like Lloyd Blankfein, Chief Executive Officer of Goldman Sachs, stated during a Congressional hearing, "After the fact, it is easy to be convinced that the signs were visible and compelling" and former US Treasury Secretary Robert Rubin said, "few, if any people anticipated the sort of meltdown that we are seeing in the credit markets at present… I do not know anyone who predicted this course of events." The former Federal Reserve Chairman, Alan Greenspan, may have provided vindication for all when he wrote, "Much as we might wish otherwise, policy makers cannot reliably anticipate financial or economic shocks or the consequences of economic imbalances. Financial crisis are characterized by discontinuous breaks in market pricing the timing of which by definition must be unanticipated."

While arguments for the "no one saw this coming" point of view abound there is also now a fast emerging body of work that suggests that signs of crisis were present; e.g.,[1] Baker [2005] and Baker DeLong and Krugman [2006] saw declining housing prices and economic slowdown in the horizon. In 2007, Godley forecast a drop in borrowing and private expenditure in the coming quarters, with severe consequences for growth and unemployment. Indeed, as Kakutani [2010] points out, the crisis may not have been foreseen by chief executives of America's premier banks, regulators, and Treasury officials or by the Federal Reserve but was anticipated by investors who used their insights to profit from the shattering breakdown of the financial system.

In this paper, we provide empirical evidence to show that the onset of the financial crisis was anticipated by equity market participants. Based on a methodology developed by Persaud [1996] in the context of currency markets and later used by Bandopadhyaya and Jones [2006] in a single equity market, we construct an index which measures the sentiment of investors across worldwide equity markets – we call this the World Equity Market Sentiment Index [*WEMSI*]. High positive values of the *WEMSI* indicate risk seeking behavior among equity investors while and low negative values of the index suggest risk averse behavior. Risk-averse behavior is more typical during a crisis period, when market participants feel less compensated for the amount of risk that is present in equities [this is explained in greater detail in the main body of the paper]. We track the *WEMSI* from December 2007 to June 2009 and use the Lehman Brothers bankruptcy in September 2008, which according to many researchers [see e.g., Aragon and Strahan, 2009] is considered to be the formal onset of the financial crisis, as breaking

[1] See Bezemer [2009) for a more complete description.

point in our analysis. We define pre-crisis, crisis and post crisis phases and examine the behavior of the *WEMSI* in each of these sub-time periods. Results indicate that while the market sentiment as measured by *WEMSI* was high during the early part of 2008, it had started to decline and attain negative values many months prior to the Lehman Brothers bankruptcy. The behavior of market participants in months leading up to the Lehman bankruptcy was just as would be anticipated during a financial crisis. Negative values of the index persist in months after the bankruptcy filing, briefly moves in to a positive range, perhaps because of optimism due to the Troubled Asset Relief Program, but then dips in to the negative region as the economy falters and the mood in financial markets becomes less sanguine.

The rest of the paper is organized as follows. Section I discusses market sentiment in general and describes the construction of the *WEMSI*. Section II presents the empirical findings and its implications. Section III concludes.

I. Market Sentiment: The World Equity Market Sentiment Index

Market sentiment influences investor judgment and behavior, and thus become an extra source of risk [Canbas and Kandir, 2009]. Studies have recognized that investor sentiment may be an important component of the market pricing process [see Fisher and Statman [2000] and Baker and Wurgler [2006]]. Market sentiment has been used to explain financial contagion in the equity and currency markets that occur independently of economic fundamentals [e.g., Eichengreen and Mody [1998]]. Some authors advocate that market sentiment may explain short-term movements in asset prices better than any other set of fundamental factors [see, e.g., Baek, Bandopadhyaya and Du [2005]].

Many investor sentiment measures have been identified in the academic literature and in the popular press. Dennis and Mayhew [2002] have used the P*ut-Call Ratio*, Randall, Suk and Tully [2003] utilize *Net Cash Flow into Mutual Funds*, Lashgari [2000] uses the *Barron's Confidence Index*, Baker and Wurgler [2006] use the *Issuance Percentage*, Whaley [2000] uses the *VIX-Investor Fear Gauge*. Kumar and Persaud [2002] construct an index called the *Risk Appetite Index* [*RAI*]. They convincingly argue that measures other than the *RAI* could be measuring changes in the underlying risk of the market itself just as easily as they could be measuring changes in investor attitude towards that risk; it is not possible to isolate the two phenomena. The advantage of the *RAI* is that changes to the underlying riskiness of the market do not directly affect the proposed measure and thus it more accurately reflects the changes in the market's attitude towards risk.

Kumar and Persaud [2002] suggest that investors are at any point in time in one of two states: risk loving or risk averse. These investors may become more risk loving or risk averse even though the underlying risk in a particular financial security has not changed. If the market's appetite for risk were fixed, changes in assets prices would be driven only by unanticipated shifts in economic risk. If the appetite for risk grows and economic risks are unchanged, investors will feel overcompensated for these risk levels and the sense of overcompensation will grow as the level of risk grows. As investors take advantage of what they see as an improving risk-return trade off, asset values will change in line with their risk. High-risk assets should increase in value more than low-risk ones and the riskiest asset should rally the most. The reverse argument applies when the risk appetite falls. Values of high-risk assets would decrease more than those

perceived to be safe. Thus, a risk appetite index could be constructed based upon the strength of the correlation between the *order* of asset price appreciation and the *order* of asset price risk. [2]

This risk appetite contributes to contagion when negative news in one market brings upon reaction in other markets. A crisis event in one country may cause investors to revise their overall risk appetite and to reassess the situation in the entire region. This will lead to further drops in asset values and generate further crisis [Kumar and Persaud, 2002]. Investigating the effects of investor sentiment during crisis periods, Gai and Vause [2006] stated that the reduction in risk appetite during the Asian financial crisis was the underlying reason for contagion and financial instability.

In order to investigate how the appetite for risk and the market sentiment of investors behaved prior to and during the financial crisis of 2008, we adapt the notion of the *RAI* in Kumar and Persaud [2002] to develop the *WEMSI*. We select nine global market indices to represent the world equity markets. These indices are the Tokyo Price Index, Hang Seng Index, Standard and Poor's 500 Index, Shanghai Stock Exchange Index, the Deutscher Aktienindex, FTSE 100, BOVESPA, SENSEX, and the CAC 40 representing the markets of Japan, Hong Kong, United States, China, Germany, London, South America, India, and France respectively. For each month between December 2007 and June 2009, we find the monthly rate of return of each index and the moving average of the standard deviation (historic volatility, which is a measure of the riskiness of the

[2] Persaud discusses the risk appetite in a research report published by JP Morgan Securities Ltd. This idea has received attention in the "Economics Focus" series in the *Economist* [1996), and in a 1998 conference on business cycles organized by the Federal Reserve Bank of Boston. Other studies [e.g., Baek, Bandopadhyaya and Du [2005)] and Bandopadhyaya and Jones (2006) have used Persaud's notion of risk appetite to construct risk appetite indices applicable to different contexts.

market represented by the index) of the index return in the five previous months. To construct the *WEMSI* we find the Spearman rank correlation coefficient between the *rank* of the monthly return and the *rank* of the historic volatility of the return of each index, multiplied by 100. Specifically:

$$WEMSI = \frac{\sum (R_{ir} - \bar{R}_r)(R_{iv} - \bar{R}_v)}{\left[\sum \left(R_{ir} - \bar{R}_r\right)^2 \sum \left(R_{iv} - \bar{R}_v\right)^2\right]^{\frac{1}{2}}} * 100 \quad ; \quad -100 \leq WEMSI \leq +100 \quad (1)$$

where R_{ir} and R_{iv} are the rank of return and volatility for index i, respectively, and $\bar{R}_r$ and $\bar{R}_v$ are the mean of the ranks R_r and R_v, respectively. The *WEMSI* accurately depicts the attitudes of equity traders because as traders shift their investments from low to high risk securities in accordance with their risk appetite, those riskier securities will increase in value. Conversely, if traders prefer low risk securities because of a decline in their risk appetite, less risky will increase in value. Thus, the strength of correlation between the rank of index return and the index risk would measure the market sentiment.

II. Empirical Findings and Implications

We use the Lehman Brothers bankruptcy in September 2008 to identify the formal onset of the crisis and define the three month period before and three month period after (June 2008 to December 2008) as the crisis period. The six months prior to our crisis period (December 2007 to May 2008) is the pre-crisis period and the six months after the crisis period (January 2009 to June 2009) is the post-crisis periods. Figure 1 summarizes the sample period and its division in to three parts.

Table 1 shows returns of each market index during the sample period. Average returns in all markets, with one exception, are negative in the pre-crisis period. During the crisis, all markets demonstrate negative average returns, and are in general more negative as compared to the pre-crisis period. In the post crisis period some markets show signs of recovery, posting positive average returns, while in other markets average returns remain in the negative region. Not unexpectedly, average returns show a greater variance during the crisis as compared to the pre-crisis period, which captures the increase in market volatility during a crisis. Market volatility remains high during the post-crisis period – even though markets begin to show some signs of recovery uncertainty contributes to large standard deviations in market returns.

Table 2 shows the correlation of returns between the indices used in the study for the pre-crisis, crisis, and post crisis period. During the pre-crisis period there is a wide range of correlation between the various indices with values ranging from 0.2 to values closer to 1. In the crisis period, most correlation values increased and values that were lower during the pre-crisis period now show a uniformly greater positive correlation. This is consistent with earlier research on asset market contagion which has documented that there is an increase in the correlations of asset prices during crises periods. For example, Baig and Goldfajn (1998) find that there is an increase in the yield spreads of sovereign bonds during periods of crises as compared to tranquil periods. Fleming, Kirby and Ostdiek (1998) examine and find strong volatility linkages between stock, bond and money markets, and they find an increase in the linkages after currency crises. In the post crisis period, correlation values increased even further suggesting that markets may not yet be out of a crisis and contagion has not yet subsided.

Table 3 reports the *WEMSI* values during the three sub periods. Index values range from -0.56667 to 0.683333 with a mean of 0.027778 during the pre-crisis period. Crisis period index values are all negative ranging from -0.13333 to -0.86667 with a mean of -0.49079. Post crisis index values are generally positive ranging from -0.46667 to 0.566667 with a mean of 0.086111. Figures 2, 3 and 4 track the *WEMSI* for each month during the pre-crisis, crisis and post-crisis periods, respectively. Starting in December 2007, the index value is high capturing the risk-seeking behavior of equity market participants at that time. However, by March 2008 *WEMSI* dropped in to the negative range, remained low in April 2008 and is negative again the following month. Market participants seem to have lowered their appetite for risk, perhaps bracing for an approaching crisis, even before the on-set of the crisis period. Notably, in March 2008 key policy makers were still confident of the strength of the financial system and the resilience of the capital markets[3] – equity market participants obviously felt otherwise and started to behave as if a crisis is impending. During the crisis period *WEMSI* declined steadily and attains its lowest value in October 2008, a month after the Lehman Brothers bankruptcy, at which time the risk appetite of the market participants is understandably the lowest. The *WEMSI* ventures in to the positive region, buoyed by transitory the optimism that the Troubled Asset Relief Program brought to the capital markets, but dips again in to the negative zone once the initial confidence of the market participants wanes. In Figure 5, we fit a polynomial trend on the *WEMSI*, which strengthens our arguments as it clearly indicates that market sentiment had followed a U-shaped trajectory, with the decline beginning many months before the crisis period,

[3] See Figure 5 for a timeline of Treasury Secretary Hank Paulson's comments during the sample period.

which reaches its lowest point right around the bankruptcy which set the financial markets in turmoil.

III. Conclusion

When questioned as to why a collapse of the financial system in 2008 was not anticipated those in government and in the financial services industry have claimed that there were not any signs that could have served as a warning – the so called "no one saw it coming" defense. In this study we provide strong evidence to show that world equity market participants, as indicated by their activity in global markets, did see the crisis coming. We develop an index that measures investor sentiment, which we argue that it declines during crisis. We find that this index drops between February and March 2008 - six months before the collapse of Lehman Brothers. Market participants were beginning to behave as is a crisis was around the corner which should have provided policy makers around the world ample time to recognize and address growing concerns. A strong implication of our findings is that market sentiment indices, including the one developed in this paper may provide policy makers with a much needed empirical tool to foretell future financial crisis.

Table 1: World Market Index Returns

Pre-Crisis Period

Date	TOPIX	^HSI	^GSPC	000010.SS	^GDAXI	^FTSE	^BVSP	^BSESN	^FCHI
Dec-07	-2.90%	4.12%	0.22%	4.77%	1.26%	0.34%	3.48%	5.70%	-0.46%
Jan-08	-3.22%	0.29%	-1.26%	-2.22%	-1.90%	-1.27%	1.93%	3.40%	-2.81%
Feb-08	-3.52%	-1.59%	-2.68%	-3.08%	-2.79%	-1.77%	1.14%	0.74%	-3.32%
Mar-08	-4.64%	-5.91%	-3.09%	-7.48%	-3.82%	-3.18%	-1.25%	-4.41%	-4.13%
Apr-08	-5.52%	-1.64%	-1.26%	-3.01%	-2.18%	-0.96%	1.72%	-1.83%	-2.29%
May-08	-2.38%	-2.01%	-0.87%	-7.14%	-2.26%	-1.15%	2.83%	-3.79%	-2.02%
Average Return	**-3.70%**	**-1.12%**	**-1.49%**	**-3.03%**	**-1.95%**	**-1.33%**	**1.64%**	**-0.03%**	**-2.51%**
Standard Deviation	**1.17%**	**3.28%**	**1.21%**	**4.43%**	**1.71%**	**1.15%**	**1.64%**	**4.04%**	**1.25%**
Skewness	**-0.75**	**0.31**	**-0.09**	**1.09**	**1.54**	**-0.32**	**-1.12**	**0.39**	**0.58**

Crisis Period 2008

Date	TOPIX	^HSI	^GSPC	000010.SS	^GDAXI	^FTSE	^BVSP	^BSESN	^FCHI
Jun-08	0.37%	-0.86%	-1.37%	-8.65%	-1.15%	-0.78%	2.12%	-4.79%	-1.68%
Jul-08	-0.04%	-1.04%	-0.87%	-8.69%	-0.66%	-1.55%	-0.92%	-3.38%	-1.55%
Aug-08	0.22%	-1.11%	-0.51%	-7.59%	-0.21%	-0.10%	-1.41%	-0.89%	-0.79%
Sep-08	0.20%	-6.71%	-3.27%	-10.26%	-3.31%	-4.06%	-5.88%	-5.33%	-4.03%
Oct-08	-3.78%	-10.25%	-6.88%	-13.73%	-6.63%	-6.09%	-12.23%	-9.10%	-6.81%
Nov-08	-8.42%	-8.38%	-6.65%	-7.55%	-6.00%	-5.09%	-10.50%	-6.92%	-5.78%
Dec-08	-8.77%	-8.24%	-6.30%	-7.69%	-5.58%	-3.64%	-8.28%	-7.03%	-5.86%
Average Return	**-2.89%**	**-5.23%**	**-3.69%**	**-9.16%**	**-3.36%**	**-3.04%**	**-5.30%**	**-5.35%**	**-3.79%**
Standard Deviation	**4.16%**	**4.08%**	**2.87%**	**2.23%**	**2.73%**	**2.27%**	**5.38%**	**2.69%**	**2.44%**
Skewness	**-0.83**	**0.13**	**-0.08**	**-1.79**	**-0.02**	**0.05**	**0.08**	**0.42**	**0.05**

Post Crisis Period

Date	TOPIX	^HSI	^GSPC	000010.SS	^GDAXI	^FTSE	^BVSP	^BSESN	^FCHI
Jan-09	-6.89%	-8.48%	-8.26%	-2.50%	-7.37%	-5.76%	-6.07%	-7.78%	-7.79%
Feb-09	-8.46%	-6.13%	-8.64%	-0.24%	-7.81%	-4.69%	-4.43%	-6.57%	-7.61%
Mar-09	-7.47%	-0.45%	-3.54%	8.45%	-3.66%	-2.05%	1.97%	0.04%	-4.13%
Apr-09	-2.40%	2.53%	-0.17%	7.68%	0.97%	-0.02%	5.43%	4.96%	-0.33%
May-09	0.77%	5.23%	0.74%	8.73%	1.08%	0.12%	7.41%	9.39%	0.69%
Jun-09	1.15%	7.56%	2.97%	7.02%	2.51%	1.80%	6.96%	10.14%	2.83%
Average Return	**-3.88%**	**0.04%**	**-2.82%**	**4.85%**	**-2.38%**	**-1.77%**	**1.88%**	**1.70%**	**-2.72%**
Standard Deviation	**4.29%**	**6.34%**	**4.84%**	**4.91%**	**4.54%**	**2.96%**	**5.86%**	**7.77%**	**4.47%**
Skewness	**0.23579**	**-0.32551**	**-0.26912**	**-0.99567**	**-0.28931**	**-0.35975**	**-0.6058**	**-0.20998**	**-0.08413**

Table 2: Correlation Matrices

Pre-Crisis Period

	TOPIX	^HSI	^GSPC	000010.SS	^GDAXI	^FTSE	^BVSP	^BSESN	^FCHI
TOPIX	1								
Hang Seng	0.471	1							
S&P 500	0.444	0.846	1						
SSE 180	0.204	0.923	0.675	1					
DAX	0.420	0.950	0.889	0.915	1				
FTSE 100	0.386	0.935	0.940	0.812	0.923	1			
BOVESPA	0.589	0.856	0.920	0.620	0.807	0.944	1		
SENSEX	0.370	0.902	0.567	0.919	0.800	0.700	0.578	1	
CAC 40	0.425	0.873	0.964	0.756	0.939	0.964	0.909	0.591	1

Crisis Period

	TOPIX	^HSI	^GSPC	000010.SS	^GDAXI	^FTSE	^BVSP	^BSESN	^FCHI
TOPIX	1								
Hang Seng	0.726	1							
S&P 500	0.857	0.963	1						
SSE 180	-0.161	0.472	0.340	1					
DAX	0.813	0.977	0.997	0.404	1				
FTSE 100	0.621	0.960	0.915	0.573	0.941	1			
BOVESPA	0.740	0.970	0.939	0.439	0.947	0.941	1		
SENSEX	0.645	0.878	0.908	0.565	0.925	0.900	0.798	1	
CAC 40	0.782	0.984	0.988	0.448	0.996	0.952	0.946	0.934	1

Post Crisis Period

	TOPIX	^HSI	^GSPC	000010.SS	^GDAXI	^FTSE	^BVSP	^BSESN	^FCHI
TOPIX	1								
Hang Seng	0.893	1							
S&P 500	0.917	0.986	1						
SSE 180	0.623	0.873	0.848	1					
DAX	0.925	0.971	0.993	0.836	1				
FTSE 100	0.877	0.993	0.989	0.869	0.981	1			
BOVESPA	0.867	0.982	0.975	0.926	0.974	0.977	1		
SENSEX	0.932	0.992	0.987	0.855	0.981	0.980	0.984	1	
CAC 40	0.940	0.986	0.996	0.812	0.992	0.987	0.966	0.989	1

Table 3: World Equity Market Sentiment Index Values

Pre-Crisis Period	
Dec-07	0.683
Jan-08	0.333
Feb-08	0.267
Mar-08	-0.567
Apr-08	-0.067
May-08	-0.483
Pre-Crisis Mean	0.028

Crisis Period	
Jun-08	-0.317
Jul-08	-0.519
Aug-08	-0.733
Sep-08	-0.600
Oct-08	-0.867
Nov-08	-0.267
Dec-08	-0.133
Crisis Mean	-0.491

Post Crisis Period	
Jan-09	0.500
Feb-09	0.567
Mar-09	-0.467
Apr-09	-0.383
May-09	0.217
Jun-09	0.083
Post Crisis Mean	0.086

Figure 1: Financial Crisis Timeline

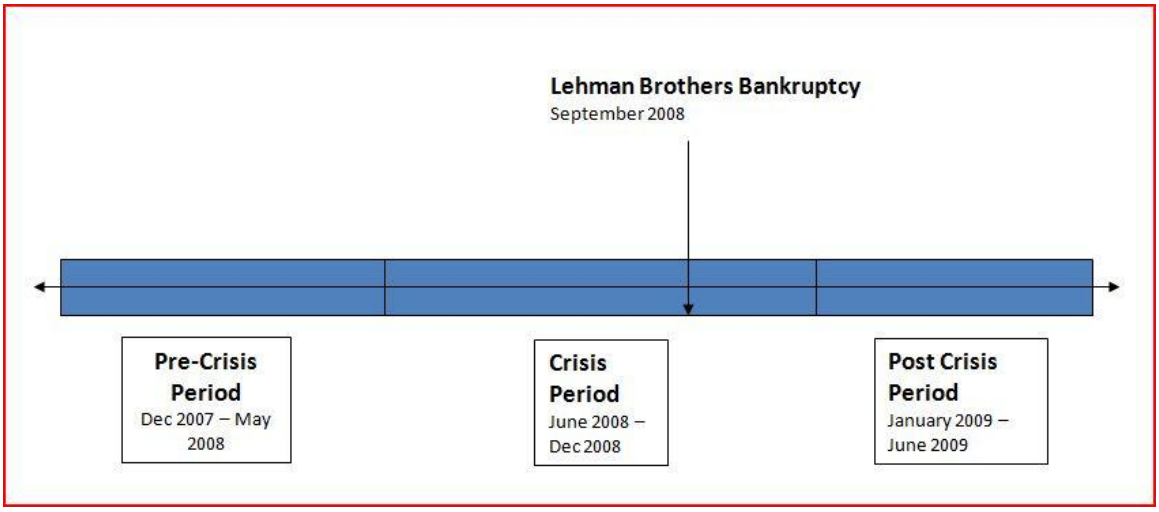


Figure 2: World Equity Market Sentiment Index - Pre-Crisis Period

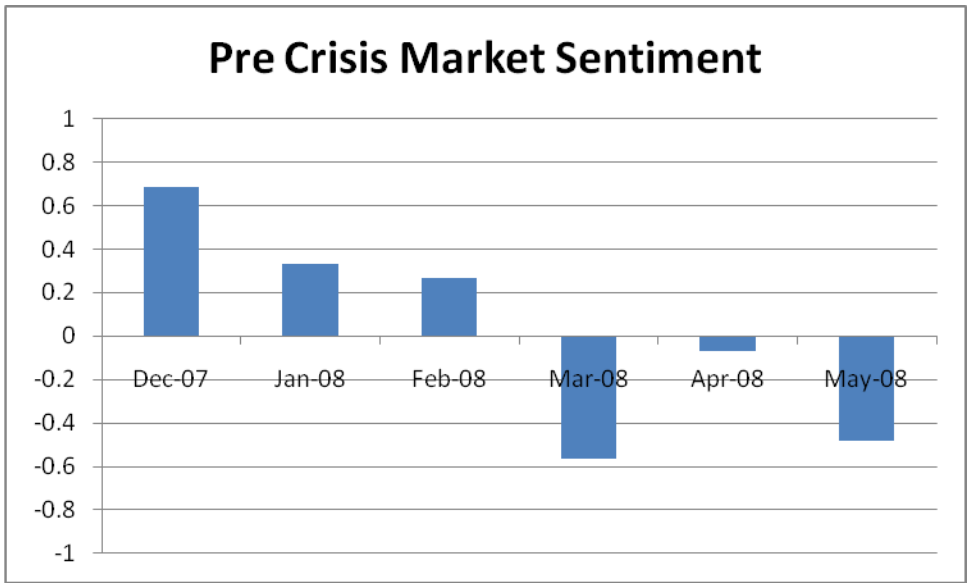


Figure 3: World Equity Market Sentiment Index - Crisis Period

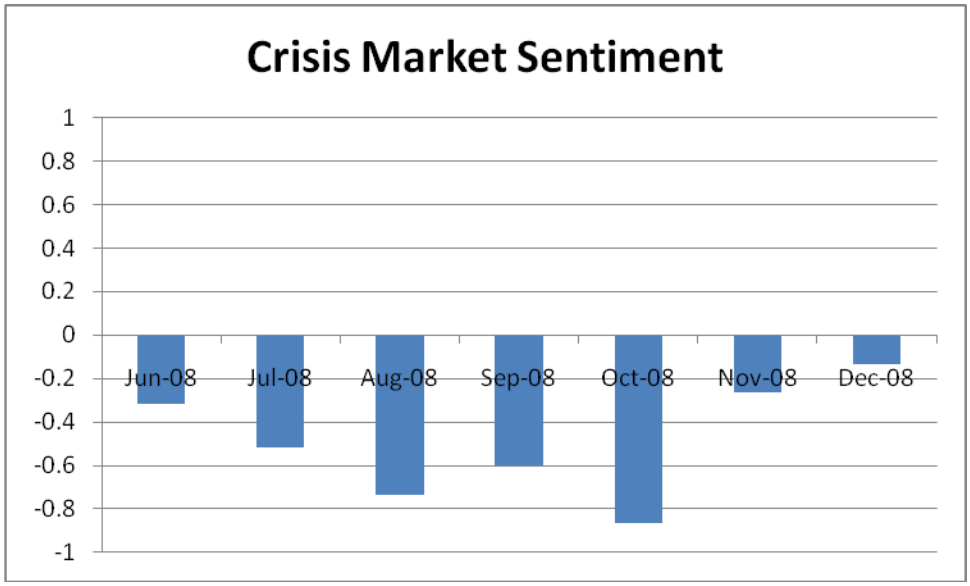


Figure 4: World Equity Market Sentiment Index - Post Crisis Period

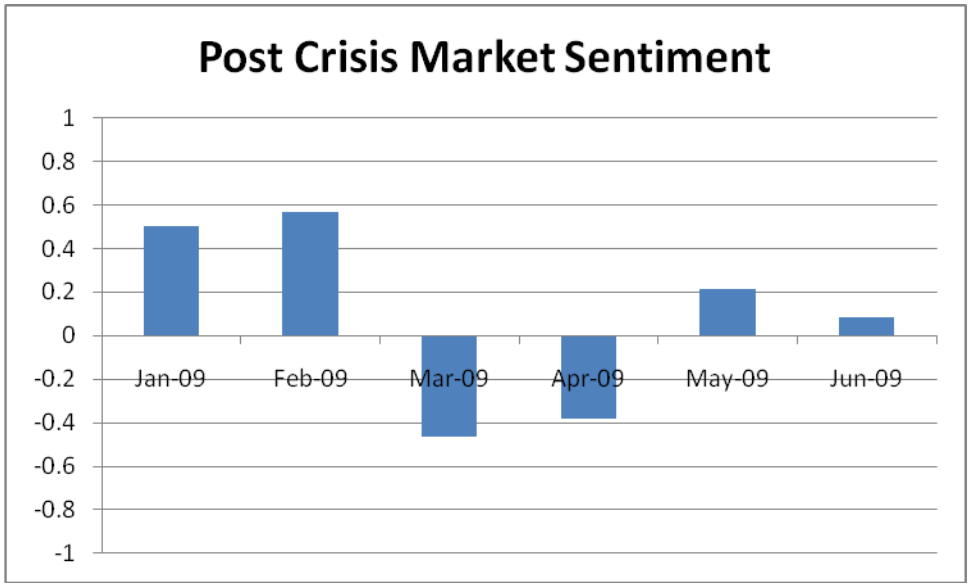


Figure 5: World Equity Market Sentiment Index and Quotations

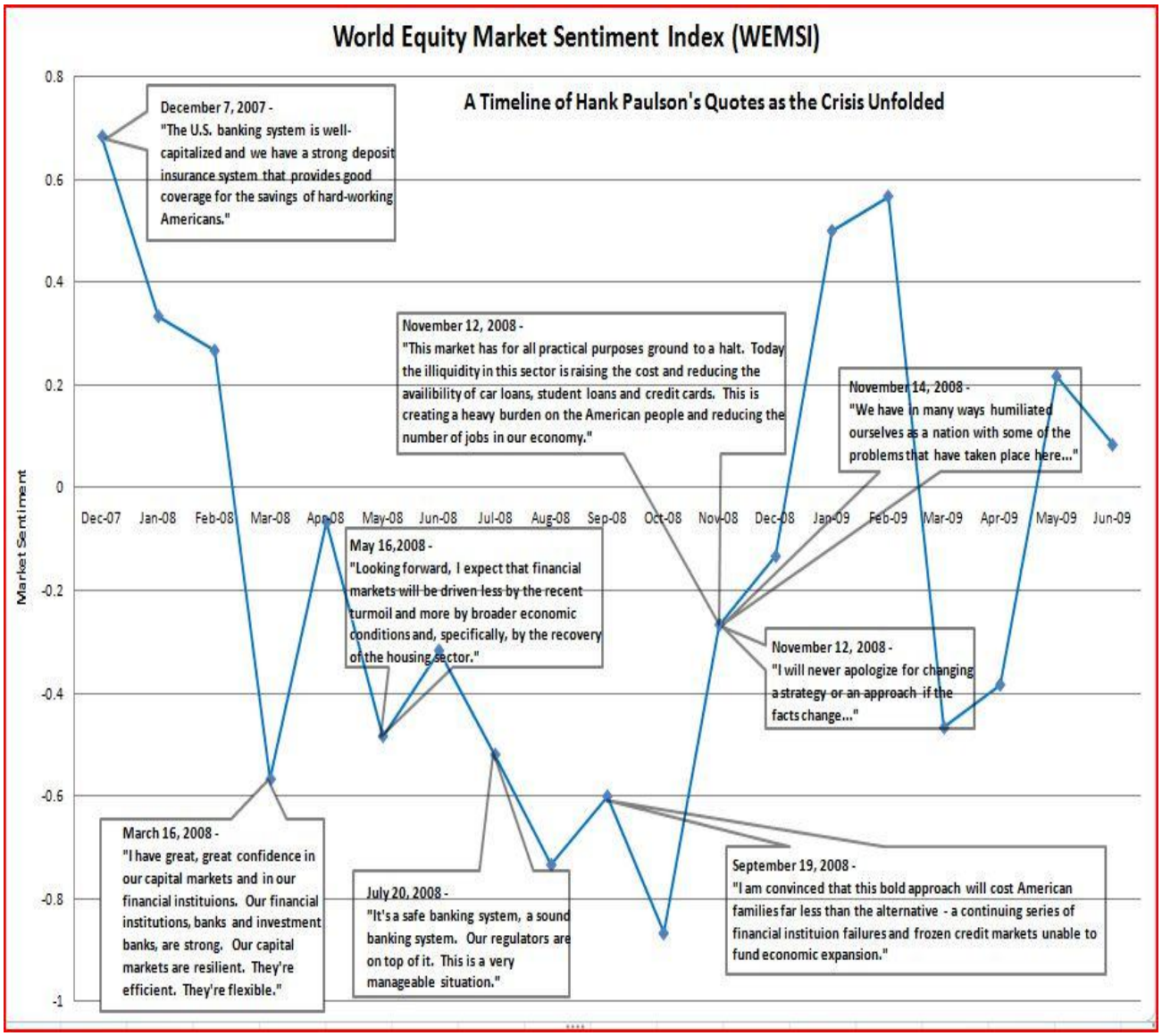
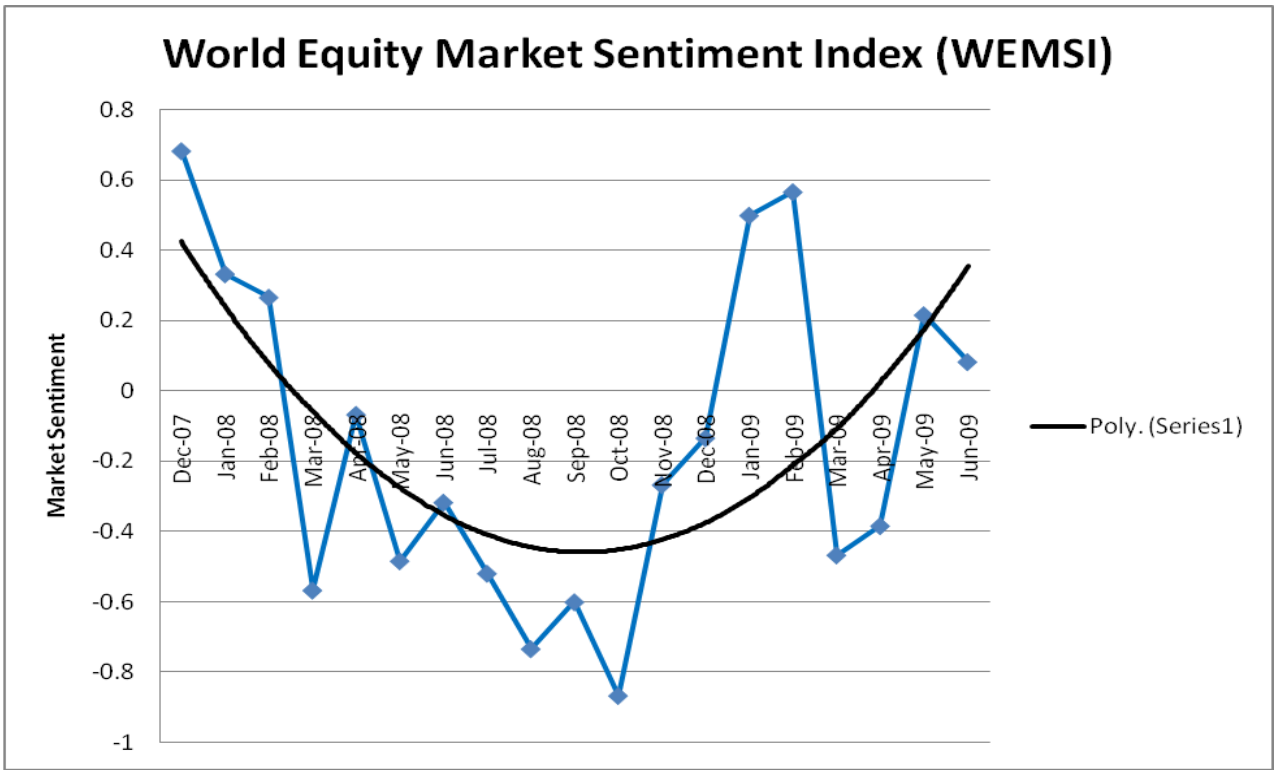


Figure 6: World Equity Market Sentiment Index Polynomial Trend



References

1. Aragon, George and Philip Strahan [2009], "Hedge Funds as Liquidity Providers: Evidence from the Lehman Bankruptcy", *Boston College Working Paper*, August.

2. Baig, T. and Goldfajn I. (1998), "Financial Market Contagion in the Asian Crisis", *IMF Working Paper*, (98/155).

3. Baker, D [2002], "The Run-Up in Home Prices: Is It Real or Is It Another Bubble?", *Center for Economic and Policy Research*, August 2002.

4. Baker, D, B DeLong, and P Krugman [2005], "Asset Returns and Economic Growth", *Brookings Papers on Economic Activity*, 2005:1.

5. Bandopadhyaya, Arindam and Anne Jones [2006], "Measuring Investment Sentiment in Equity Markets", *Journal of Asset Management*, September.

6. Bezemer, Dirk J. [2009], "No One Saw This Coming: Understanding Financial Crisis Through Accounting Models, *Munich Personal RePEc Archive MPRA*, Paper No. 15892, June.

7. Canbas, Serpil and Serkan Yilmaz Kandir, [2009], "Investor Sentiment and Stock Returns: Evidence from Turkey", *Emerging Markets Finance & Trade*, Vol. 45 No. 4, July-August: 36-52.

8. Fleming, J., Kirby C. and Ostdiek B. [1998], "Information and Volatility Linkages in the Stock, Bond and Money Markets", *Journal of Financial Economics*, 49: 111-137.

9. Gai, Prasanna and Nicholas Vause, [2006], "Measuring Investors' Risk Appetite", *International Journal of Central Banking*, Vol.2 No.1, March: 167-188.

10. Godley, W and M Lavoie [2007], "Fiscal Policy in a Stock-Flow Consistent Model", *Journal of Post Keynesian Economics*, 30[1]:79-100.

11. Kakutani, Michiko, [2010], "Investors Who Foresaw, and Jumped On, the Meltdown", *The New York Times*, March 15.

12. Kumar, Manmohan S., and Avinash Persaud, [2001], "Pure Contagion and Investor's Shifting Risk Appetite: Analytical Issues and Empirical Evidence", *IMF Working Paper*, Number 01134, September.