A note on the relationship between financial asset returns and well-being

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This note considers the effect of changes in the well-being of U.S. residents owing to changes in the value of various financial assets. Ordinary least squares estimates reveal that equity market returns have a significant, and asymmetric, impact on well-being. This result is likely the result of a wealth effect whereby rising (falling) stock markets increase (decrease) the ability to meet basic needs and this contributes to a shifting assessment of life-situation and overall well-being.

Prior research regarding the effect of wealth and income on well-being has produced mixed results concerning both the initial response and the longevity of such effects. Blanchflower and Oswald (2004) find only a small impact of income on life satisfaction relative to other life circumstances, while Kahneman et al. (2005) suggest that this measure overstates the effects of income owing to a "focusing illusion" which prompts respondents to compare their incomes to previous levels; therefore, over the long run, increases in income will generate no increase in life satisfaction.

Di Tella et al. (2007) suggest that income only provides a temporary boost to life satisfaction which is complete within four years. On the other-hand, Deaton (2008) and Stevenson and Wolfers (2008) depict a clear positive relationship between well-being and wealth such that high-income countries have greater life satisfaction than low-income countries and also report no evidence that the effects of greater income fade-out or vanish. Additionally, Heady et al. (2004) suggest that increase in wealth, which can be viewed as providing a degree of economic security, have at least as great an effect on well-being as does changes in income.

This note considers the effect of changes in the well-being of U.S. residents owing to changes in the value of various financial assets; this study does not attempt to measure the long-term impact of such changes. Ordinary least squares estimates reveal that equity market returns have a significant, and asymmetric, impact on well-being. This result is likely the result of a wealth effect whereby rising (falling) stock markets increase (decrease) the ability to meet basic needs and this contributes to a shifting assessment of life-situation and overall well-being.

1. Data

Well-being data is taken from the Gallup-Healthways Well-Being Index[1] which tracks the well-being of U.S. residents throughout the year, conducting telephone interviews with 500 U.S. adults on a daily basis. The Well-Being Index, which utilises a 0-100 scale, measures six domains of well-being; life evaluation, emotional health, physical health, healthy behaviour, work environment and basic access. The use of a composite index overcomes at least some of the issues identified in Kahneman and Krueger (2006) relating to the use of subjective well-being measures.

The life evaluation index includes a self-evaluation of the present life situation and anticipated life situation five years hence on a Cantril (1965) Ladder Scale with 0 representing the

[1] Source: Gallup, Inc. and Healthways, Inc. © 2009.

worst possible life and 10 representing the best possible life. The emotional health index measures the daily experiences of respondents concerning emotions such as happiness, sadness, anger and stress. Physical health focuses on items such as the number of sick days in the past month, health problems and energy levels. Healthy behaviour measures lifestyle habits such as smoking, eating healthy food and exercise frequency. Work environment measures the perception of the work environment. Finally, basic access measures the access to necessities crucial to well-being such as clean water, medicine and money for food and shelter. Monthly data is available[2] from January 2008 until December 2012, forming a sample of 60 periods.

Individual investors may be able to invest in, and thus have wealth tied-up in, a range of assets including, but not strictly limited to, equities, cash, government bonds, corporate bonds, housing and foreign exchange. Data for the monthly returns of proxies for such financial assets is provided by the Federal Reserve (FRED) database. In addition, the CBOE implied volatility measure (VIX) is included as this is an increasingly popular measure of investor fear which may have some relationship with Well-Being and is now an investable asset owing to the presence of VIX futures and options. Returns of financial assets, together with changes in the Well-Being Index and its sub-components, are calculated as $R_{it} = 100 \times \log(R_{it}/R_{it-1})$

Table 1 presents summary statistics for the variables used in the analysis. A mean of 66.39 for the composite Well-Being Index suggests that U.S. residents have a positive level of well-being, however a mean life evaluation score of 47.68 denotes that less than 50% of respondents see themselves as thriving. On average, the equity market has risen whilst bond yields and house prices have fallen during the sample period. The sample period considered also encapsulates the global financial crisis of 2007-2008 and subsequent recovery and it is thus not surprising that there is a large range of values for the levels of financial assets, or standard deviation of their returns.

<Insert Table 1>

2. Empirical results

An ordinary least squares model, with an AR(1) term, is utilized to investigate the relationship between financial asset returns, the composite Well-Being Index and its various sub-components. The OLS model takes the form:

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[2] Data for the Well-Being Index, together with a complete methodology, is available via www.well-beingindex.com

$$WB_t = \beta_{0,t} + \sum_{i=1}^{n} \beta_{i,t} R_{i,t} + WB_{t-1} + \varepsilon_{i,t}$$

Where WB_t represents the change in the well-being indicator in month t, $R_{i,t}$ is the return of financial asset i in period t, and ε is the error term. The regression results are displayed in Table 2.

<Insert Table 2>

Regarding the composite Well-Being Index; the return on equity markets, represented by the S&P 500 Index, and the AR(1) term are the only significant explanatory variables. A negative and significant AR(1) term suggests that the Well-Being Index is mean-reverting with an increase in well-being in one period followed by a decrease in the next. A positive and significant relationship with the S&P 500 Index implies that the well-being of U.S. residents increases in-line with the stock market, and is thus suggestive that well-being is positively related to wealth generated by equity markets. This result is not too surprising given that households hold 19.6% of their wealth (or $15.3 trillion) in corporate equities or mutual fund shares[3]. However, if the wealth effect is the prime driver then one may question why changes in house prices do not also have a significant relationship with well-being given that real estate constitutes 24.9% of household wealth. Possible explanations for this could include the incremental media attention on short-term changes in equity markets, as opposed to housing markets, which may influence individual households or the greater ability of investors to benefit (or suffer) from changes in equity market wealth owing to the lower transaction costs in buying and selling stocks in comparison to houses. One should also note that whilst equity income apparently has an effect on well-being in the short-run I make no comment on the long-run effect.

Considering the sub-components of the composite index; it is apparent that the AR(1) variable of the emotional health, physical health, healthy behaviour, work environment and basic access components are mean-reverting and significantly so in the case of emotional health and work environment. Changes in the equity market also have a significant, and positive, impact on the life evaluation and basic access components (Fig. 1). This suggests that increases (decreases) in household wealth created by changes in stock prices have a significant impact on the ability of U.S. residents to access food, shelter and healthcare thus improving their life situation. Since the S&P 500 does not have a significant impact on the other well-being components it is likely that it

is the strong relationship with the basic access component that influences the life situation components and hence the composite well-being score.

<Insert Figure 1>

Other results indicate that an increase in the implied volatility of equity markets, that is an increase in investor fear, results in declining life-situation well-being. While an increase in interest rates results in improving well-being, suggested by the positive relationship between short-term interest rates and healthy living and a negative relationship between the corporate bond index and the basic access component, perhaps because interest rates tend to increase when the economy is improving. 10-year Government bonds, foreign exchange and house prices do not appear to have a significant impact of any of the components of well-being considered in this analysis.

The contrasting impact of positive and negative stock market returns on well-being is considered in Table 3 which reports the results for a truncated OLS model that utilises disaggregated S&P 500 returns and an AR(1) term. As expected, positive (negative) stock returns result in increases (declines) in well-being. However, there is an asymmetric impact with the coefficients for positive returns been of a much higher magnitude and highly significant; that is, the well-being of U.S. households apparently increases to a greater extent following a rise in the S&P 500 Index than it falls owing to a corresponding stock market decline. This finding is somewhat consistent with that of Deaton (2008). Once more, the well-being measures appear to have a well-defined negative AR(1) term.

<Insert Table 3>

3. Discussion

The well-being of U.S. households is significantly influenced by changes in the level of equity markets, at least in the short-term, and is likely evidence of a wealth effect whereby rising (falling) stock markets increase (decrease) household wealth and the ability to meet basic needs which then feeds into the assessment of life-situation and overall well-being. However, this effect does not seem to impact emotional or physical well-being. The majority of the well-being measures considered in this note also appear to be mean-reverting from one period to the next. Further, well-being appears to exhibit an asymmetric reaction to changes in the S&P 500 Index

with the magnitude of gains following market rallies exceeding the losses following market declines.

It is possible that change in the value of financial assets does not affect the level of household well-being, and it is likely that individual well-being is impacted by more than just financial reward; the results in this study could therefore be a product of omitted variable bias rather than a wealth effect. Future research may consider a wider range of assets, including international assets, and other economic variables and their effect on well-being, possibly at a higher data-frequency and may also consider the long-term impact of such effects.

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Figure 1

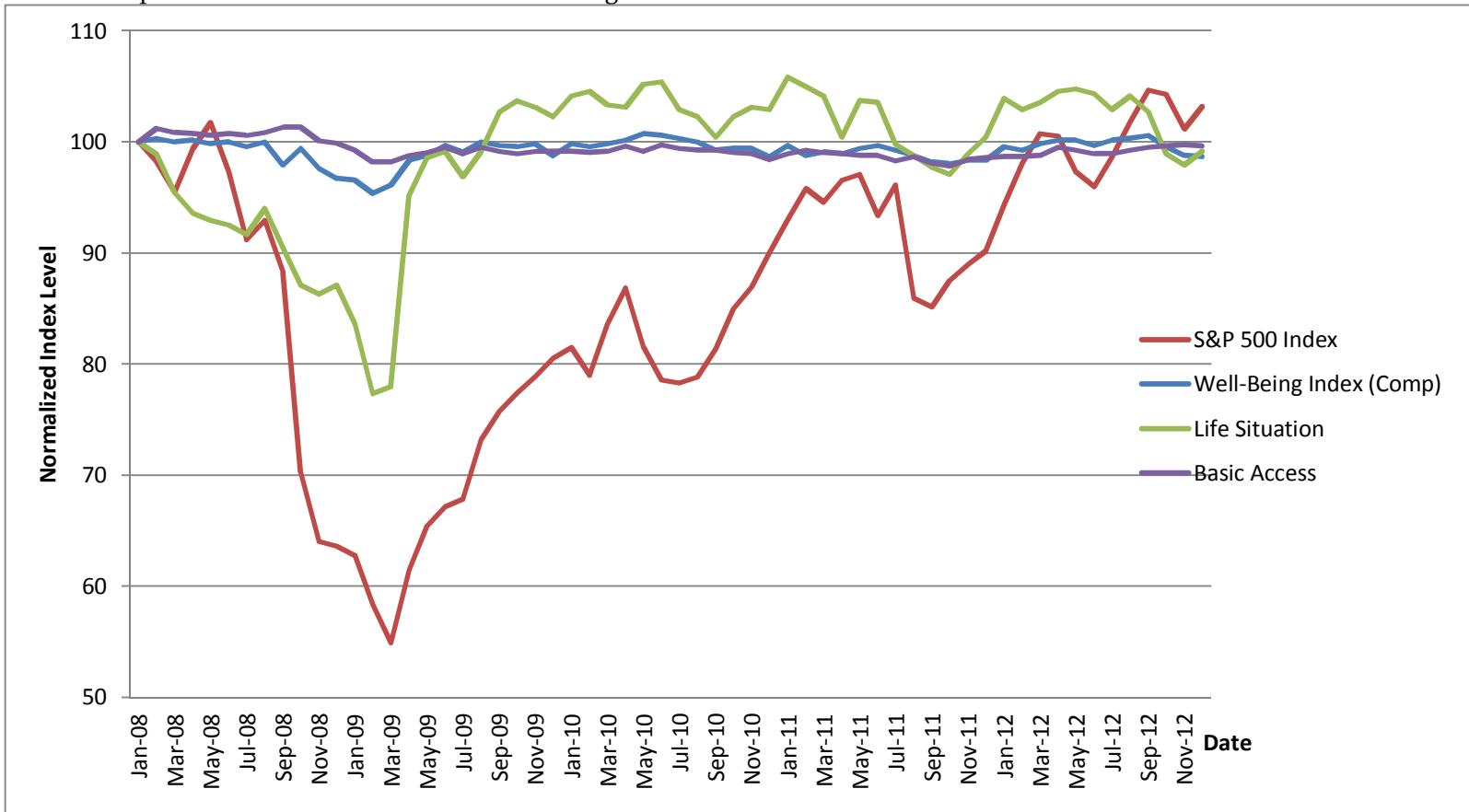Relationship between S&P 500 Index and Well-Being Index

Table 1

Summary Stastics

	N	Level				Return	
		Mean	Std Dev	Min	Max	Mean	Std_Dev
Well-being	60	66.39	0.73	63.80	67.40	-0.023	0.756
Life	60	47.68	3.17	37.30	51.00	-0.014	0.002
Emotional	60	79.09	0.54	77.50	79.90	0.002	0.556
Physical	60	76.81	0.50	75.70	77.90	-0.011	0.658
Health	60	63.69	1.30	59.70	65.90	-0.032	1.514
Work	60	48.78	1.61	45.40	53.30	-0.099	1.837
Basic	60	82.45	0.68	81.20	84.10	-0.006	0.427
SP500	60	1191.08	180.53	757.13	1443.42	0.053	5.116
VIX	60	25.75	10.64	15.28	62.64	-0.678	19.22
FF	60	0.51	0.86	0.07	3.95	-5.332	23.42
Govt 10yr	60	2.95	0.77	1.53	4.10	-1.317	-1.246
Corp Bond	60	481.25	51.22	390.03	569.42	0.470	1.454
Housing	60	147.32	10.71	136.74	182.07	-0.374	0.896
USD	60	74.36	3.68	68.95	84.31	-0.003	1.960

Source:	Gallup-Healthways Well-Being Index (www.well-beingindex.com)
	Federal Reserve Economic Data (http://research.stlouisfed.org)

Table 2

Ordinary Least Square estimates of relationship between asset returns and well-being

	Well-being	Life	Emotional	Physical	Health	Work	Basic
Constant	0.030	-0.275	0.022	0.064	-0.028	0.123	0.048
	(0.092)	(0.584)	(0.067)	(0.089)	(0.226)	(0.211)	(0.050)
S+P 500	0.065**	0.729***	0.019	-0.008	-0.060	0.099	0.049**
	(0.025)	(0.159)	(0.715)	(0.034)	(0.081)	(0.083)	(0.019)
VIX	-0.009	-0.103***	-0.002	0.001	-0.003	0.014	0.007
	(0.008)	(0.034)	(0.339)	(0.008)	(0.018)	(0.019)	(0.004)
Fed Funds Rate	-0.001	-0.034*	0.001	0.003	0.020**	0.005	0.003
	(0.004)	(0.020)	(0.003)	(0.004)	(0.010)	(0.010)	(0.002)
10Y Government Bond Rate	0.011	-0.083	0.008	0.008	0.049	-0.005	-0.009
	(0.015)	(1.236)	(0.011)	(0.015)	(0.034)	(0.035)	(0.008)
Corporate Bond Index (>AA)	-0.071	-0.172	-0.033	-0.049	0.196	-0.412	-0.117**
	(0.113)	(0.350)	(0.081)	(0.107)	(0.247)	(0.257)	(0.056)
Dollar Index	-0.030	0.194	-0.013	-0.058	-0.139	-0.017	-0.036
	(0.059)	(0.251)	(0.043)	(0.058)	(0.130)	(0.137)	(0.030)
Shiller House Price Index	0.032	-0.278	0.005	0.031	-0.211	0.060	0.034
	(0.108)	(0.647)	(0.079)	(0.105)	(0.265)	(0.252)	(0.058)
Well-being AR(1)	-0.373**	0.252	-0.362***	-0.271*	-0.097	-0.425***	-0.193
	(0.141)	(0.158)	(0.131)	(0.150)	(0.149)	(0.135)	(0.127)
R^2	0.247	0.398	0.213	0.131	0.164	0.273	0.335
Standard Error	0.713	2.894	0.521	0.660	1.506	1.703	0.352
Log-likelihood	-57.76	-139.04	-39.62	-53.28	-101.17	-108.27	-16.82
F-Statistic	2.01	4.04	1.66	0.92	1.20	2.30	3.09

Standard Errors are denoted in parentheses

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

Table 3

Ordinary Least Square estimates of relationship between disaggregated S+P 500 Index returns and well-being

	Well-Being	Life	Basic
Constant	-0.411***	-1.836***	-0.131*
	(0.106)	(0.587)	(0.076)
S+P 500 Positive	0.184***	0.967***	0.061**
	(0.035)	(0.182)	(0.024)
S+P 500 Negative	-0.019	-0.004	-0.005
	(0.342)	(0.107)	(0.014)
Well-being AR(1)	-0.399***	-0.001	-0.118
	(0.124)	(0.007)	(0.124)
R^2	0.369	0.388	0.145
Standard Error	0.621	2.778	0.380
Log-likelihood	-52.61	-139.49	-24.11
F-Statistic	10.54	11.42	3.06

Standard Errors are denoted in parentheses
* Significance at the 10% level
** Significance at the 5% level
*** Significance at the 1% level