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Abstract: From the beginning of 2011 to the middle of 2012 the U.S. stock market did not generally perform well. This subpar performance has been largely attributed by the business media to the Eurozone crisis. The purpose of this paper is to determine the extent to which the values of U.S. food companies are related to the Eurozone crisis. The stock prices of nine well-known U.S. food companies and the S&P index are regressed, using a system of equations approach, against a set of variables accounting for profitability and the economic wellbeing of the Eurozone and the United States. Based on the findings of this study it would seem that the U.S. stock market, including food companies, is primarily affected by the wellbeing of the U.S. economy as opposed to that of the EU. Key Words: SUR, agriculture, stock prices, crisis

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Abstract

From the beginning of 2011 to the middle of 2012 the U.S. stock market did not generally perform well. This subpar performance has been largely attributed by the business media to the Eurozone crisis. The purpose of this paper is to determine the extent to which the values of U.S. food companies are related to the Eurozone crisis. The stock prices of nine well-known U.S. food companies and the S&P index are regressed, using a system of equations approach, against a set of variables accounting for profitability and the economic wellbeing of the Eurozone and the United States. Based on the findings of this study it would seem that the U.S. stock market, including food companies, is primarily affected by the wellbeing of the U.S. economy as opposed to that of the EU.

Key Words: SUR, agriculture, stock prices, crisis

Introduction

Since the last recession began at the end of 2007, according to The Conference Board (2012), through the middle of 2012, U.S. companies, as measured by the benchmark equity market index, the S&P 500, had great difficulty in recovery. This includes many U.S. food companies as well. However, since the end of the recession, pegged at the end of June 2009 according to The Conference Board (2012), to the beginning of June 2012, the S&P index increased over 42% with some U.S. food companies besting this percentage increase and many below it. Most of this gain accrued before the start of 2011 (Yahoo! Inc. 2012).

From the beginning of 2011 to the middle of 2012 the situation appears rather lackluster with the S&P increasing a mere 0.51% with many U.S. food companies performing worse (Yahoo! Inc. 2012). This less than stellar performance has been largely attributed by the business media to the Eurozone crisis (BBC 2012; Domm 2012; Farrell 2011; Thomson Reuters 2012).

The purpose of this paper is to determine the extent to which the values of U.S. food companies are related to the Eurozone crisis. The stock prices of nine well-known U.S. food companies and the S&P index are regressed, using a system of equations approach, against a set of variables accounting for profitability and the economic wellbeing of the Eurozone and the United States.

A study by Schnitkey and Kramer (2012) indicates that very little research has been conducted to explain the comportment of stock prices for agricultural firms. Their study compared the stock price performance of select groups of publicly traded agricultural companies relative to the S&P 500 index performance from the beginning of 2000 to the end of 2011. The types of agricultural companies included in their study were those on the farm input side and those at the first handler-processor level on the farm output side. Dummy variables accounting for enactment of the U.S. energy bill and the most recent recession did not reveal any effects. Food companies, such as those included in our analysis, were not included in Schnitkey and Kramer's study. Another recent work by Enlow and Katchova (2011) did find that agricultural firms with a relatively large return on equity were less adversely affected by recession than agricultural firms with a lower return on equity.

Model and Data

The general model specification is based on economic and finance theory (Bodie, Kane, and Marcus 2005; Varian 1992). The specific variables selected for the model are those

suggested by the business media such as BLOOMBERG L.P. (2012), CNBC, LLC (2012), and FOX News Network, LLC (2012).

For the S&P 500 and nine representative U.S. food companies, stock price is specified as a function of profitability, a set of variables that account for the macroeconomic conditions in the EU, and a set of variables that account for the macroeconomic conditions in the United States. Profitability for the S&P 500 is in terms of earnings per share. The measure of profitability for the food companies is net income as a percentage of total revenue. The EU macro variables include Greek per capita GDP on a quarterly basis, EU per capita GDP on a quarterly basis, and the value of the Euro as tracked by the FXE (CurrencyShares Euro Trust) ETF (exchange traded fund). The U.S. macro variables are the UUP (PowerShares DB US Dollar Index Bullish) ETF, which tracks the value of the dollar, and the U.S. per capita GDP on a quarterly basis. The stock price and ETF data are from Yahoo! Finance (Yahoo! Inc. 2012); the profitability data are from Standard & Poor's Financial Services (2012) and YCharts (2012); the Greek and EU per capita GDP data are from Eurostat (European Commission, EU. 2012); and the U.S. per capita GDP data are from the BEA (USDC 2012).

Based on economic and finance theory as commonly indicated by business media pundits, all independent variables are expected to be positively related to stock prices with the exception of the value of the dollar. The dataset is monthly and extends from January 2008 to June 2012 for a total of 54 observations. Quarterly observations are associated with monthly observations based on when the quarterly data became public. For example, January, February, and March 2008 prices and ETF values are associated with profit and GDP estimates for the fourth quarter of 2007, April, May, and June 2008 prices and ETF values are associated with

profit and GDP estimates for the first quarter of 2008, etc. The variable descriptions and simple statistics for the data are presented in Table 1.

Model Estimation and Results

The SUR results are presented in Table 2. Because of unit root problems, the estimation results are based on data that are first differenced (Kennedy 2008). Using the variance inflation factor (VIF) method, no multicollinearity was exhibited (Gujarati 2003). The discussion regarding coefficient significance levels is uniformly in terms of the 10% level of significance.

For the S&P 500 price (spprice) equation, all of the coefficients have the expected sign except that for the value of Euro (fxe). Even so, only one coefficient is significant, that for the value of the dollar (uup).

The results for the nine representative food companies vary widely. Five of the nine firms have the correct coefficient sign for the measure of profitability of which three are significant. Those with the wrong sign include Kellogg (K), Dean Foods (DF), ConAgra Foods (CAG), and Kraft Foods (KFT). Only that for KFT is significant. Ironically, CAG and KFT have fared relatively well since the beginning of the recession with prices increasing about 7% and 19%, respectively, Table 3. From the beginning of the Eurozone crisis CAG and KFT prices increased about 9% and 20%, respectively. Even greater was the rise in the price of DF, about 55%, during this period, Table 3.

During the Eurozone crisis period of this study, more often than not, the path of the Greek economy was given as a reason by the business media for faltering U.S. stock performance. Nonetheless, in this study not a single coefficient for Greek per capita GDP (grkgdp) is significant, Table 2. The situation is similar regarding the EU per capita GDP

(eugdp) as an indicator of U.S. stock performance. Just three food companies have a eugdp coefficient with the expected positive sign – that for CAG, WFM (Whole Foods Market), and SFK (Smithfield Foods). Only the coefficient for WFM is significant. Of the companies with an unexpected eugdp coefficient sign, the one for TAP (Molson Coors) is significant. Again, another indicator of the economic wellbeing of the EU, the value of the Euro (fxe), seems not to be related to the performance of U.S. food company stocks. Only one company, Kroger (KR), has an fxe coefficient with the expected positive sign, though not significant. Only the fxe coefficient for KFT is significant, but with a negative sign.

Regarding the health of the U.S. economy, the value of the dollar is discussed in two ways by the business media. On one hand, a strong dollar is good for the U.S. consumer as the cost of goods tend to be lower. On the other hand, a weak dollar is good for U.S. business as U.S. goods become relatively cheap in foreign markets giving rise to an increase in demand for U.S. goods. Of the set of variables used in this analysis the value of the dollar (uup) behaves relatively well according to expectations. The expected negative sign for the uup coefficient manifests in every case except that for KR, though not significant. The coefficient is significant for TAP, CAG, and KFT. Foreign sales account for 98% and 60%, respectively, of total sales for TAP and KFT which is high relative to that for the other representative companies in this study, Table 3. The remaining variable reflecting the health of the U.S. economy is U.S. per capita GDP (usgdp). Two companies, CAG and WFM, have unexpected negative usgdp coefficient signs, though not significant. Four companies have significant and positive usgdp coefficient signs – TAP, GIS (General Mills), KR, and KFT.

Conclusions

The results of this analysis are mixed at best. The fact that only one coefficient, that for the value of the dollar, is significant in the broad market (S&P) equation is telling. Even reported profitability seems to have no bearing on the S&P index. Moreover, the efficacy of business media reporting regarding the effects of the Eurozone crisis on the U.S. stock market appears to be specious. Given the importance of the value of the dollar, it should be noted that 46% of S&P 500 company gross sales are foreign (Standard & Poor's Financial Services 2012).

For the nine representative food companies the results diverge markedly from that for the S&P 500. One would easily expect reported company profitability to have a powerful and direct effect on the value of the company stock. However, this was not generally found. Only three companies had positive and significant profitability coefficients. It may be that other forms of profitability information are more important, for example, earnings projections by leading analysts.

None of the variables alleged by the business media pundits to be central regarding the impact of the Eurozone crisis on the U.S. stock market was found to be important. The Greek per capita GDP, EU per capita GDP, and the value of the Euro were expected to be directly related to the food company stock prices in this study. Not a single significant coefficient with the correct sign manifested for the Greek per capita GDP or value of the Euro. Only one was found for the EU per capita GDP.

The measures reflecting the health of the U.S. economy seemed to yield somewhat better results. For the nine food companies, save one, the value of the dollar exhibited the expected negative relationship though only three of the coefficients were significant. There was some evidence that the magnitude of foreign sales might be important with respect to the value of the

dollar. The expected positive relationship between U.S. per capita GDP and food company stock prices manifested for seven of the nine firms, and in four of those cases the coefficient was significant. Based on the findings of this study it would seem that the U.S. stock market, including food companies, is primarily affected by the wellbeing of the U.S. economy as opposed to that of the EU.

Given the less than stellar results with respect to the reported profitability measures used in this analysis, future research should consider alternatives such as an array of projected earnings growth measures by different recognized analysts. Of course, a study like this regarding the effect of the Chinese economy on U.S. food companies is another extension to consider.

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Table 1. Variable Descriptions and Simple Statistics

Variable	Discription	Units	Mean	Std. Dev.	Min	Max
spprice	S&P 500 Index	thous USD	1.17	0.18	0.74	1.41
kprice	Kellogg Price	USD	47.12	4.96	33.08	55.11
tapprice	Molson Coors Price	USD	42.44	4.20	31.48	52.51
dfprice	Dean Foods Price	USD	15.31	4.96	7.26	27.69
cagprice	ConAgra Foods Price	USD	20.54	3.55	12.80	26.16
gisprice	General Mills Price	USD	31.90	5.02	22.38	39.46
wfmprice	Whole Foods Market Price	USD	41.83	22.66	9.33	88.48
sfdprice	Smithfield Foods Price	USD	18.52	5.48	6.81	31.29
krprice	Kroger Price	USD	22.48	2.11	18.96	26.94
kftprice	Kraft Foods Price	USD	28.67	5.05	19.78	39.56
spprofit	S&P 500 Profit	USD	14.50	10.45	-23.25	23.03
kprofit	Kellogg Profit	%	9.29	1.90	6.07	12.60
tapprofit	Molson Coors Profit	%	17.34	7.80	2.53	29.27
dfprofit	Dean Foods Profit	%	-1.45	10.75	-45.17	2.82
cagprofit	ConAgra Foods Profit	%	6.52	3.11	-2.13	14.47
gisprofit	General Mills Profit	%	10.14	2.55	5.34	15.10
wfmprofit	Whole Foods Market Profit	%	2.45	1.09	0.08	4.41
sfdprofit	Smithfield Foods Profit	%	1.06	2.71	-3.97	6.36
krprofit	Kroger Profit	%	0.98	1.63	-4.95	2.02
kftprofit	Kraft Foods Profit	%	7.42	3.13	1.93	16.64
grkgdp	Greek Per Capita Quarterly GDP	EUR	4782.50	604.54	3444.00	5500.00
eugdp	EU Per Capita Quarterly GDP	EUR	6161.11	231.01	5700.00	6500.00
fxe	CurrencyShares Euro Trust ETF Price	USD	137.70	9.15	121.60	156.00
uup	PowerShares DB US Dollar Index Bullish ETF Price	USD	23.19	1.43	20.95	26.55
usgdp	U.S. Per Capita Quarterly GDP	thous USD	11.76	0.30	11.31	12.35

Table 2. SUR Coefficient Estimates for the Effects of the Eurozone Crisis on Stock Prices: S&P 500 and Nine U.S. Food Companies

Variable	S&P 500	K	TAP	DF	CAG	GIS	WFM	SFD	KR	KFT
profit	5.7E-04	-0.1144	0.0456	-0.0178	-0.0124	0.0673*	1.7386*	0.2697*	0.0015	-0.0822*
	(5.7E-04)	(0.1288)	(0.0425)	(0.0167)	(0.0204)	(0.0356)	(0.6500)	(0.1526)	(0.0576)	(0.0338)
grkgdp	1.0E-06	0.0004	0.0011	-0.0002	4.7E-05	0.0004	-0.0007	-0.0001	0.0002	0.0006
	(2.3E-05)	(0.0010)	(0.0013)	(0.0011)	(0.0005)	(0.0005)	(0.0017)	(0.0011)	(0.0005)	(0.0006)
eugdp	2.6E-05	-0.0018	-0.0036*	-0.0002	0.0005	-0.0007	0.0069*	0.0006	-0.0008	-0.0015
	(3.9E-05)	(0.0023)	(0.0017)	(0.0017)	(0.0007)	(0.0008)	(0.0025)	(0.0018)	(0.0007)	(0.0010)
fxe	-0.0034	-0.2608	-0.1281	-0.0667	-0.1255	-0.1390	-0.4728	-0.1814	0.1509	-0.4555*
	(0.0057)	(0.2515)	(0.2825)	(0.2695)	(0.1169)	(0.1355)	(0.4001)	(0.2848)	(0.1211)	(0.1399)
uup	-0.0749*	-2.7124	-3.6065*	-0.5687	-1.4229*	-1.0409	-4.0056	-2.7723	0.4815	-3.9159*
	(0.0408)	(1.7894)	(2.0135)	(1.9161)	(0.8318)	(0.9644)	(2.8449)	(2.0273)	(0.8617)	(0.9957)
usgdp	0.0377	3.3046	6.0239*	0.7977	-0.7220	2.6334*	-0.8103	0.7810	3.3239*	4.4549*
	(0.0731)	(3.2563)	(3.3721)	(3.2037)	(1.4000)	(1.6288)	(4.7707)	(3.4772)	(1.4438)	(1.7942)
intercept	-0.0036	-0.0911	-0.2301	-0.3129	0.0773	0.1331	0.4612	-0.3196	-0.0725	-0.1221
	(0.0076)	(0.3380)	(0.3802)	(0.3578)	(0.1562)	(0.1808)	(0.5324)	(0.3797)	(0.1606)	(0.1880)
R-sq	0.43	0.14	0.47	0.05	0.19	0.05	0.23	0.25	0.22	0.36
Chi-sq	39.78	8.45	48.04	4.43	12.51	8.67	19.20	16.51	15.59	35.40
P	0.00	0.29	0.00	0.73	0.08	0.28	0.01	0.02	0.03	0.00

Breusch-Pagan test of independence: Chi-sq (45) = 204.26, P = 0.00

Note: The values in parentheses are standard errors. Asterisks (*) indicate significance at the 10% level or better.

Table 3. Percentage Stock Price Changes by Time Period and Foreign Sales Percentage

Company	1/4/08-6/1/12[a]	7/2/09-6/1/12[b]	1/7/11-6/1/12[c]	Foreign Sales
S&P	-9.46	42.43	0.51	46.00
K	-5.77	2.99	-5.45	38.00
TAP	-24.38	-11.62	-19.25	98.00
DF	-37.31	-21.47	55.31	3.00
CAG	7.01	32.49	8.76	5.00
GIS	36.09	29.57	6.40	25.00
WFM	125.90	376.80	76.30	3.00
SFD	-28.00	41.17	-0.46	11.00
KR	-14.60	1.79	0.19	0.00
KFT	19.46	44.72	20.46	60.00

[a]From beginning of last recession.

[b]From end of last recession.

[c]From beginning of Eurozone crisis.

Note: Foreign sales percentages are from ADVFN (2012) except for the S&P and CAG which are from Standard & Poor's Financial Services (2012) and Nvest, Inc. (2012), respectively.