International Journal of Academic Research in Accounting, Finance and Management Sciences
Vol. 8, No.4, October 2018, pp. 163–170
E-ISSN: 2225-8329, P-ISSN: 2308-0337

www.hrmars.com

To cite this article: Riaz, A., Hongbing, O., Hashmi, S.H. Khan, M.A. (2018). *The Impact of Economic Policy Uncertainty on US Transportation Sector Stock Returns,* International Journal of Academic Research in Accounting, Finance and Management Sciences 8 (4): 163-170.

www.hrmars.com
ISSN: 2225-8329

http://dx.doi.org/10.6007/IJARAFMS/v8-i4/5500 (DOI: 10.6007/IJARAFMS/v8-i4/5500)

The Impact of Economic Policy Uncertainty on US Transportation Sector Stock Returns

Adeel Riaz[1], Ouyang Hongbing[2], Shujahat Haider Hashmi[3], Muhammad Asif Khan[4]

[1,2,3,4] School of Economics, Huazhong University of Science and Technology, Wuhan, P.R. China*Corresponding author: *riazadeel46@yahoo.com *(Corresponding Author)*

Abstract

Development of transportation sector is a fundamental prerequisite for economic growth, which is sensitive to variations in domestic and international economic policies. In this vein, we investigate how domestic and global economic policy uncertainty affects stock returns of transportation sector firms in the United States. We deploy autoregressive distributed lag bounds testing method to investigate the relationship of monthly returns of Dow Jones Transportation Average with economic policy uncertainty, global economic policy uncertainty, and other macroeconomic factors. Our findings suggest that economic policy uncertainty at the national and international level negatively influences the stock returns of the transportation sector. The paper also demonstrates a positive effect of industrial production and consumer's confidence on returns of U.S. transportation sector. The empirical findings offer useful policy implications to the stakeholders of the US transportation sector.

Key words

Transportation stock return, economic policy uncertainty, global economic policy uncertainty, industrial production, consumer confidence

Received: 22 Ian 2019
Revised: 18 Feb 2019
Accepted: 27 Feb 2019
Published Online: 09 Mar 2019

1. Introduction and Literature review

Governments around the world set rules and keep changing these rules with the time. A change in these rules affects communities, individuals and businesses alike. Either uncertainty in economic and political decisions generates uncertainty for businesses, which can increase or decrease profits for firms. Uncertainty in economic policy affects businesses differently; it can be beneficial for some industries and adversely affects some. Uncertainty in economic policy creates turbulence in macroeconomic variables, which influence stock prices. Scott *et al.* (2016) reported that EPU is responsible for a decline in investment, output, and employment in the United States. Aizenman and Marion (1993) explored the relationship between GDP and policy uncertainty for 46 developing countries. They found that uncertainty in policy could weaken economic growth through a decline in corporate investments.

Impact of policy uncertainty on other variables such as unemployment, investments, economic growth, and oil prices (Bloom *et al.*, 2007; Caggiano *et al.*, 2017; Kang *et al.*, 2014; Kang and Ratti, 2013; Liu and Zhang, 2015) have also been observed. Policy uncertainty has also implications for stock market indices and consequently for returns. Numerous researchers have investigated the relationship between stock market and economic policy uncertainty (Ozoguz, 2009; Pástor and Veronesi, 2012; Sum, 2012a; Sum,

2012b; Kang and Ratti, 2015; Arouri *et al.*, 2016; Wu *et al.*, 2016; Yang and Jiang, 2016; Tsai, 2017; Phan *et al.*, 2018). Higher volatility in policy uncertainty dampens stock market returns thereby increasing stock market volatility (Antonakakis *et al.*, 2013).Bloom *et al.* (2016) developed a measure for economic policy uncertainty index and found that it is linked to greater stock price volatility and reduces business investments. Numerous researchers have employed economic policy uncertainty index to investigate its effects on financial markets' indices, and it is widely accepted and employed in recent studies.

However, Phan *et al.* (2018) were of the view that EPU is more important for some countries and sectors than others and its effects are asymmetric across sectors in the US. Therefore, in this paper, we use economic policy uncertainty index to analyses how EPU and other economic variables affect stock returns of the US transportation sector measured by Dow Jones Transportation Average (DJTA). The transport sector is responsible for a major share in emissions that affects climate (Timilsina and Shrestha, 2009). A change in climate policy by the government has huge implications for the transport sector. Uncertainty in regulations, economic incentives such as fuel taxes and implementation of fuel economy standards also affect the transportation sector. Although DJIA is well known among researchers, it excludes transportation sector companies. DJTA is an important index for measuring the performance of the transportation sector of US; it includes 20 companies (Appendix A) and is price weighted. Reconstitution of the index is based on corporate actions and market developments. To the best of our knowledge, this is the first study to investigate the effect of economic policy uncertainty and other macroeconomic variables on the transportation sector of US. It is important for investors and policymakers in order to better assess hedge and manage the risk in the transportation sector. As a world leader in trade U.S. economy is influenced by uncertainty in domestic and international policies. Therefore, in order to account for international uncertainty spillovers, we employ global EPU index to investigate its influence on US transportation sector. In order to test this relationship, both aspects are considered separately by applying ARDL method in our models. We postulate a negative effect of both in light of empirical literature. In addition to economic uncertainty variables, we add economic variables as control variables in order to assess their impact on DJTA. The existing literature provides strong evidence for the relevance of each of these variables for stock returns.

The remainder of this paper is organized as follows. Section 2 provides data and methodology. Section 3 discusses the main empirical results, and section 4 concludes the study.

2. Data and Methodology

Monthly changes in economic policy uncertainty in the United States and globally are provided by the Economic Policy Uncertainty Index website (http://www.policyuncertainty.com/) developed by (Scott R. Baker et al., 2016). EPU index is widely accepted and employed by numerous researchers and is based on newspaper coverage of policy-related economic uncertainty. Our data covers a monthly period of 17 years from January 2000 to December 2017. Data for macroeconomic variables and the Dow Jones Transportation Index has been obtained from CEIC. Our main motivations for selecting DJTA as representation of transportation sectors are i) it represents companies from different sub-sectors of transport sector, i.e. airlines, trucking, railroad and marine transportation ii) changes in composition of DJTA are rare iii) stocks included in the index are highly traded iv) all the companies in the index are U.S. based. First, we investigate the relationship between DJTA, EPU, and other economic variables. Our empirical model is as follows:

$$\Delta DJTA_t = \alpha_0 + \beta_1 \Delta EPU_t + \beta_2 \Delta M2_t + \beta_3 \Delta Prod_t + \beta_4 \Delta Conf_t + \beta_5 \Delta Discount_t + \beta_6 \Delta Oil_t + \varepsilon_t \quad (1)$$

Where Δ represents a change in a *DJTA* calculated as the difference between ending and beginning value divided by the beginning value of a variable. *EPU* is economic policy uncertainty, *M2* is money supply, *Prod* is industrial production, which is a measure of economic activity, and *Conf* is the consumer's confidence. Discount is an interest rate of 3-months U.S. Treasury bond and Oil denotes monthly Brent crude oil price. Railroad and water transport are used for transportation for imported and exported goods. Because of huge trade volume, U.S. economy influences are influenced by policy uncertainty at the global level. Therefore, the effect of global policy uncertainty is also examined:

$$\Delta DJTA_t = \alpha_0 + \beta_1 \Delta GPU_t + \beta_2 \Delta M2_t + \beta_3 \Delta Prod_t + \beta_4 \Delta Conf_t + \beta_5 \Delta Discount_t + \beta_6 \Delta Oil_t + \varepsilon_t \quad (2)$$

Table 1 shows the descriptive statistics of the variables, which suggests the suitability of the indicators for further estimation. A higher standard deviation for discount rate as compared to other variables is an indication of larger variations in discount rate specifically after the 2008 financial crisis.

Table 1. Descriptive Statistics

Variables	DJTA	EPU	GPU	M2	PROD	CONF	Interest	Oil
Mean	0.00829	0.01852	0.02420	0.00031	0.00039	0.003646	0.073429	0.00845
Median	0.01205	-0.0191	-0.0023	0.00525	1.98E-05	-0.0012	0	0.01931
Maximum	0.17140	1.23112	1.22564	0.02734	0.015962	0.516729	10	0.21880
Minimum	-0.2199	-0.4743	-0.4331	-1	-0.03332	-0.36808	-9	-0.2672
Std. Dev.	0.05769	0.20621	0.22052	0.07014	0.006958	0.094883	1.107444	0.08944
Observations	215	215	215	215	215	215	215	215

Note: Significant at * 1% level ** 5% level and *** 10% level

A correlation test to check multicollinearity among variables is presented in Table 2. Multicollinearity does not exist if correlation among variables is less than .80-.90% (Kennedy, 1993). All of the variables are fulfilling this criterion.

Table 2. Correlations Matrix

Variables	DJTA	EPU	M2	PROD	CONF	Interest	Oil	GPU
DJTA	1							
EPU	-0.27437	1						
M2	0.006718	0.014422	1					
PROD	0.031037	-0.06476	-0.13929	1				
CONF	0.237548	-0.0907	0.02289	-0.08706	1			
Interest	0.00212	-0.00239	0.014833	-0.01698	-0.06912	1		
Oil	-0.00568	-0.12346	-0.02313	0.030082	0.029223	-0.1445	1	
GPU	-0.25488	NA	0.087978	-0.00728	-0.12656	0.037664	-0.13061	1

Table 3 presents the stationarity results examined through Augmented Dickey and Fuller (ADF), which is prevalent among researchers. All the variables are stationary at level except M2, which is stationary at first difference. The use of ARDL is the most effective and appropriate method to examine the dynamic relationship between the variables when the integration order is mixed (Pesaran *et al*., 2001).

Table 3. Unit Root Test

	Level		1st Difference	
	t-statistics	p-value	t-statistics	p-value
DJTA	-13.6477	0.0000*	-10.3563	0.0000*
EPU	-11.7987	0.0000*	-12.9459	0.0000*
GPU	-16.1554	0.0000*	-12.7671	0.0000*
M2	-2.69269	0.077	-3.92218	0.0023**
PROD	-4.71522	0.0001	-11.7949	0.0000*
CONF	-14.2263	0.0000*	-11.2205	0.0000*
Interest	-12.2536	0.0000*	-10.6092	0.0000*
Oil	-12.1467	0.0000*	-8.71484	0.0000*

Note: Significant at *** 1% level ** 5% level and * 10% level

A suitable lag length is crucial to avoid the serial correlation of error correction terms. In order to select optimal lag length, we use Akaike Information Criteria (AIC) Since AIC is robust and reliable (Lütkepohl, 2006) so we prefer AIC for appropriate lag length for both of our equations.

Table 4. Lag Length Criteria-EPU

Lag	LogL	LR	FPE	AIC	SC
0	1170.393	NA	3.97E-13	-11.52865	-11.43038*
1	1223.65	102.8216	3.34E-13	-11.6995	-11.0116
2	1253.956	56.71276	3.54E-13	-11.64313	-10.3657
3	1311.951	105.0794	2.85E-13	-11.8609	-9.99386
4	1350.553	67.64895	2.79e-13*	-11.88666*	-9.43003
5	1386.441	60.76129*	2.82E-13	-11.88556	-8.83933

Table 5. Lag Length Criteria GPU

Lag	LogL	LR	FPE	AIC	SC
0	1338.188	NA	3.65E-15	-13.37877	-13.26293*
1	1409.76	137.3904	2.91E-15	-13.60563	-12.6789
2	1450.274	74.91986	3.17E-15	-13.52034	-11.7827
3	1513.328	112.1663	2.77e-15*	-13.66159	-11.113
4	1558.658	77.44744	2.90E-15	-13.6247	-10.2652
5	1612.792	88.68209	2.79E-15	-13.67630*	-9.50588

We applied ARDL bound testing approach (Pesaran *et al*., 2001) to investigate the existence of a long-run relationship among variables and found F-statistics higher than lower I(0) and upper I(1) bound as shown in table 6. Results from table 6 suggest long-run cointegration among variables.

Table 6. ARDL Bound Test Estimate(k=6)

F-statistic (EPU)	F-statistic (GPU)	Significance	I0 Bound	I1 Bound
15.90291	19.39104	10%	2.12	3.23
		5%	2.45	3.61
		2.50%	2.75	3.99
		1%	3.15	4.43

3. Results and Discussions

The paper examines the relationship between DJTA and other macroeconomic variables including economic policy uncertainty at the domestic and global level. Table 7 presents the long run results for our model 1. The results show how domestic policy uncertainty in the US affects the transportation sector returns.

Table 7. Long Run Effect (EPU)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EPU	-0.05085	0.015991	-3.1796	0.0017***
M2	-0.00423	0.044475	-0.0951	0.9243
PROD	1.608397	0.774155	2.077617	0.0391***
CONF	0.194097	0.04999	3.882695	0.0001***
Interest	-0.00855	0.009317	-0.91797	0.3598
Oil	0.094278	0.05572	1.691988	0.0924**
C	0.007504	0.003195	2.349116	0.0199**

Note: Significant at *** 1% level ** 5% level and * 10% level

Results indicate that economic policy uncertainty although affects transportation index to a smaller extent but it is significant at 1% level of significance. The negative relationship between the two indicates that an increase in economic policy uncertainty affects the economy as a whole and as a result, the transportation sector is influenced negatively by volatility in EPU. The results are in line with previous

studies about other stock market indices that an EPU has adverse bearings for stock market returns and indices.

Effect of the money supply is insignificant and negative. The negative sign indicates that higher inflation results in a decrease in stock prices. (Sarel, 1992) found that when the inflation rate is higher, as was the case in the 1980s, then it affects economic growth negatively. Consumer's confidence in the economy has a positive and significant impact on the transportation index. The result is intuitive since the consumer's confidence in the economy is an important tool to understand development in consumer expectations about the well-being of the economy. This result is consistent with (Sum, 2012b) who found that consumer confidence has a stronger impact on stock returns than business confidence. Statman and Fisher (2002) also found a statistically significant relationship between stock returns and consumer confidence.

The relationship between transportation and industrial production was quite evident and is significant and positive. A higher industrial production employs more transportation and increases profits for transportation firms. Schwert (1990) also found a positive relationship between real economic activity and stock returns. He used industrial production as a proxy for real economic activity and covered a period of hundred years. This result is also in agreement with (Humpe *et al.*, 2009). Although oil is one of the major operating expenses for the transportation sector, yet, results indicate a higher oil price increases the transportation sector's stock returns. Arouri and Nguyen (2010) found an increase in oil price as a signal of economic growth for some industries. They were of the view that investors associate increasing oil prices with a booming economy and it reflects in robust business performances.

Table 8. Long Run Effect (GPU)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GPU	-0.04424	0.01453	-3.04465	0.0027***
M2	0.010881	0.044019	0.247184	0.805
PROD	2.080839	0.734885	2.831517	0.0051***
CONF	0.153153	0.046231	3.312787	0.0011***
Interest	0.004175	0.006821	0.612192	0.5412
Oil	0.083862	0.054628	1.535143	0.1264
C	0.006609	0.003125	2.114579	0.0358***

Note: Significant at *** 1% level ** 5% level and * 10% level

Since transportation companies' revenues are based on domestic transportation of goods as well as trade with other countries. Marine shipping companies make part of DJTA, and their revenues depend on global trade volumes. Results of model 2 indicate that economic policy uncertainty at the global level also affects DJTA index negatively. Economic policy uncertainty at the global level disrupts trade among countries resulting in lost benefits for marine shipping and other transportation-related companies. The relationship between DJTA and other macroeconomic control variables remains the same as was in case of model 1 except oil which becomes insignificant.

Breusch–Godfrey Serial Correlation LM Test, presented in Table 9, confirms no serial correlation. Stability of the model is represented by CUSUM and CUSUMQ, which indicates the model's stability as shown in figure 1 and figure 2.

Table 9. Breusch-Godfrey Serial Correlation LM Test

EPU	F-statistic	1.51044	Prob. F (2,181)	0.2236
	Obs*R-squared	3.316025	Prob. Chi-Square (2)	0.1905
GPU	F-statistic	2.076346	Prob. F (2,185)	0.1283
	Obs*R-squared	4.478652	Prob. Chi-Square (2)	0.1065

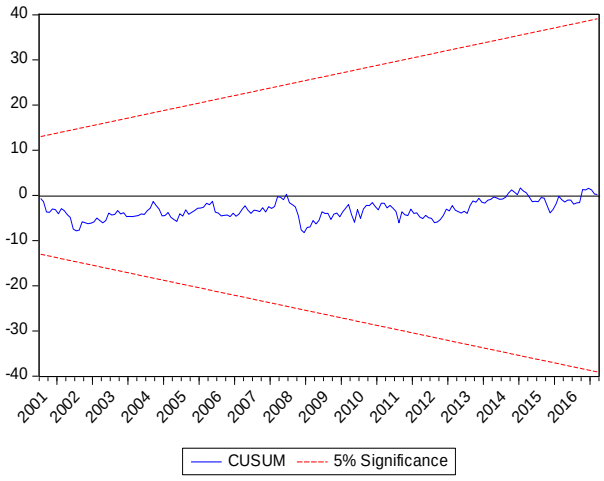

Figure 1. Stability Test (CUSUM)

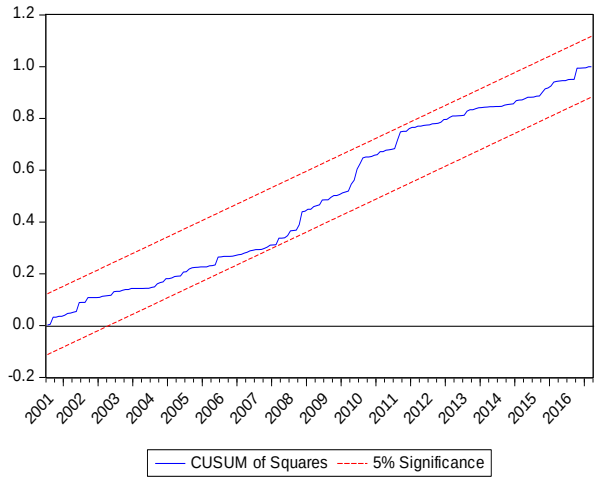

Figure 2. Stability Test (CUSUMQ)

4. Conclusions

In this study, we use economic policy uncertainty index for US and world developed by (Baker *et al.*, 2016) to see its effects on companies listed on Dow Jones Transportation Index. Our empirical analysis is based on monthly data for DJTA, EPU and macroeconomic variables for a period of 2000-01 to 2017-12. This is the first study to examine the effect of EPU on transportation firms of US. We applied ARDL developed by (Pesaran *et al*., 2001) to investigate the relationship between DJTA, EPU, and macroeconomic variables.

We find strong evidence that uncertainty in economic policy at the domestic level negatively affects stock returns of the US transportation sector. Moreover, the effect of uncertainty in global economic policy is transmitted to transportation firms in US and contracts stock returns. In this article, we also seek to identify the relationship between the transportation sector returns and macroeconomic variables. Industrial production, a proxy for economic activity, has a positive influence on stock returns. Consumer's confidence in the economy affects returns positively. Empirical research has found oil as a signal for economic growth. Our framework suggests that oil affects returns of transportation industry positively. It is further to be investigated, whether other economic variables affect DJTA or not and to what extent, which will be beneficial for the transportation sector's growth and its management of risk.

References

1. Aizenman, J., & Marion, N. P. (1993). Policy Uncertainty, Persistence and Growth. *Review of International Economics*.

2. Antonakakis, N., Chatziantoniou, I., & Filis, G. (2013). Dynamic co-movements of stock market returns, implied volatility and policy uncertainty. *Economics Letters*, *120*(1), 87–92.

3. Arouri, M., Estay, C., Rault, C., & Roubaud, D. (2016). Economic policy uncertainty and stock markets: Long-run evidence from the US. *Finance Research Letters*, *18*, 136–141.

4. Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics*, *131*(4), 1593–1636.

5. Bloom, N., Bond, S., & Van Reenen, J. (2007). Uncertainty and investment dynamics. *Review of Economic Studies*.

6. Caggiano, G., Castelnuovo, E., & Figueres, J. M. (2017). Economic policy uncertainty and unemployment in the United States: A nonlinear approach. *Economics Letters*, *151*, 31–34.

7. Hedi Arouri, M. El, & Khuong Nguyen, D. (2010). Oil prices, stock markets and portfolio investment: Evidence from sector analysis in Europe over the last decade. *Energy Policy*, *38*(8), 4528–4539.

8. Humpe, A., Macmillan, P., Humpe, A., & Macmillan, P. (2009). Can macroeconomic variables explain long-term stock market movements ? A comparison of the US and Japan Can macroeconomic variables explain long-term stock market movements ? A comparison of the US and Japan, *3107*.

9. Kang, W., Lee, K., & Ratti, R. A. (2014). Economic policy uncertainty and firm-level investment. *Journal of Macroeconomics*, *39*(PA), 42–53.

10. Kang, W., & Ratti, R. A. (2013). Structural oil price shocks and policy uncertainty. *Economic Modelling*, *35*, 314–319.

11. Kang, W., & Ratti, R. A. (2015). Oil shocks, policy uncertainty and stock returns in China. *Economics of Transition*, *23*(4), 657–676.

12. Kennedy, P. (1993). A guide to econometrics. *Journal of Macroeconomics*, *15*(2), 402–403.

13. Liu, L., & Zhang, T. (2015). Economic policy uncertainty and stock market volatility. *Finance Research Letters*, *15*, 99–105.

14. Lütkepohl, H. (2006). Structural Vector Autoregressive Analysis for Cointegrated Variables. In *Modern Econometric Analysis* (pp. 73–86). Berlin, Heidelberg: Springer Berlin Heidelberg.

15. Ozoguz, A. (2009). Good Times or Bad Times? Investors' Uncertainty and Stock Returns. *Review of Financial Studies*, *22*(11), 4377–4422.

16. Pástor, L., & Veronesi, P. (2012). Uncertainty about {Government} {Policy} and {Stock} {Prices}. *The Journal of Finance*, *67*(4), 1219–1264.

17. Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*(3), 289–326.

18. Phan, D. H. B., Sharma, S. S., & Tran, V. T. (2018). Can economic policy uncertainty predict stock returns? Global evidence. *Journal of International Financial Markets, Institutions and Money*, *55*, 134–150.

19. Sarel, M. (1992). The effects of inflation on economic growth. Lessons from Latin America. *European Economic Review*, *36*(2–3), 417–425.

20. Schwert, G. W. (1990). Stock Returns and Real Activity : A Century of Evidence, *XLV*(4), 1237–1257.

21. Scott R. Baker, Bloom, N., & Davis, S. J. (2016). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics*, *131*(June), 1593–1636.

22. Statman, M., & Fisher, K. L. (2002). Consumer Confidence and Stock Returns. *Ssrn*, (August).

23. Sum, V. (2012a). The Reaction of Stock Markets in the BRIC Countries to Economic Policy Uncertainty in the United States. *Ssrn*, 1–15.

24. Sum, V. (2012b). The Reaction of Stock Markets in the BRIC Countries to Economic Policy Uncertainty in the United States. *Ssrn*, *32*(4), 512–521.

25. Timilsina, G. R., & Shrestha, A. (2009). Transport sector CO2 emissions growth in Asia: Underlying factors and policy options. *Energy Policy*, *37*(11), 4523–4539.

26. Tsai, I. C. (2017). The source of global stock market risk: A viewpoint of economic policy uncertainty. *Economic Modelling*, *60*(August 2016), 122–131.

27. Wu, T. P., Liu, S. B., & Hsueh, S. J. (2016). The Causal Relationship between Economic Policy Uncertainty and Stock Market: A Panel Data Analysis. *International Economic Journal*, *30*(1), 109–122.

28. Yang, M., & Jiang, Z. Q. (2016). The dynamic correlation between policy uncertainty and stock market returns in China. *Physica A: Statistical Mechanics and Its Applications*, *461*, 92–100.

Appendix

Company	Symbol	Category
Alaska Air Group, Inc.	ALK	Airlines
American Airlines Group Inc.	AAL	Airlines
Avis Budget Group, Inc.	CAR	Rental And Leasing Services
C.H. Robinson Worldwide, Inc.	CHRW	Trucking
CSX Corp.	CSX	Railroads
Delta Air Lines	DAL	Airlines
Expeditors International	EXPD	Delivery Services
FedEx Corporation	FDX	Delivery Services
JB Hunt Transport Services, Inc.	JBHT	Trucking
JetBlue Airways Corp.	JBLU	Airlines
Kansas City Southern	KSU	Railroads
Kirby Corp.	KEX	Marine Transportation
Landstar System, Inc.	LSTR	Trucking
Matson, Inc.	MATX	Marine Transportation
Norfolk Southern Corp.	NSC	Railroads
Ryder System, Inc.	R	Transportation Services
Southwest Airlines, Inc.	LUV	Airlines
Union Pacific Corp.	UNP	Railroads
United Continental Holdings	UAL	Airlines
United Parcel Service, Inc.	UPS	Delivery Services