Forecasting Cycles in the Transportation Sector

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Abstract

The purpose of this paper is to develop a method for predicting fluctuations in the transportation sector using leading indicators. From twenty-five initial candidates, we select seven leading indicators using various screening techniques and modern time series models. A composite leading index is constructed and found to perform well in predicting their reference cycles. The leading index signals downturns in the transportation sector by 9 months and upturns by 6 months, on average. The former predicted the latest recession in transportation 20 months ahead. We also confirm the predictive contents of the CLI in relation to transportation growth cycles. These evaluation criteria ensure accurate forecasts of the general state of the transportation sector in a timely fashion.

Keywords: Forecasting; Business cycles; Composite leading index; Transportation.

I. Introduction

Business cycle studies play an important role in the decision-making process for both government agencies and private sector organizations. For instance, section 254 of the Gramm-Rudman-Hollings (GRH) law, passed by the U.S. Congress in December 1985, provides for "Special Procedures in the Event of a Recession." It states that the Congressional Budget Office (CBO) Director shall notify the Congress at any time if the CBO "has determined that real economic growth is projected or estimated to be less than zero with respect to each of any two consecutive quarters within a period of six successive quarters starting with the one preceding such notification…" This rule, designed as a key condition for the suspension of several GRH provisions, reflects some filtering algorithms that have long been employed by the National Bureau of Economic Research (NBER) to monitor the business cycles of the U.S. economy. The latter is also utilized as an important input for macroeconomic policies or business planning (Lahiri and Moore, 1991; Zarnowitz, 1992). For instance, businesses implement different strategies during expansions and recessions of the general market.

Burns and Mitchell (1946), the pioneers of NBER studies, define a business cycle as "consist[ing] of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals…" These concurrent movements can be captured by a single underlying unobservable variable or index estimated from cyclical indicators. These indicators are grouped into leading, coincident, and lagging categories according to their tendency to change direction before, during or after a corresponding change in the general state of the economy. The composite indices constructed from leading and coincident indicators are named composite leading index (CLI) and composite coincident index (CCI) respectively. CLI is used mostly to forecast the directional change in CCI. Economic theory states that profits are the prime mover in a private enterprise economy and that the recurring business cycles of expansion and recession are caused by changes in expectation of profits (de Leeuw, 1991). The CCI and its components measure movements in production and sales; hence, they are concurrent with the current state of the economy. The CLI and its components represent business commitments and expectations regarding labor, product and financial markets, and thus point to the future profit outlook.

The NBER currently uses four coincident indicators to define recessions and expansions in the U.S. economy. The U.S. Bureau of Economic Analysis and the Conference Board currently maintain ten leading indicators to forecast the directional change in the CCI and the general state of the economy. In practice, determining turning points (peaks or troughs) based on coincident indicators usually involves the resolution of difficulties such as substantial lag or data revision. For instance, the NBER confirmed the latest recession – beginning in March 2001 – on November 26, 2001, and the latest recovery – beginning in November 2001 – on July 17, 2003. Many leading indicators have the advantage of early signaling, timely availability, and freedom from revision. The leading economic indicator approach has also survived repeated testing over time and has been found to be a very effective forecasting technique for predicting economic recessions in other countries; see Moore (1961), Lahiri and Moore (1991), and Zarnowitz (1992). Therefore, developing leading indicators is an integral component of business cycle studies.

Lahiri and Yao (2004) studied both business and growth cycles in the U.S. transportation services sector using the economic indicators analysis and modern time series models. Four coincident indicators are selected to represent different aspects of the transportation sector including a newly developed transportation services index (TSI), payrolls, personal consumption expenditure, and employment in this sector. Based on the CCI, chronologies of both classical business cycles and of growth slowdowns are determined. We find that, relative to the economy, business cycles in the transportation sector have an average lead of 6 months at peaks and an average lag of nearly 2 months at troughs. The study undertaken by Lahiri and Yao (2004) helps us to understand the role of transportation in economic fluctuations and can monitor all aspects of this sector in the current period. Although the cycles based on coincident indicators can serve as an important reference for planning and other decision-making processes, they are also subject to substantial lag and revision errors with no exception.

This paper intends to predict the future state of the U.S. transportation sector using leading indicators. Unlike traditional travel demand forecasting models in transportation economics, our predicted future value comprises the summarized information of traffic, income, employment, and revenues. In particular, leading indicators are very effective in predicting the tendency of directional change in transportation. All the data are monthly series, which generates detailed and accurate short- and long-term forecasts in a timely fashion, whereas current transportation forecasts are more long-term. In making these forecasts, we initially examined all the relevant transportation-related indicators as well as the economy-wide leading indicators currently in use, resulting in an initial list of 25 indicators. The selection of valid leading indicators requires the employment of different criteria[1] and statistical procedures.

After the Introduction, Section II screens these candidates according to their economic relevance to the reference cycles. Section III refines the list further by testing their ability to Granger-cause the transportation CCI. Section IV checks for the existence of co-movements among a final list of leading indicators, which is one of the two key features of Burns and Mitchell's (1946) business cycle studies. Section V uses a constructed composite index of leading indicators to predict the business cycles in the U.S. transportation sector. Section VI examines the prediction of transportation growth cycles and the last section summarizes the main conclusions of the paper.

II. Screening by Economic Relevance

Ten leading indicators that are currently used by the Conference Board cover the following aspects of the economy: the degree of tightness in the labor market due to employer hiring and firing; new orders in manufacturing for future production; financial information related to short-term and long-term interest rate differentials that indicate the effect of monetary policies; stock market performance that indicates investors' pessimism or optimism for the future; and consumer expectation for the household's future spending. These rationales are used for our initial screening.

As a measure of the degree of tightness in the labor market in the transportation sector, the average weekly working hours of production workers in transportation, communications and public utilities (TP) is a good candidate and is thus included in the initial list. Since transportation equipment provides supplies and equipment, it might be considered a "manufacturing sector" for the transportation sector and many other sectors.

[1] These criteria, discussed in detail in Zarnowitz and Boschan (1975, pp. 171-3), include: a) economic significance, b) statistical adequacy, c) conformity to historical business cycles, d) consistency of timing during cycles, e) smoothness, and f) currency.

Besides its new orders (NO), some of the coincident or leading indicators for the transportation equipment industry could also have leading value for the transportation services CCI. Those series include shipments[2], the industrial production index (IP), employment, change in unfilled orders (UO), real aggregate payrolls (Payrolls), and average weekly working hours of production workers (Hours) of transportation equipment. Given the fact that operation of every transportation mode relies heavily on the supply of crude oil and petroleum products, change in the spot oil price could be an important indicator for supply decisions in transportation. In calculating the change in the spot oil price, we replace the controversial conventional smoothing procedures with the smoothing filter developed by *Statistics Canada*. With respect to the stock market, the current Dow Jones transportation average (DJTA) includes a total of 20 common stocks associated with transportation. Among them are six airlines, then five trucking companies, four railroads, two air-freight service providers, and one each for marine transportation, transportation service and industrial service. Like the rationale for including the S&P 500 in the economic leading indicators, DJTA reflects investors' expectations for the profit outlook of transportation industries, and thus should be included.

From the pool of leading indicators for the overall economy, only four of those currently used are included in our list, while the other six leading indicators are excluded, since we have already obtained similar measures from transportation-related industries. The included indicators are: the consumer sentiment index (CSI) of the University of Michigan; interest rate spread between 10-year treasury bonds and federal funds; M2 deflated to constant dollars; and new housing starts. The CSI reflects consumer attitudes toward the general economy and their perceptions about future buying, and thus covers prospective spending on transportation services. Batchelor (2001) accessed the predictive value of both the CSI of consumer perceptions and the PMI of business perceptions using time-varying Markov-switching models. His empirical study concluded that a rise in consumer confidence lowers the probability of staying in the bad or low-growth state (state 0), and thus is useful in predicting peaks. Although the statistical significance over the sample period does not necessarily provide a reliable judgment rule for forecasting the state of the economy, it strongly suggests the usefulness of the CSI as a leading indicator. It would be also a good predictor for household transportation. The interest rate spread was the dominant constituent series in Stock and Watson's (1991) leading index. Interest spread is pro-cyclical because it measures, among other things, the default risk on private securities. Both interest spread and deflated M2 are indicators of the effects of monetary policies, and thus should also be connected with demand for household and business transportation. New housing starts represent the beginning of residential construction. This process directly results in hiring of workers, and purchase of household appliance and equipments. This variable is heavily influenced by growth in household numbers and real incomes, and changes in mortgage rates, *etc*. It can create direct demand for transportation services and otherwise affect the general level of the economy.

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[2] Both new orders and shipments are estimates of manufacturers' orders data prepared by the U.S. Bureau of Census. Data are based on SIC (Standard Industrial Classification) up to 2001:03 while NAICS (North American Industry Classification System) based data are reported since 1992:02. According to the BEA's Handbook of Cyclical Indicators (1984), the constant-dollar orders series of transportation equipment are deflated using producer price index for capital equipment. Because TE's new orders contain too much high frequency noise, it was smoothed by the filter $S(L) = 1+2L+2L^2+L^3$ as developed by *Statistics Canada*.

The purchasing management index (PMI) diffusion index represents businesses' attitude to future profits. Its five components, namely, promptness of deliveries, inventories, new orders, production, and employment diffusion indexes, represent five different aspects of the direction of economic activity in manufacturing industries. All of them have similar cyclical movements. Batchelor (2001) also finds that a fall in PMI-all index leads to a fall in the probability of the good state. Klein and Moore (1991) found that PMI-new orders lags the actual volume of new orders by a few months, but its movements are much smoother; PMI-inventory closely matches the swings in inventory change and hence is a leading indicator of business cycles; the PMI-all matches every business cycle with an average lead time of 3 months between 1948 and 1988. In addition, diffusion indexes have great advantages like prompt availability, revision free, and simplicity. PMI-delivery is currently included as one of the leading indicators. Among these PMI indexes, PMI-inventory is then preferred for the following reasons. Theoretically, the transportation sector plays the major role in moving both final goods and supplies & materials to build up inventories, and inventory cycles are the dominant feature of business cycles in the overall economy. Therefore there should be a reasonable lead-and-lag relationship between the change in inventory in the economy and activities in the transportation sector. But since there are different commodities in the inventories, it is not clear which indicator of inventory will do a better job. Tamm (1991) evaluates the inventory data of the Department of Commerce and the National Association of Purchasing Management (now Institute for Supply Management (ISM)) inventory diffusion index for a better measure of cyclical movements of inventory. Regardless of its timeliness, Tamm argues that the PMI index can be useful for its supplemental role to the NBER inventory data series. Blinder and Maccini (1991) show that retail inventory and manufacturers' purchased material and supplies are by far the most volatile components of inventory investment, which is exactly the coverage of the PMI-inventory. In addition, the PMI-inventory seems to have fewer false signals than other PMI indexes. Therefore we prefer it as a leading indicator for the transportation sector.

Following the above rationales, we have a total of 14 potential leading indicators for the transportation sector, including PMI-inventory.

III. Tests for Predictive Content of Individual Indicators

In a qualified leading indicator, its predictive content for the composite coincident index should be emphasized over other factors. Therefore, these variables are screened by testing their ability to Granger-cause (Granger, 1969) the transportation CCI. Applying this procedure ruled out four time series from the list. Series that Granger-cause the transportation CCI at the 5% level of significance are: CSI, Interest Spread, New Sousing Starts, Hours (TE), NO (TE), IP (TE), Shipments (TE), Payrolls (TE), DJTA, and PMI-inventory. The very small probabilities of PMI-inventory and CSI accepting H_0 in the Granger causality tests also validate the compelling predictive content of these two diffusion indexes. This bivariate analysis is similar to Stock and Watson (1991) in selecting leading indicators for the economy.

In the next step, we used multivariate analysis to obtain the effects of additional variables compared with a base model. The purpose of doing this was to identify which variables add "new" information in addition to those well-established variables like CSI and PMI-inventory. Our study considered three base models, starting from the regression of growth of the transportation CCI on four of its own lags and those of the CSI (base model 1), then CSI and PMI-delivery (base model 2); and CSI & PMI-delivery and new housing starts (base model 3). The reason for using these three variables was that they are aggregate economy variables and have shown most significant predictive content in the first step. In the definition of the Granger causality test, an additional series is considered to have additional predictive power if H_0 that the coefficients of its current and lagged values are all zeros is rejected in an F test. Our study also considered whether the adjusted R^2 was increased by including 6 and 12 lags, respectively, of a new variable. Table 1 shows the resulting p-value and adjusted R^2 where * marks the additional series that has only increased adjusted R^2, and ** marks the variables that increase the adjusted R^2 and pass the F test. In base model 1, PMI-inventory, interest spread and new housing starts have additional predictive power in the Granger causality test and they are marked with **; only one transportation variable, TE's payrolls, increases the adjusted R^2, and is thus marked with *. In base model 2, new housing starts are the only variable that Granger-causes growth of the transportation CCI in addition to the two diffusion indexes; interest spread, TE's new orders, payrolls, shipments and DJTA have all contributed to the adjusted R^2. In base model 3, only TE's shipments Granger-cause the dependent variable with 6 lags at the 5% level of significance in addition to the two diffusion indexes and new housing starts. Interest rate spread, TE's new orders, production and DJTA increased the adjusted R^2 but failed to reject H_0 of the Granger causality test. Provided that the CSI and/or PMI-inventory reflect the most valuable information in the list, TE's weekly working hours generated little new information, and thus should be removed. TE's production is marginal, and is held for the next selection procedure.

IV. Tests for the Synchronization of Cycles

Co-movement or common cycle is one of the two key features in the Burns and Mitchell (1946) definition of business cycles. Extraction of the co-movements out of coincident and leading indicators leads to the so-called CCI and CLI respectively. The existence of the common cycle among leading indicators can be tested following the index of concordance defined as follows (Harding and Pagan, 2002):

$$I = \frac{1}{T}\{\sum_{t=1}^{T} S_{xt}S_{yt} + \sum_{t=1}^{T}(1-S_{xt})(1-S_{yt})\}. \quad (1)$$

S_{xt} and S_{yt} are the underlying states (0 or 1) of x_t and y_t based on turning points defined using the NBER procedure (Bry and Boschan, 1971). We defined S_x for each of these candidates. Among 28 indexes of concordance, there are 12 of them less than 0.70; alternatively, 9 pairs of variables have correlations below 0.25. They are marked with shades in the table. All weak correlations are related to interest rate spread and new housing starts. The former series even has negative correlation with most of the others. The rest of concordances or correlations are very strong.

To test the existence of common cycles among these series, we calculated the standard and robust t-statistics to test if H_0: $\rho_S = 0$ is true. Following Harding and Pagan (2002), $\hat{\rho}_S$ is obtained from the regression

$$\frac{S_{yt}}{\sigma_{S_y}} = a_1 + \rho_S \frac{S_{xt}}{\sigma_{S_x}} + u_{t.} \quad (2)$$

Standard t-statistics are based on OLS under the assumption of no serial correlation and heteroskedasticity while robust t is based on Newey-West heteroskedasticity and auto-correlation consistent standard errors and covariance to account for serial correlation.

Considering the highly serial correlation among the variables, robust *t* could be preferable. At the 5% significance level, t-statistics of interest rate spread with other variables cannot reject H_0 against H_1. At the 1% level of significance, *t*-statistics for new housing starts with other variables cannot reject H_0 except for its relationship with TE's production. The correlation between CSI and DJTA is very close to the 1% critical value, but all of their other correlations are significant statistically. Therefore, interest rate spread and new housing starts are removed from the list for lack of common cycles with seven other series. The remaining seven variables are our finalists for leading indicators to predict the coincident index of the U.S. transportation sector. They are plotted in Figure 1 where shaded areas represent the recessions Lahiri and Yao (2004) have defined for U.S. transportation sector.

V. The Predictive Power of the Constructed Transportation CLI

Based on these seven leading indicators, a leading index was constructed using the conventional NBER approach (Conference Board, 2001). Standardization factors of leading indicators used for constructing an NBER index are the inverse of the standard deviation of each series, as reported in Table 2. The constructed leading index for transportation sector is a weighted average of their transformed symmetric month-to-month change, then converted back to a level index (the transportation CLI). It is plotted in Figure 2 against the transportation CCI. The former appears to lead the both peaks and troughs of all recessions in the latter with solid lead time.

The exact lead-and-lag relation of the transportation CLI relative to transportation business cycle chronologies is reported in Table 3. During the latest transportation recession beginning in 2000:11 and ending in 2001:12, the leading index led the transportation coincident index by 20 months at the peak and 3 months at the trough. Overall, the leading index of U.S. transportation sector leads its CCI, on average, by 9 months at the peaks and 6 months at the troughs. The CLI also gives two short falls in 1995:2 – 1996:2 and 1998:5 – 1998:7. However, these extra turns are very short and mild. The extra turn in 1995 is associated with a growth cycle recession instead of a full-fledged recession in transportation sector; see Lahiri *et al.* (2003). The other one might be caused by a sector-wide temporary shock, as seen in most of the transportation indicators.

We should, however, point out that the lead-time analysis presented above does not take into account either the lag involved in obtaining the data necessary to construct the series or the necessity of employing a non-parametric filter rule that by its very nature involves a delay in identifying a turn. After all, a leading indicator is only as good as the filter rule (*e.g.,* the three-consecutive-declines rule for signaling a downturn) that interprets its movements. These rules typically involve trade-offs of accuracy for timeliness and miss signals for false alarms, see Lahiri and Wang (1994).

VI. Predicting Growth Cycles in the Transportation Sector

In addition to identifying economy-wide recessions, the NBER has a long-standing tradition of also identifying growth cycles; see Zarnowitz and Ozyildirim (2002). These are the periods when the economy undergoes alternating periods of decelerations and accelerations of growth that often do not develop into full-fledged recessions.

The conventional NBER algorithm to define growth cycles is the Phase Average Trend (PAT) method (Boschan and Ebanks, 1978). Alternatively, the trend value τ_t of the de-seasonalized data y_t can be estimated by minimizing (Hodrick and Prescott, 1997):

$$\sum_{t=1}^{T}(y_t - s_t)^2 + \lambda\sum_{t=2}^{T-1}((\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1}))^2, \quad (3)$$

The penalty parameter λ controls the smoothness of the series.[3] Then growth cycles are defined based on the deviation from the trend of original seasonally adjusted data series. Lahiri and Yao (2004) studies the growth cycles of transportation sector and find that deviation from PAT and deviation from Hodrick-Prescott trend appear to be similar. They are not too smooth, but the different phases are clearly identified with the assistance of the zero line. Over our sample period, there are six such growth cycle recessions in the U.S. transportation sector. Four of them developed into full-fledged recessions; the other two are just stand-alone slowdowns. Like business cycles, these slowdowns in the transportation sector are also longer than those in the aggregate economy; they peak ahead of the economy by almost 3 months on the average, while at troughs they lag by 2 months. Growth cycles of this sector are well synchronized with those of the economy, but with slightly longer durations.

Growth cycles of the transportation sector were defined based on the deviation from PAT of the transportation CCI. Then growth cycles from the transportation CLI were used to predict them based on the deviation from its Hodrick-Prescott trend, as plotted in Figure 3. The exact lead-and-lag relationship of growth cycles of transportation CLI relative to the transportation sector is also reported in Table 3. Given the growth cycles for the U.S. transportation sector, the transportation CCI leads the economy growth cycle, on average, by 4 month at peaks and 10 months at troughs. The minimum lead of the leading index is a 1-month lead while forecasting the trough of 1980 growth recession, where two consecutive recessions followed each other very closely. For the latest growth cycle recession, it has a lead of 12 months at the peak and 2 months at the trough.

VII. Conclusions

Lahiri and Yao (2004) define transportation reference cycles as representing the general state of the transportation sector. These cycles can be useful to the decision-making process in transportation in both short-run and middle range forecasting. This paper predicts the reference cycle for the U.S. transportation sector by selecting leading indicators. The selection of indicators is an important process in leading economic indicator literature. Various techniques and tests were adapted for this purpose including rationales of economic theory, graphic investigation, Granger-causality tests in bivariate and multivariate environments for predictive content, and directional change analysis to test the co-movements among a group of indicators. A sufficiently long lead-time between turning points in the series and those of reference cycles with regularity is the essential property of valid leading indicators.

Out of 25 indicators included in the initial list, seven survived various screening procedures. Based on these, we developed a transportation CLI using the conventional NBER approach. The leading index of the U.S. transportation sector leads its CCI, on average, by 9 months at the peaks and 6 months at the troughs. For the latest recession, the former signaled the start of recession 20 months earlier and the recovery 3 months ahead.

[3] The first term in the equation represents the cyclical movement (difference between a time series and its trend), and the second term represents the second order change or smoothness of the trend. Thus the minimization of the equation amounts to balancing between the closeness of y_t to its to-be-estimated trend, and the smoothness of this trend. λ is the weighting parameter emphasizing smoothness of trend relative to closeness, so it is a unit-free number relative to 1 (weight emphasizing the closeness).

We also tested the predictive content of the CLI for transportation growth cycles. The former can signal the latter earlier, on average, by 4 months at peaks and 10 months at troughs.

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Leading Indicators of U.S. Transportation Sector

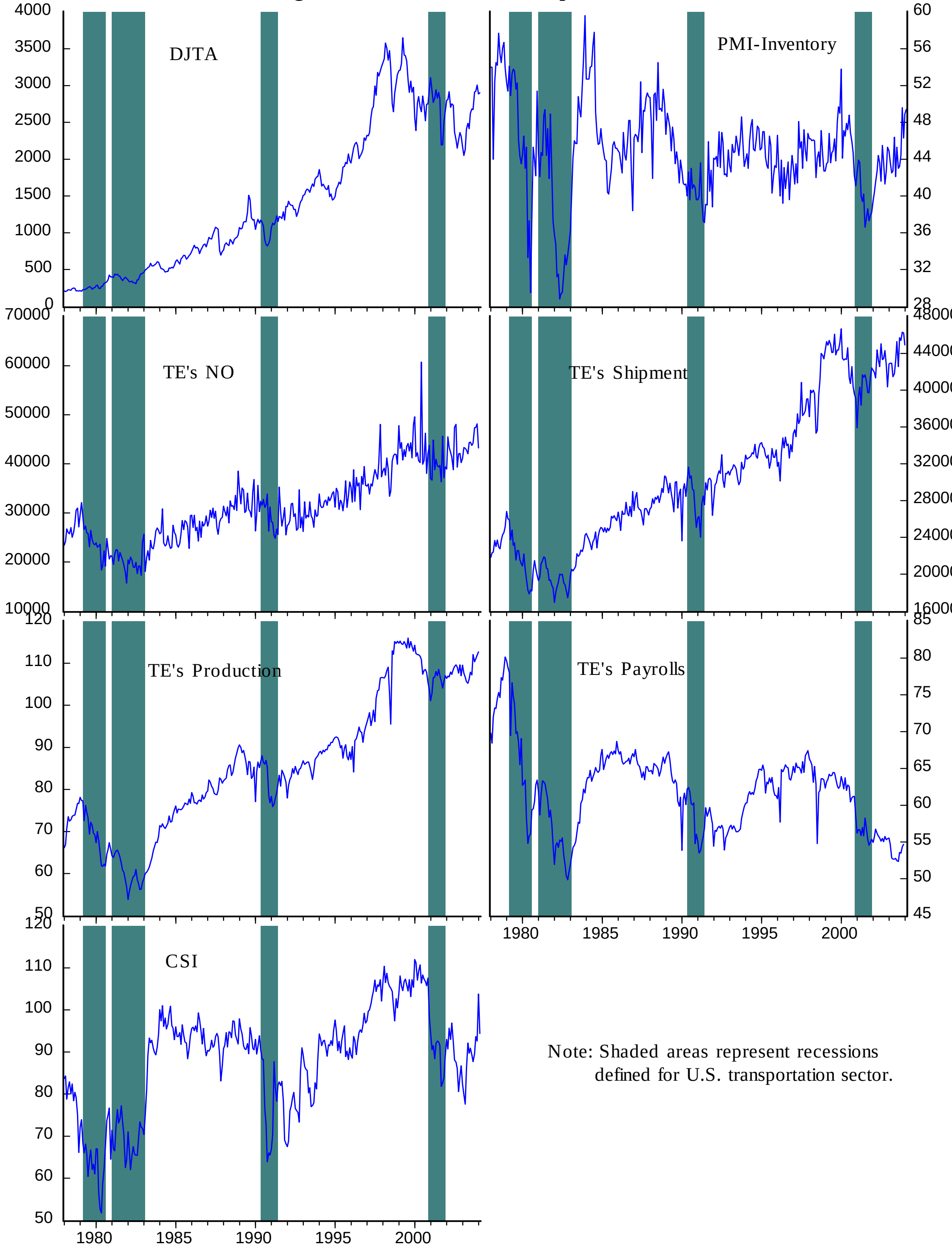
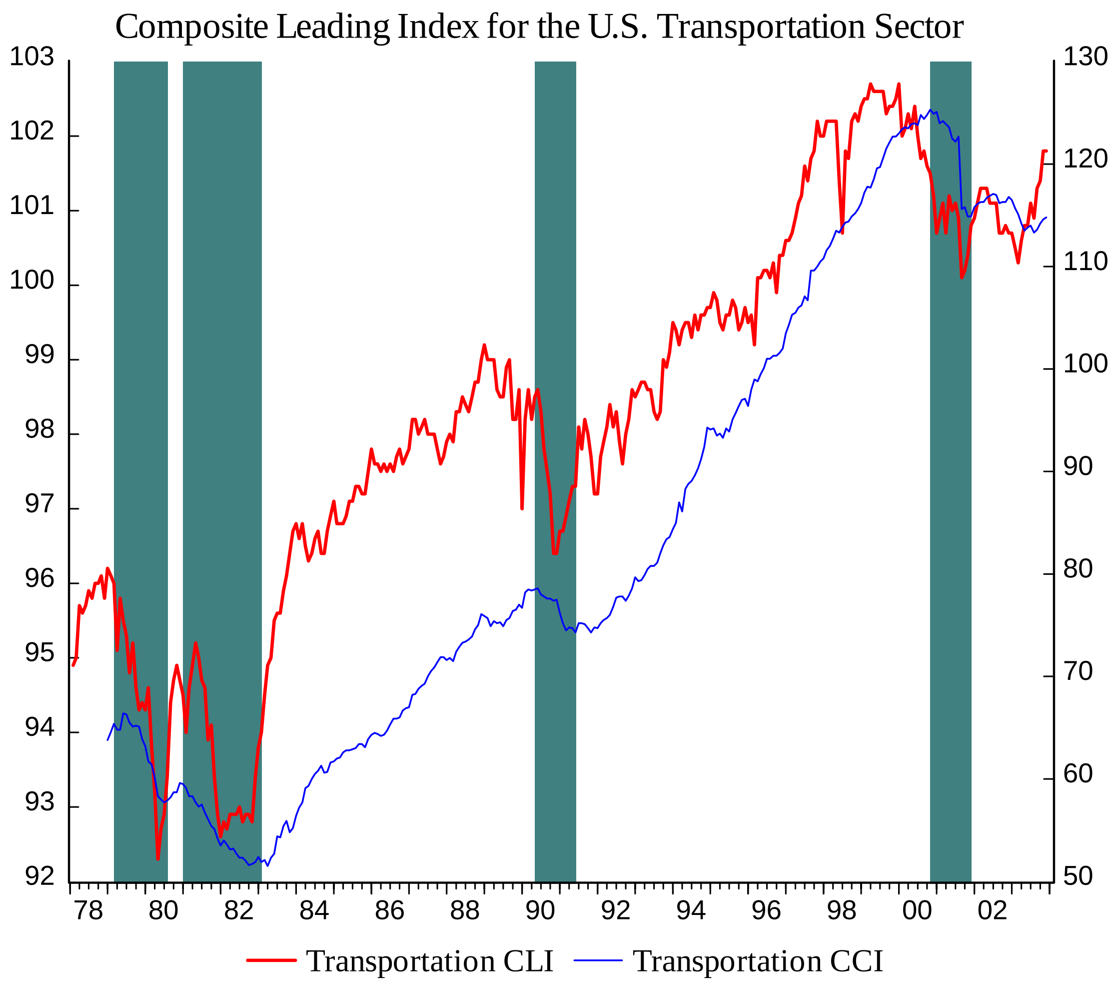
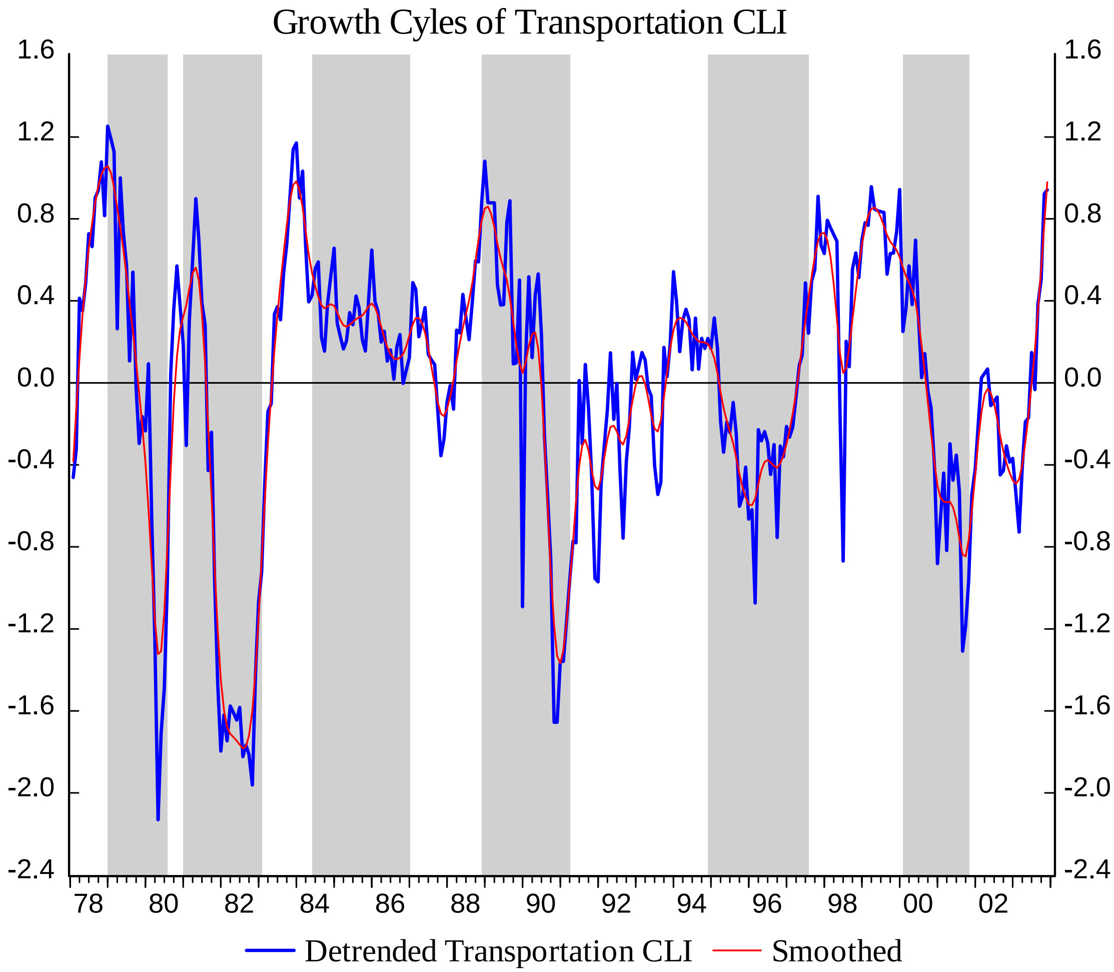


FIGURE 1



Note: Shaded areas represent recessions defined for U.S. transportation sector.

FIGURE 2



Note: Shaded areas represent growth cycles defined for U.S. transportation sector.

FIGURE 3

TABLE 1 Effects of Including Additional Variables in the CLI Base Models

	P-value		$\bar{R}^2$	
	6 lag	12 lag	6 lag	12 lag
Base model 1: CSI			0.144	0.152
PMI-Inventory**	0.003	0.011	0.189	0.19
Housing**	0.017	0.102	0.175	0.166
TE-NO	0.390	0.637	0.145	0.137
TE-Pay*	0.322	0.084	0.147	0.174
Interest Spread**	0.037	0.098	0.168	0.166
TE-Hour	0.811	0.831	0.134	0.129
TE-IP	0.272	0.716	0.149	0.134
TE-Ship	0.115	0.412	0.158	0.146
DJTA	0.450	0.376	0.143	0.147
	P-value		$\bar{R}^2$	
	6 lag	12 lag	6 lag	12 lag
Base model 2: CSI + PMI-Inventory			0.189	0.183
Housing**	0.000	0.005	0.250	0.241
TE-NO*	0.118	0.452	0.189	0.209
TE-Pay*	0.157	0.153	0.200	0.203
Interest Spread*	0.065	0.218	0.208	0.201
TE-Hour	0.720	0.720	0.182	0.179
TE-IP	0.340	0.838	0.192	0.174
TE-Ship*	0.139	0.574	0.201	0.185
DJTA*	0.459	0.367	0.189	0.193
	P-value		$\bar{R}^2$	
	6 lag	12 lag	6 lag	12 lag
Base model 3: CSI + PMI-Inventory + Housing			0.251	0.233
TE-NO*	0.392	0.109	0.252	0.270
TE-Pay	0.487	0.344	0.249	0.248
Interest Spread*	0.417	0.575	0.251	0.246
TE-Hour	0.924	0.813	0.238	0.237
TE-IP*	0.417	0.866	0.251	0.235
TE-Ship*	0.047	0.348	0.271	0.255
DJTA*	0.401	0.358	0.251	0.254

Note:

1) Columns (1) and (2) present p-values for the F-test of the null hypothesis that the coefficients on the CLI candidate variables are zeros in an OLS regression of the one-month growth rate in the transportation CCI on the base set of two diffusion indexes, four lags of the dependent variable, and 6 and 12 lags, respectively, of the candidate variable.

2) * indicates the CLI candidate variable that increases the $\bar{R}^2$ in explaining dependent variable in addition to the base model; ** indicates the CLI candidate variable that both increases the $\bar{R}^2$ and reject the H_0 that the coefficients of its lags are all zeros.

TABLE 2 Standardization Factors for Constructing Transportation CLI

U.S. transportation leading indicators	Factors (Up to 12/2003)
DJTA (20 stocks)	0.098
PMI-inventory diffusion index (PMI-INVENTORY)	0.091
NO (TE)	0.058
Shipments (TE)	0.140
IP (TE)	0.256
Payrolls (TE)	0.220
Consumer Sentiment Index (CSI)	0.137

TABLE 3 Predicting Transportation Growth Cycles

Transportation Business Cycles		Leads (-) and Lags (+), in months, of Transportation Leading Index relative to Transportation Business Cycles		Transportation Growth Cycles		Leads (-) and Lags (+), in months, of Transportation Leading Index relative to Transportation Growth Cycles	
P	T	P	T	P	T	P	T
03/79	08/80	-4	-1	01/79	08/80	-2	-3
01/81	2/83	-1	-13	01/81	02/83	-2	-4
-	-	-	-	06/84	01/87	-6	-20
05/90	06/91	-16	-6	12/88	04/92	1	-16
-	-	-	-	12/94	08/97	-11	-17
11/00	12/01	-20	-3	02/00	11/01	-12	-2
Mean		-10	-6	Mean		-4	-10
Median		-10	-6	Median		-5	-10
Std Dev		9	6	Std Dev		5	8