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The Prediction of Road Freight Demand in Pakistan under the Background of China-Pakistan Economic Corridor

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***Abstract*—With the continuous advancement of the "One Belt, One Road" and China-Pakistan Economic Corridor transportation infrastructure cooperation, the continuous increase in the density of Pakistan's roads, and the upgrading of existing roads, road freight, which has always been dominant in Pakistan's freight transport, will usher in faster development. To this end, this article explores its demand forecasting. This article mainly uses univariate forecasting ARMA model, Gompaz growth curve model, multivariate multiple regression model and a combination model of the three to forecast Pakistan's road freight demand (freight turnover). The results show that the growth of total fixed capital formation, GDP, highway mileage, and population will all cause the same direction change of road freight turnover; using a combined model is more accurate than using a single model to predict the results, so the combined model is used to predict the road freight turnover volume in 2020, 2025 and 2030 in order to provide a valuable reference for the investment decision of China and Pakistan in Pakistan's transportation infrastructure construction.**

***Index Terms*- freight demand; ARMA model; multiple regression model; growth curve; combined forecast**

I. INTRODUCTION

Developed roads, railways, ports and other transportation infrastructures play a pivotal role in the economic development of a country. With the continuous advancement of the "Belt and Road" and China-Pakistan Economic Corridor transportation infrastructure cooperation, the continuous increase of Pakistan's road density, and the upgrading of existing roads, road freight, which has always been dominant, will usher in a faster pace in Pakistan's freight transport. On December 18, 2017, the "China-Pakistan Economic Corridor Vision Plan 2017-2030" (referred to as the "Plan") was released in Islamabad. The "Plan" pointed out that "the infrastructure of logistics and transportation is a prerequisite for the construction of the China-Pakistan Economic Corridor." Transportation infrastructure is still a key area of cooperation between China and Pakistan. According to data from the official website of the China-Pakistan Economic Corridor (CPEC), there are currently 5 major road construction projects under construction and planned investment in the China-Pakistan Economic Corridor, with a total length of 966 kilometers. Scientific and reasonable investment decision-making in transportation infrastructure construction should match the transportation demand. From the literature search, no scholars have forecasted Pakistan's road freight demand. By the end of the "Plan", How many Pakistan's road freight demand will reach in 2030? Do we need to add new investment? For this reason, this article will forecast Pakistan's road freight demand, in order to provide a valuable reference for the investment decision of China and Pakistan in Pakistan's transportation infrastructure construction.

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II. RESEARCH METHODS AND DATA

A. Research methods

Based on existing research, scholars mainly used time series method, regression analysis method[1-3], gray model prediction method[4], neural network method[5-7] and combined forecasting method [8-9] to predict freight demand. In forecasting practice, the weighted combination of different forecasting methods and the comprehensive utilization of the advantages of various methods will make the forecast more accurate. Therefore, this article uses the independent vector moving average model (ARMA) model of univariate forecasting, the regression model of Gompaz growth curve model and multivariate forecast, and their combined model to predict Pakistan's freight demand.

1. Autonomous Moving Average Model

First, establish the auto vector moving average model ARMA (p, q). It is a commonly used univariate stationary time series model. It is a combination of the autoregressive model AR(p) and the moving average model MA(q). Based on the numerical characteristics of the time series , it mainly establishes the relationship among the current value of the variable ,several lag periods and the error term ,and then on this basis predicts the later data. The ARMA(p,q) model has the following form:

$$y_t = c + \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + \ldots + \alpha_p y_{t-p} + u_t + \theta_1 u_{t-1} + \theta_2 u_{t-2} + \ldots + \theta_q u_{t-q}$$

2. Gomperz growth curve model

The Gompaz curve is a kind of growth curve. This model mainly describes the process that as time progresses, the individual grows slowly from stored energy to rapid growth, then the growth rate tends to slow, and finally reaches the limit value. It is a nonlinear model. From the 1991-2018 time series trend chart of Pakistan (Figure 1), it can be seen that the growth of road freight demand in Pakistan is non-linear, and

the growth rate in the early stage is relatively slow, and the growth rate has accelerated after 2005, basically in line with the growth curve. In the first two stages, and limited by many factors, the demand for road freight will not grow to infinity, so the Gompaz curve is more suitable for forecasting freight demand. The main form of the Gompaz curve and the corresponding logarithmic form are as follows:.

$$y_t = Ka^{b^t}$$

$$Lny_t = LnK + b^t Lna$$

Among them, K, a, b are parameters, and the independent variable t is time. The values of K, a, and b can be calculated by the Three Sum Method, and then Ln Y can be predicted. Different values of K, a, and b correspond to the Gompaz curve with different shapes. When a>0, b>1, the shape of the Gompaz curve is similar to the current Pakistan road freight demand trend graph.

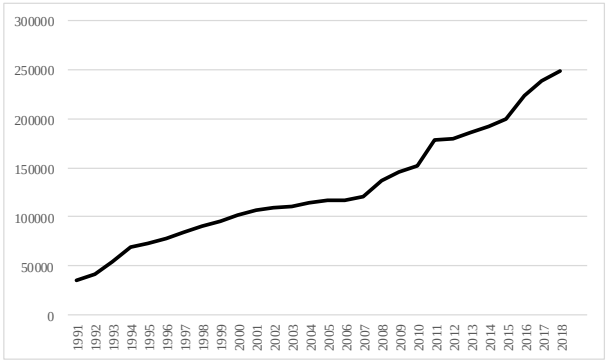

Figure 1 Time trend of Pakistan's road freight demand (million tons*km)

3. *Multiple regression model*

Regression is a model established by the study of the quantitative relationship between the independent variable and the dependent variable, and its regression coefficient reflects the influence of the independent variable on the dependent variable. When the number of independent variables is more than one, the established regression model is a multiple regression model, and its form is as follows:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 \ldots + \beta_p x_p + \varepsilon$$

4. *Combination model*

Combination prediction is a weighted average of the prediction results obtained by two or more prediction methods to make the prediction error smaller. If n different prediction methods are selected, and their predicted values are respectively Ln Y_{1t}, Ln Y_{2t}...Ln Y_{nt}, the combined weights of these n types of prediction methods are w1, w_2...w_n, and satisfy $w_1+w_2+\ldots+w_n=1$, the general criterion for judging the optimal model is to minimize the residual sum of squares. At this time, the weighted prediction model is:

$$\hat{y}_t = w_1 y_{1t} + w_2 y_{1t} + \ldots + w_n y_{nt}$$

$$s.t. \min Var(w_1 e_{1t} + w_2 e_{2t} + \ldots + w_n e_{3t})$$

B. *Sample selection and data source*

The main indicators of freight demand include freight volume and freight turnover. Freight refers to the actual quantity of goods transported by the transportation department in a certain period of time, while freight turnover is the product of freight tonnage and its transportation distance. Limited to the availability of data, this article chooses Pakistan's road cargo turnover (Y) indicator as an indicator to describe the demand for road freight. From the perspective of the factors that affect the demand for road freight, the factors that current scholars choose are roughly divided into four categories:

1.Economic aggregate factors: GDP, GDP per capita, total investment in fixed assets, etc. [1, 6-8, 13]; 2. Infrastructure construction factors: road mileage, highway mileage, etc. [6-7]; 3. Others competitor factors: the proportion of railway, aviation, water transportation and freight demand [8]; 4. Population and its consumption level factors: total population, total retail sales of consumer goods, etc. [1, 7, 13]

As road freight is a part of land transportation, its main competitor is railways. In recent years, Pakistan's railway development has stagnated and lost its competitiveness compared with roads. Therefore, the third category of factors is not considered in this article. Based on the actual situation and the availability of data, this paper selects four influencing factor indicators: GDP, total fixed capital formation, highway mileage, and population. 28 sets of data from 1991 to 2018 are used for modeling, and the representation of each indicator and its data source as shown in Table 1. In order to eliminate heteroscedasticity, the highway cargo turnover and influencing factors are all in logarithmic form, and the regression estimation coefficient is interpreted as elasticity.

Table 1 Index selection and data sources of factors

	Indicator	Logarithmic Form	Source of the data
Freight demand	Road cargo turnover	Ln Y	Data for 1991-2011 are compiled by qianzhan Database and Economy Survey 2008-2009;2012-2018 data are calculated in terms of truck registrations.
Total economy	Gross domestic product	Ln GDP	World Bank
	Fixed capital formation	Ln FCF	World Bank
Road facilities	Road mileage.	Ln LR	Statistical Year Book
Populatio n	Population	Ln POP	Statistical Year Book

Among them, road cargo turnover data from 2012 to 2018 is not available, and there is a long-term stable relationship between the number of truck registrations and the number of freight turnover. Therefore, the missing cargo turnover data is derived from the number of truck registrations (RT). The calculation model is shown in the table. As shown in Table 2, according to the size of the R^2 of goodness of fit and the expectation of the future trend of freight volume, three models of linear, logarithmic and compound are selected, and weights of 0.5, 0.3, and 0.2 are respectively assigned. The weighted combination is calculated 2012-2018 The calculation results of annual road freight turnover are shown in Table 3.

Table 2 The calculation process of road freight turnover volume

	Model form	R^2	weight
Linear model	Y=-42775.363+0.902RT	0.917	0.5
Logarithmic model	Y=-1598362.843+142185.696Ln(RT)	0.914	0.3
Compound model	Ln(Y)=Ln(9.896)+Ln(0.00001)RT	0.912	0.2

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Table 3 Calculation results of road freight turnover volume

Year	Registered truck (thousand)	Calculated road freight turnover (million tons*km)	Year	Registered truck (thousand)	Calculated road freight turnover (million tons*km)
2012	240888	179585	2016	278872	223850
2013	247197	186503	2017	289941	238123
2014	252606	192559	2018	298000	248989
2015	259198	200106			

III. MODEL ESTIMATION AND RESULT ANALYSIS

A. *ARMA model*

1. Stationarity test

The premise of ARMA model modeling requires the time series to be stable, so the sequence should be tested for stationarity first, using the ADF unit root test method. The test results are shown in Table 4. The P value of Ln Y is 0.103, which is a non-stationary series at the 5% significance level. However, ΔLn Y is obtained after the first-order difference of Ln Y, which is interpreted as the increase in the logarithm of highway cargo turnover. The null hypothesis is rejected at the 5% significance level, and it is a stationary sequence, that is, Ln Y is I(1) process. Therefore, an ARMA model can be established for the ΔLn Y stationary sequence.

Table 4 Unit root inspection of highway cargo turnover

Variable	t-Statistic	Prob.*	stationary （5% level）
Ln Y	-3.217016	0.1030	NO
ΔLn Y	-3.018534	0.0458	Yes

2. Model identification and establishment

Use the autocorrelation function graph and the partial correlation function graph for model identification. The ACF and PACF graphs of ΔLn Y are shown below.

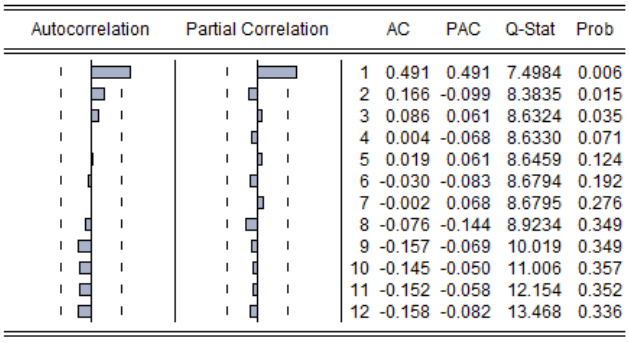

Figure 2 ΔLn Y autocorrelation graph and partial correlation graph

It can be seen that both the ACF and PACF graphs are tailed. An ARMA model should be established and p may be inferred to be 1 Or 2, q may be 1 or 2. So ARMA(1,1), ARMA(1,2), ARMA(2,1) and ARMA(2,2) models are established respectively, according to the information criteria of AIC, SC, and HQC , ARMA(2,1) model is better, the specific model form is as follows:

$$\text{Ln } Y=0.0732-0.233\text{Ln } Y_{t-1}+0.314Y_{t-2}+\alpha_{t-1}$$

Carry out the residual series correlation test and heteroscedasticity test on the above model. According to the information criterion, the residual series correlation LM test takes the lag order as level 1, and the P value corresponding to the LM test statistic Obs*R-squared is 0.093, which is at 5% Under the significance level of, the null hypothesis is not rejected, that is, there is no serial correlation problem, and the lag order is selected reasonably. Then select the lag order of the ARCH heteroscedasticity test according to the information criterion as 1, and the P value corresponding to the ARCH (1) test statistic Obs*R-squared is 0.622. At the 5% significance level, the null hypothesis is not rejected, that is, none Heteroskedasticity in ARCH form. In summary, the model setting is more reasonable.

3. Road freight demand forecast (ARMA model)

The established ARMA model is used to predict the turnover of road freight from 1991 to 2030. The predicted values are shown in Table 5, where the absolute value of the relative error=|(predicted value-actual value)/actual value×100%|. From the table, the average value of the absolute value of the relative error predicted by the ARMA model is 4.76%, indicating that the model fits well. Extrapolating the trend of the model, it is predicted that the road freight demand in 2020, 2025, and 2030 will be 271556, 391526, and 564509 million tons·km respectively.

Table 5 Forecast value of road freight demand (ARMA model)

Year	Actual Value	Predicted Value	Relative Error	Year	Actual Value	Predicted Value	Relative Error
1991	35211	-	-	2007	121200	120200	0.83%
1992	41536	-	-	2008	137489	127667	7.14%
1993	53719	-	-	2009	145303	143795	1.04%
1994	69383	-	-	2010	152510	164874	8.11%
1995	73195	82541	12.77%	2011	177954	156525	12.04%
1996	78493	85889	9.42%	2012	179585	195654	8.95%
1997	84174	81756	2.87%	2013	186503	199177	6.80%
1998	90268	92465	2.43%	2014	192559	190805	0.91%
1999	95246	94997	0.26%	2015	200106	207718	3.80%
2000	101261	104230	2.93%	2016	223850	206088	7.93%
2001	107085	105719	1.28%	2017	238123	241774	1.53%
2002	108818	116782	7.32%	2018	248989	259796	4.34%
2003	110172	113801	3.29%	2020E	-	271556	-
2004	114244	116307	1.81%	2025E	-	391526	-
2005	116327	117737	1.21%	2030E		564509	-
2006	117035	124580	6.45%				

Unit: million tons·km

B. *Gomperz growth curve model*

There are many ways to calculate K, a, and b for the Gompertz curve. This paper uses the three-sum method to solve the problem. The samples are divided into three groups, each group of n samples, and S_i represents the sum of the logarithm of the freight demand of the i group , The formula for solving K, a, b is:

$$S_1=\sum_{i=1}^{n}\text{Lny}_i \quad S_2=\sum_{i=n+1}^{2n}\text{Lny}_i \quad S_3=\sum_{i=2n+1}^{3n}\text{Lny}_i$$

$$b^n=\frac{S_3-S_2}{S_2-S_1} \quad \text{Lna}=\frac{(S_2-S_1)(b-1)}{(b^n-1)^2 b} \quad \text{LnK}=\frac{\frac{1}{n}(S_1S_3-S_2^2)}{S_1+S_3-2S_2}$$

This paper combines the trend of Pakistan's road freight demand time trend chart, and uses 26 sets of data from 1993 to 2018 to perform model fitting. At this time, n=9, the calculation can get b=1.0273>1, a=3.712>0, which is in line with the expected result. The model is:

$$y_t = 18225.17 * 3.712^{1.0273^t}$$

Among them, t=0 in 1993, and t will increase by 1 every year thereafter. Use this model to predict Pakistan's road freight demand. The predicted value and error are shown in Table 6. From the table, the average absolute value of the prediction error of the Gompaz curve is 6.44%, and with the passage of time, the absolute value of the overall error has a downward trend, indicating that the fit is better. The forecast results show that Pakistan's road freight demand in 2020, 2025, and 2030 will be 274921, 406518, and 635968 million tons·km respectively.

Table 6 Forecast value of road freight demand (Gomperz curve)

Year	Actual Value	Predicted Value	Relative Error	Year	Actual Value	Predicted Value	Relative Error
1993	53719	67649	12.06%	2008	137489	129946	5.49%
1994	69383	70115	1.05%	2009	145303	137104	5.64%
1995	73195	72741	0.62%	2010	152510	144868	5.01%
1996	78493	75542	3.76%	2011	177954	153301	13.85%
1997	84174	78531	6.70%	2012	179585	162477	9.53%
1998	90268	81726	9.46%	2013	186503	172475	7.52%
1999	95246	85143	10.61%	2014	192559	183387	4.76%
2000	101261	88802	12.30%	2015	200106	195316	2.39%
2001	107085	92725	13.41%	2016	223850	208379	6.91%
2002	108818	96935	10.92%	2017	238123	222709	6.47%
2003	110172	101459	7.91%	2018	248989	238458	4.23%
2004	114244	106327	6.93%	2020E	-	274921	-
2005	116327	111571	4.09%	2025E	-	406518	-
2006	117035	117228	0.16%	2030E	-	635968	-
2007	121200	123338	1.76%				

Unit: million tons·km

C. Multiple regression model

Establish a multiple regression model in the form:

$$\text{Ln } Y=-32.51+2.07\text{Ln GDP}+0.27\text{Ln FCF}+5.23\text{Ln POP}+1.16\text{Ln LR}$$

From this, it can be obtained that the gross domestic product, total fixed assets formation, road mileage, and population growth of 1% make the road freight turnover change by 2.006%, 0.269%, 1.163%, and 5.231% respectively. The established regression model is used to predict Pakistan's road freight demand from 1991 to 2018, and the predicted value is shown in Table 7. The absolute value of the average relative error is 5.95%, which shows that the overall equation forecast accuracy is better.

Table 7 Forecast value of road freight demand (regression model)

Year	Actual Value	Predicted Value	Relative Error	Year	Actual Value	Predicted Value	Relative Error
1991	35211	42050	19.42%	2006	117035	124245	6.16%
1992	41536	46263	11.38%	2007	121200	125509	3.55%
1993	53719	53833	0.21%	2008	137489	136004	1.08%
1994	69383	59039	14.91%	2009	145303	141061	2.92%
1995	73195	65452	10.58%	2010	152510	150713	1.18%
1996	78493	72582	7.53%	2011	177954	168815	5.14%
1997	84174	84865	0.82%	2012	179585	177524	1.15%
1998	90268	81023	10.24%	2013	186503	182991	1.88%
1999	95246	88906	6.66%	2014	192559	186111	3.35%
2000	101261	99684	1.56%	2015	200106	194941	2.58%
2001	107085	114103	6.55%	2016	223850	198198	11.46%
2002	108818	118762	9.14%	2017	238123	252097	5.87%
2003	110172	119091	8.10%	2018	248989	259912	4.39%
2004	114244	118446	3.68%				
2005	116327	120439	3.53%				

Unit: million tons·km

To forecast Pakistan's road freight demand in 2020, 2025, and 2030, we first need to know the predicted values of Ln GDP, Ln FCF, Ln LR, and Ln POP in 2020, 2025, and 2030. According to the time trend characteristics of each explanatory variable, this paper uses time as the independent variable to select a variety of curve forms to perform curve fitting on Ln GDP, Ln FCF, Ln LR, and Ln POP. The fitting model is shown in Table 8. The explanatory variables are predicted according to the fitted model, and the predicted value is brought into the regression model to predict the road

cargo turnover. The predicted values of the road freight turnover in 2020, 2025, and 2030 are 271571, 386222, 612032.

Table 8 Predicted value of the original value of explanatory variable

Variable	Regression Equation	R^2	2025E	2020E	2030E
Ln GDP	Ln GDP=10.62+0.04t	0.99	168309	137774	205612
Ln FCF	Ln FCF=9.03+0.03t	0.82	23672	20207	27731
Ln LR	Ln LR=12.22+0.01t	0.96	24449	21788	27435
Ln POP	Ln GDP=9.29+0.02t	0.99	306673	289115	325295
Ln Y	Ln Y=-32.51+2.067Ln GDP+0.27Ln FCF+5.23Ln POP+1.16Ln LR	0.89	271571	386222	612032

D. Combination forecast

Suppose the predicted value sequence of the ARMA model is Ln Y_1, the predicted value of the Gompaz curve is Ln Y_2, and the predicted value of the multiple regression model is Ln Y_3. The predicted values of the three models are combined with a weight to make the residual after the model fit the sum of squared differences is the smallest, and the specific form of the resulting model is as follows:

$$\hat{y}_t = 0.3799y_{1t} + 0.2516y_{2t} + 0.3685y_{3t}$$

The combined model is used to predict Pakistan's road freight demand, and the results are shown in Table 9. From the table, we can get that the average value of the absolute value of the prediction relative error based on the combination model is 2.27%, and the prediction value of the combination model has smaller fluctuations and is more stable. The combined model is used to predict highway cargo turnover in 2020, 2025, and 2030. The predicted values are 272408, 393345, and 600000 million tons·km respectively. Compared to 2018, the growth rate was9.40%，57.98%，140.97%.

Table 9 Forecast value of road freight demand (combined model)

Year	Actual Value	Predicted Value	Relative Error	Year	Actual Value	Predicted Value	Relative Error
1993	53719	-	-	2008	137489	131312	4.49%
1994	69383	-	-	2009	145303	141104	2.89%
1995	73195	73779	0.80%	2010	152510	154622	1.38%
1996	78493	78382	0.14%	2011	177954	160242	9.95%
1997	84174	82090	2.48%	2012	179585	180625	0.58%
1998	90268	85547	5.23%	2013	186503	186494	0.00%
1999	95246	90273	5.22%	2014	192559	187209	2.78%
2000	101261	98673	2.56%	2015	200106	199889	0.11%
2001	107085	105539	1.44%	2016	223850	203757	8.98%
2002	108818	112517	3.40%	2017	238123	240781	1.12%
2003	110172	112644	2.24%	2018	248989	254470	2.20%
2004	114244	114584	0.30%	2020E	-	272408	2020E
2005	116327	117181	0.73%	2025E	-	393345	2025E
2006	117035	122606	4.76%	2030E	-	600000	2030E
2007	121200	122945	1.44%				

Unit: million tons·km

IV. Conclusion

This paper mainly uses the ARMA model, Gomperz growth curve model, multiple regression model and their combination model to predict Pakistan's road freight demand. The results show that the growth of GDP, total fixed capital formation, road mileage, and population will all cause changes in the same direction of highway cargo turnover, and the total fixed capital formation and population have a significant impact on highway cargo turnover, so China and Pakistan should continue to pay attention Investment in Pakistan's infrastructure will increase Pakistan's freight demand, thereby boosting the development of Pakistan's economy.However, scientific investment plans should match the freight demand. Empirical analysis shows that the combined forecasting model is more stable and accurate than using a single model. Its forecast results show that in 2020, 2025 and 2030,the domestic road cargo turnover in Pakistan will be 272408, 393345, and 600000 million tons*km respectively. Compared to 2018, the growth rate was9.40%，57.98%，140.97%.

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References

[1] Zhao Jianyou, Zhou Sunfeng, Cui Xiaojuan, et al. Predictive method of highway freight volume based on fuzzy linear regression model [J]. Journal of Traffic and Transportation Engineering, 2012, 12(3):80-85.
[2]Novak D C ,Hodgdon C ,Guo F , et al. Nationwide Freight Generation Models: A Spatial Regression Approach[J]. Networks & Spatial Economics, 2011, 11(1):23-41.
[3]Yang Y . Development of the regional freight transportation demand prediction models based on the regression analysis methods[J]. Neurocomputing, 2015, 158:42-47.

[4] Gai Chunying, Pei Yulong. Study of the GM(1,1)-Markov chain model on highway freight forcast [J].China Journal of Highway and Transport，2003，16(3):113-116.
[5] Bogna Mrówczyńska, Karolina Łachacz, Tomasz Haniszewski & Aleksander Sładkowski. A comparison of forecasting the results of road transportation needs[J]. Transport, 2012, 27(1):73-78.
[6] Zhao Chuang, Liu Kai, Li Diansheng. Freight Volume Forecast Based on GRNN [J].Journal of China Railway Society，2004，26(1):12-15.
[7] Li Jie, Wang Ke, Wang Hang. Highway Freight Prediction Method Based on Generalized Regression Neural Network[J].Traffic Information and Safety，2007，25(3):131-133.
[8] Liu Yugang, Zhou Benyu. Road Freight Demand Forecast Based on Gray-combined Relation [J]. Highway Engineering, 2013, 38(1):111-115.
[9] Zhou Zhijuan, Chen Senfa.The application of combined forecasting method in the forecast of highway freight volume in my country[J].China Water Transport，2010，10(5):166-167.
[10]Mckinnon A C . Decoupling of road freight transport and economic growth trends in the UK:An exploratory analysis[J]. Transport Reviews, 2007, 27(1):37-64.
[11]Sorrell S ,Lehtonen M ,Stapleton L , et al. Decoupling of road freight energy use from economic growth in the United Kingdom[J]. Energy Policy, 2012, 41(4):84-97.
[12]Anam Zahra，Sadaf Razzaq，Ahsan Nazir.Impact of Electricity Consumption and Transport Infrastructure on the Economic Growth of Pakistan[J]. International Journal of Academic Research in Business and Social Sciences,2006.
[13] Liu Ximing. Forecasting and verification of roadway logistics freight volume based on mathematical models[J].Logistics Technology，2014(9):252-254.

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