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Research on Inner Mongolia freight volume forecast model based on computable general equilibrium

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Abstract: *Inner Mongolia Autonomous Region is a big province of energy, variety complete and reserve sufficient. However, with the continuous growth of energy freight volume, the imbalance of energy freight varieties and the unreasonable structure of energy industry in Inner Mongolia Autonomous Region are becoming more and more serious. The energy SAM table was compiled based on the latest official input-output table of Inner Mongolia, and the CGE model of regional energy freight volume and GAMS program were constructed to simulate and predict the total energy freight volume of Inner Mongolia Autonomous Region in 2025-2035. The results show that the average accuracy of the prediction model is 2.27% according to the error terms between the prediction results and the actual results. The conclusions can provide reference for stabilizing economic growth, developing regional green logistics and strengthening technological innovation and transformation.*

Keywords: *CGE models; Energy; Cargo volume forecast; Green development*

1. Introduction

As energy consumption continues to increase, Inner Mongolia energy transportation is on a continuous growth trend. Between 2017 and 2021, more than 85% of 2021 Energy Cargo Inner Mongolia was carried in China. Less than 15% of cargo was carried by fuels such as crude oil, gas, hydropower and nuclear power. Large-scale utilization of coal resources will affect the natural environment and air quality, not conducive to sustainable development [1-4].

Looking through the existing literature, it is found that freight volume forecast has been a research hotspot. At present, the freight volume forecasting models mainly include the System dynamics models used by Lu Hua and Yuan Min, Xu Fei and Ren Shuang, the Arima model used by Alexandru-Eugen S T Tescu, the nested Logit model used by Jiao XI and the Input-output model of Amaya Johanna, etc., these models have their own characteristics, with corresponding data base, analysis methods, application scope, advantages and disadvantages. To sum up, the disadvantages can be summarized as follows: (1) Inadequate consideration of freight economic linkages; (2) Does not take into account freight transport costs; (3) Insufficient capacity to address policy impacts; (4) Weak supply-demand and logistics base; 5. Poor interaction with other passenger and freight transport models.

Taking Chongqing as an example, Yang Kunhe gives an estimation model of freight volume based on computable general equilibrium, and compares it with the actual freight volume and other data and forecast values, you can see that the expected results of the model are quite good. This paper uses the method of Yang Kun-he to construct the energy freight volume forecasting model by using the open economy dynamic CGE model.

Based on the theory of computable general equilibrium (CGE), this paper first calculates the Sam Table of the social accounting matrix from the 2017 Inner Mongolia data, constructs the CGE model, and determines the relevant parameters. Secondly, 2021 freight volume from 2017 to 2021 is verified by the actual energy freight volume. The results show that the CGE model is feasible in energy freight forecasting. Finally, the CGE model is used to forecast the Inner Mongolia energy freight volume from 2025 to 2035[5-7].

2. Sam table compilation and data sources

The whole three industries are divided into 11 departments (Table 1) , the data are Inner Mongolia from the input-output tables for 2017 and the Inner Mongolia Statistical Yearbook for 2018.

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Table 1: Sam Table Division of Inner Mongolia

primary sector of the economy	Agriculture, forestry, animal husbandry and fishery
secondary sector of the economy	Coal mining and washing industry
	Oil and gas extraction
	Petroleum Processing, coke manufacturing and nuclear fuel processing industries
	Production and supply of electricity and heat
	Gas production and supply
	Other secondary sector of the economy departments
tertiary sector of the economy	Construction
	Transportation, warehousing and postal communications
	Wholesale and retail trade and accommodation and catering
	Other tertiary sector of the economy departments

According to the methods of Lu Chunhua [8] and Yan Xingchen [9-10], the energy is divided into six kinds, as shown in the table 2 below.

Table 2: Specific energy categories

The energy sector	Energy
Coal mining and processing industry	Raw coal
Oil extraction	Crude oil
Natural gas extraction	Natural gas
Coking Industry	Coke
Petroleum and nuclear fuel processing industries	Oil products
Gas production and supply	Gas
Production and supply of electricity and heat	Electricity

Production and supply of Electricity and heat Electricity uses the 2017 Inner Mongolia input-output tables, the 2018 Inner Mongolia Statistical Yearbook and the 2018 China Fiscal Yearbook to construct the energy Sam Tables. The SAM table data used in this paper can be obtained by referring to the “Social accounting matrix of the Chinese economy” compiled by Li Shantong et al of the development research center of the State Council, as well as relevant literature such as Wang Jun and Su Limin. Although the SAM content built for different problems is not exactly the same, its data source and basic structure are the same.

Table 3: Inner Mongolia Energy Sam balance sheet in 2017(100 million yuan)

	sec1	sec2	secau	sec3	com1	com2	comau	com3	lab	cap	hh	ent	gov	invsav	row	total
sec1					2781.89										31.65	2813.54
sec2						11934.48									254.95	12189.43
secau							5968.21								7.47	5975.68
sec3								12729.95							31.92	12761.87
com1	413.48	562.70	1.18	90.57							720.51		20.72	1017.46		2826.61
com2	482.58	4088.31	1716.94	1175.11							1947.04			2906.84		12316.82
comau	40.93	2586.44	753.07	767.10							355.21			1646.53		6149.28
com3	198.84	2315.21	1249.55	4401.54							1137.43		390.57	3036.96		12730.10
lab	1593.98	1296.36	775.24	4752.42												8418.00
cap	83.73	1340.41	1479.70	1575.14												4478.98
hh									8417.99	325.68			704.14			9447.82
ent										4153.29						4153.29
gov											521.42	594.02				1115.44
invsav											4766.22	3559.28			282.30	8607.79
row					44.73	382.34	181.07	0.14								608.28
total	2813.54	12189.43	5975.68	12761.87	2826.61	12316.82	6149.28	12730.09	8417.99	4478.98	9447.82	4153.29	1115.44	8607.79	608.28	104592.92

Since the SAM tables based on data sources such as the input-output tables, the statistical yearbook and the financial yearbook are usually unbalanced (i.e. the total value of the rows in the tables does not equal the total value of the columns), it is therefore necessary to level the SAM table so that its totals in the same row are equal. There are different methods for balancing the SAM table, such as the least square cross-entropy method of Tu tao-tao [11-13], the direct cross-entropy method of Zhang Yang [14] and the Gras method of Godfrey Ho and Liu Lanjuan [15]. In this paper, the initial Sam Table of the total difference is less, so the use of manual adjustment method.

The balanced Sam Table (see table 3) is used as the basis for the CGE model.

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3. Freight volume forecasting model based on computable general equilibrium theory

3.1 Model assumptions

In the equation of CGE model, the uppercase of letters denotes endogenous and exogenous variables, and the general exogenous parameters are denoted by lowercase symbols. The set of production activities and products is defined as follows: A = {production activities}; an = {non-energy production activities}; AE = {energy production activities}; F = {elements}; C = {commodities}; CN = {non-energy commodities}; CE = {energy commodities}.

Based on the viewpoint of Yang Kun River, the model assumes that cross-regional commodity logistics forms logistics. The volume of freight traffic studied is the flow of goods (as shown in Figure 1):

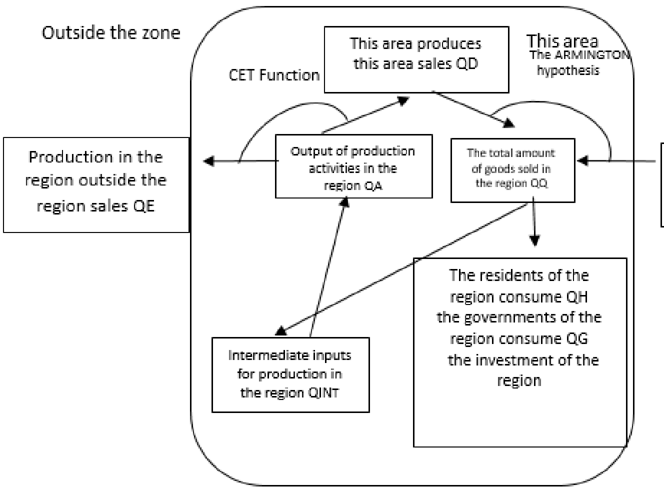

Figure 1: CGE model of open area commodity flow process

3.2 Model building

3.2.1 Production module

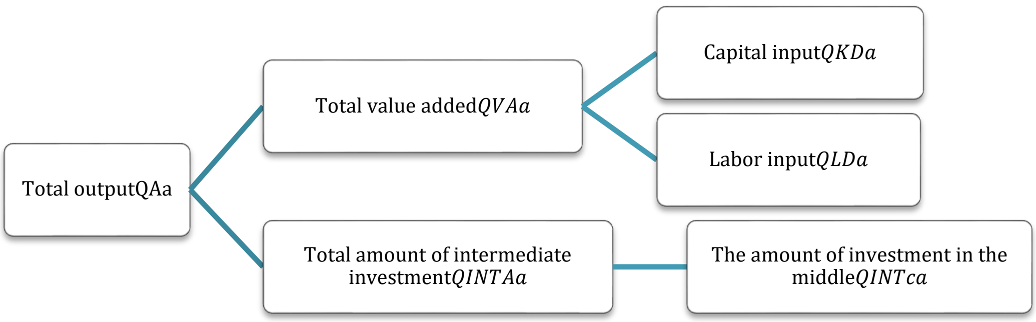

Figure 2: Production structure of enterprise

The total output of production mainly includes the total amount of value-added part and the total amount of intermediate input, the value-added part consists of capital input and labor input, and the total amount of intermediate input consists of the individual amounts of intermediate input in various industries, where C is a collection of goods. In this paper, a dynamic CGE model is developed to predict Inner Mongolia energy freight volume. The CGE model built in this paper mainly includes the following modules, as shown in Figure 2.

The first level is the CES production function; it describes the total output QA for each manufacturing enterprise:

$$QA_a = \alpha_a^q\left[\delta_a^q QVA_a^{\rho_a} + \left(1-\delta_a^q\right)QINTA_a^{\rho_a}\right]^{1/\rho_a}, a \in A \tag{1}$$

$$\frac{PVA_a}{PINTA_a} = \frac{\delta_a^q}{1-\delta_a^q}\left(\frac{QINTA_a}{QVA_a}\right)^{1-\rho_a}, a \in A \tag{2}$$

$$PA_a * QA_a = PVA_a * QVA_a + PINTA_a * QINTA_a \tag{3}$$

In this part, according to the model of Yang kun-he, $\alpha_a^q$is the scale parameter of the total output, $\delta_a^q$is the share parameter of the value-added part;ρ_a is the elastic parameter of the total output, QVA_a is the total quantity of input of the value-added part; $QINTA_a$ is the total quantity of intermediate inputs, PVA_a is the total value of value-added components, and $PINTA_a$ is the total value of intermediate inputs.

The next level refers to Wang Jia [16], that is, the value-added part of the formula and the middle part of the formula. The production parameters of value-added part QVA_a are CES function, mainly composed ofQLD_a of labor input and QKD_a of capital input, whose values are WL and WK in turn.

$$QVA_a = \alpha_a^{va}\left[\delta_{la}^{va} QLD_a^{\rho a^{va}} + (1-\delta_{la}^{va})QKD_a^{\rho a^{va}}\right]^{\frac{1}{\rho a^{va}}}, \alpha \in A \tag{4}$$

$$\frac{WL}{WK} = \frac{\delta_{la}^{va}}{1-\delta_{la}^{va}}\left(\frac{QKD_a}{QLD_a}\right)^{1-\rho a^{va}}, \alpha \in A \tag{5}$$

$$PVA_a * QVA_a = WL * QLD_a + WK * QKD_a \tag{6}$$

In Chinese formula, α_a^{va} is the scale parameter of added value, δ_{la}^{va} is the share parameter of labor input in added value, and ρa^{va} is the elastic parameter of added value.

The formula for the intermediate input part of $QINTA_a$ is as follows:

$$QINT_{ca} = ica_{ca} * QINTA_a, a \in A, c \in C \tag{7}$$

$$PINTA_a = \sum_{c\in C} ica_{ca} * PQ_c \tag{8}$$

In the formula, $ica_{ca}$is the direct consumption coefficient of input-output of intermediate input, $QINT_{ca}$ is the quantity of intermediate investment C required for production activity a, PQ_c is the total value of commodity C in the local market $PINTA_a$ is the total value of the intermediate inputs.

3.2.2 Trade module

The product QA of production activities in this region is divided into two parts: QDA of sales in this region and QE of sales out of this region. The substitution relation is represented by CET production function:

$$QA_a = \alpha_a^t\left[\delta_a^t QDA_a^{\rho_a^t} + (1-\delta_a^t)QE_a^{\rho_a^t}\right]^{\frac{1}{\rho_a^t}}, \rho_a^t > 1, a \in A \tag{9}$$

In the formula, α_a^t is a scale parameter, δ_a^t is a share parameter and ρ_a^t is an elastic parameter.

The QDA price for products manufactured and sold in the area is PDA. The price of goods sold outside the production area is PE. Relative changes in PDA and PE affect relative sales within and outside the region, depending on the primary conditions of optimization.

$$\frac{PDA_a}{PE_a} = \frac{\delta_a^t}{1-\delta_a^t}\left(\frac{QE_a}{QDA_a}\right)^{1-\rho_a^t}, a \in A \tag{10}$$

The production price Pa of the activity department is composed of the weighted average of the local sales price and the external sales price:

$$PA_a = PDA_a * \frac{QDA_a}{QA_a} + PE_a * \frac{QE_a}{QA_a}, a \in A \tag{11}$$

Out-of-area sales prices are affected by logistics freight costs.

$$PE_a = pwe_a * (1-\eta_a) \tag{12}$$

In the formula, pwe_a is the user price of the outside area (user price of the outside area), η_a is the ad valorem rate of the goods, indicating the freight cost per unit of the goods. As you can see, PE can be

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determined as long as pwe_a and η_a are given by the outside world. Thus the price PD can be calculated in PA.

The quantity of commodity C available on the market in the region is represented by QQ_c. In the open economy, QQ_c includes the production and sales part of QDC_c for the area of PDC_c at a certain price, and the production and sales part of QM_c for the area of PM_c at a certain price. Regional markets provide products that consumers, companies and government departments need. In addition to the final requirements described above, intermediate input requirements for product activities must also be addressed. QQ_c in the region of the formation of supply and supply outside the region can be replaced with each other (although not necessarily completely replaced). The Armington condition illustrates these substitutions, which were originally used to describe substitutions of domestic and overseas products:

$$QQ_c = \alpha_c^q \left[\delta_c^q QDC_c^{\rho_c^q} + (1-\delta_c^t) QM_c^{\rho_c^q}\right]^{1/\rho_c^q}, c \in C \tag{13}$$

$$\frac{PDC_c}{PM_c} = \frac{\delta_c^q}{1-\delta_c^q}\left(\frac{QM_c}{QDC_c}\right)^{1-\rho_c^q}, c \in A \tag{14}$$

In the formula, δ_c^q is a scale parameter, ρ_c^q is a share parameter and ρ_c^q is an elastic parameter.

The price of a product on the market, PQ_c, is a Weighted mean of both:

$$PQ_c = PDC_c * \frac{QDC_c}{QQ_c} + PM_c * \frac{QM_c}{QQ_c}, c \in C \tag{15}$$

The above formula (13)—(15) can form the optimal condition of supply allocation based on the price of PQ, PDC and PM, and on the basis of QQ, QDC and QM. The selling price of the imported goods PM is determined according to the selling price in the foreign market (the price of the foreign user PWM and η_a from the market price rate.

$$PM_c = pwm_c * (1 + \eta_a), c \in C \tag{16}$$

pwm_c is used in the production of goods in the outer region of the price.

Because economic activity corresponds to the number of goods, that is, QDC_c and QDA_a, PDC_c and PDA_a are the same thing, can represent the same number of goods. However, since this article uses a tool for the Integrated Application Model System (GAMS), it is necessary to distinguish between product names representing different defined regions of the same variable in Gams. However, because the program accepts only the last variable and the region it defines. So, to accommodate the GAMS program, we used a different name, and they can be mapped one by one in the following ways:

$$QDC_c = \sum_a IDENT_{ac}\, QDA_a \tag{17}$$

$$PDC_c = \sum_a IDENT_{ac}\, PDA_a \tag{18}$$

The $IDENT_{ac}$ is the identity matrix.

The 18 equations described above describe the relationship between the activities contained in the production module and the goods.

3.2.3 Revenue and Expenditure Module

The principal institutions of an open economy include residents, governments, and other regions (rows) in addition to businesses. Residents' income consists of three parts: labor income, capital income and government transfer income.

$$YH = WL * QLS + WK * shif_{hk} * QKS + transfr_{hgov} \tag{19}$$

QLS is the total supply of labor; $transfr_{hgov}$ is the transfer payment of the government to the residents; QKS is the total supply of capital; and the capital factor income is distributed to both the residents and the companies, the $shif_{hk}$ represents the total share of capital element income distributed to the population. The disposable income ratio is $YH(1 - ti_h)$, in which ti_h is the basic income tax rate of urban residents, and the MPC determines the amount of consumption and the saving beyond consumption. The influence function is the cobb-douglas function, from which the consumer demand for product C is derived:

$$PQ_c * QH_c = shrh_c * mpc * (1 - ti_h) * YH, c \in C \tag{20}$$

In Yent, the tax revenue of enterprise in capital input includes the transfer expenditure of state finance to enterprise capital. This model focuses only on the former.

$$\mathrm{YENT} = \mathrm{shif}_{\mathrm{entk}} * \mathrm{WK} * \mathrm{QKS} \tag{21}$$

In the formula, $\mathrm{shif}_{\mathrm{entk}}$ is the share of capital element income distributed to the enterprise.

Corporate tax rate is income tax $\mathrm{ti}_{\mathrm{ent}}$ corporate savings is equal to corporate income minus income tax:

$$\mathrm{ENTSAV} = (1 - \mathrm{ti}_{\mathrm{ent}}) * \mathrm{YENT} \tag{22}$$

The government revenue only considers the individual income tax levied by residents and the enterprise income tax levied by enterprises. The government revenue is as follows:

$$\mathrm{YG} = \mathrm{ti}_{\mathrm{h}} * \mathrm{YH}_{\mathrm{h}} + \mathrm{ti}_{\mathrm{ent}} * \mathrm{TENT} \tag{23}$$

The government expenditure in this model includes commodity consumption and transfer expenditure to residents. Suppose that government demand for goods is determined by external variables:

$$\mathrm{EG} = \sum_{\mathrm{c}} \mathrm{PQ}_{\mathrm{c}} * \overline{\mathrm{QG}_{\mathrm{c}}} + \mathrm{transfr}_{\mathrm{hgov}} \tag{24}$$

Government revenue and expenditure are government net savings GSAV. If it is a positive sign, it is a fiscal surplus; if it is a negative, it is a fiscal deficit. GSAV endogenously:

$$\mathrm{GSAV} = \mathrm{YG} - \mathrm{EG} \tag{25}$$

3.2.4 Equalization module

In this model, the supply (inflow) and demand (outflow) of out-of-region products are endogenous variables. Under CET, exports are determined by the previous output model, which in Armington is one of the determinants of imports. Assume that the business is in the market economy of full competition. The state of supply and demand of products in a given region is that the products supplied on the regional market are equal to the products needed in that region:

$$\mathrm{QQ}_{\mathrm{c}} = \sum_{\mathrm{a}} \mathrm{QINT}_{\mathrm{ca}} + \mathrm{QH}_{\mathrm{c}} + \overline{\mathrm{QINV}_{\mathrm{c}}} + \overline{\mathrm{QG}_{\mathrm{c}}}, \mathrm{c} \in \mathrm{C} \tag{26}$$

Factor market clearing, factor demand equals supply:

$$\sum_{\mathrm{a}} \mathrm{QLD}_{\mathrm{a}} = \mathrm{QLS} \tag{27}$$

$$\sum_{\mathrm{a}} \mathrm{QKD}_{\mathrm{a}} = \mathrm{QKS} \tag{28}$$

In macroscopically closed neoclassicism, factors are exploited. For example, if the actual supply of labour is fully employed, factor supply equals factor endowment:

$$\mathrm{QLS} = \overline{\mathrm{QLS}} \tag{29}$$

$$\mathrm{QKS} = \overline{\mathrm{QKS}} \tag{30}$$

In an open national economy, a net savings account is needed to adjust the foreign exchange balance. This model is an open economy at the regional level, which does not take into account exports and imports but only the external balance of payments outside the region:

$$\sum_{\mathrm{c}} \mathrm{pwm}_{\mathrm{c}} * \mathrm{QM}_{\mathrm{c}} = \sum_{\mathrm{a}} \mathrm{pwe}_{\mathrm{a}} * \mathrm{QE}_{\mathrm{a}} + \mathrm{FSAV} \tag{31}$$

In the model, FSAV is the net balance of regional trade as an endogenous variable. Then there is the investment-savings balance:

$$\mathrm{EINV} = (1 - \mathrm{mpc}) * (1 - \mathrm{ti}_{\mathrm{h}}) * \mathrm{YH} + \mathrm{ENTSAV} + \mathrm{GSAV} + \mathrm{FSAV} \tag{32}$$

The 32 equations (1) to (32) form a common part of the CGE model for the open economy. There are 32 internal variables that can be untangled.

3.3 Parameter assignment

In this paper, we use Yang Kun-he, Hu Ming [17] and Freire-gonz ã 1/4 lez Jaume [18] for reference to assign the elastic parameters involved in the model. The elastic parameters of the production function, CET function and Armington condition function need to be given by the outside world, the production function parameters are as follows Table 4:

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Table 4: Production function parameter assignment

	sec1	Sec2	Secan	Sec3
rhoAa(a)	0.2	0.3	0.3	0.1
rhoVA(a)	0.3	0.2	0.2	0.5
rhoQq(c)	0.4	0.6	0.6	0.4
rhoCET(a)	1.4	1.4	1.4	2.0

The remaining parameters are assigned as follows: PA(a)=1; PVA(a)=1; PINTA(a)=1; PDA(a)=1; PDC(c)=1; PE(a)=1;PM(c)=1;PQ(c)=1;WK=1;WL=1.

3.4 Model predictions

According to the basic assumption of the model, there are QE_c, QM_c and QD_c (QD_c =QD_a) data in the end, in which QE_c indicates the quantity of goods produced and QM_c indicates the quantity of goods attracted, QD_c is the rate of movement of goods in an area. Because the calculation results of CGE model are based on the SAM table in value form, the QE_c, QM_c and QD_c are all in value form, here we can use the following method to obtain the characteristic weight form of freight volume $HYLW_t$:

$$HYLW_t = \frac{HYLW_b * HYLV_t}{HYLV_b} \tag{33}$$

$HYLW_b$ represents the quantity of goods in the form of social weight in the base year, $HYLV_b$ represents the quantity of goods in the form of social value in the base year, and $HYLV_t$ represents the sum of QE_c, QM_c and QD_c, representing the quantity of goods in the form of social value in the characteristic year, the most direct output for the CGE mode, such as:

$$HYLV_t = QE_c + QM_c + QD_c \tag{34}$$

4. Analysis of model results

Taking Labor (labor remuneration) and capital (the sum of net production tax, fixed asset depreciation and operating surplus) as the main exogenous factors, this paper simulates the change trend of energy freight volume in Inner Mongolia after 2017. Trends in the dynamic and exogenous data obtained in the statistical data relative to the base period are shown in table 5.

Table 5: Dynamic exogenous variables

Year	2017	2018	2019	2020	2021
Remuneration for workers (billion million)	7734.11	7682.84	8061.86	8205.96	8352.63
Ratio of labor remuneration to base year	1	0.993	1.042	1.061	1.080
NET production tax (billion yuan)	2725.66	2779.98	2995.74	3141.84	3295.07
Depreciation of fixed assets (billion yuan)	2148.89	2156.75	2282.46	2353.15	2426.04
The operating surplus in GDP (billion yuan)	3487.55	3521.43	3872.47	4084.29	4307.71
Capital Input (billion yuan)	8362.10	8458.16	9150.67	9579.29	10028.82
Ratio of capital investment to base year	1.000	1.011	1.094	1.146	1.199

Input and output processing using GAMS program, parameter calibration and dynamic simulation procedures are not detailed. The output is the forecast data in table 6.

Table 6: Forecasts of regional energy freight volume (value form)

Year	2017	2018	2019	2020	2021
Forecast Regional Energy Freight Volume QD	5968.197	5961.932	6364.351	6563.399	6764.301
QM of attraction forecast	181.073	180.456	116.092	98.654	86.723
The quantity of QE is predicted	7.47	7.48	13.249	16.581	20.035
Forecast total freight volume	6156.74	6149.868	6493.692	6678.634	6871.059

According to the output results, combined with the actual freight volume, through comparison and analysis, the characteristic annual energy freight volume and regional energy freight volume are obtained.

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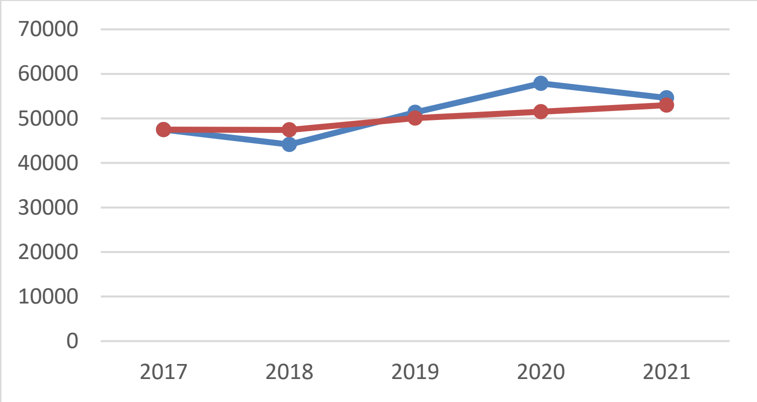

Figure 3: Comparison of forecasts with reality

As can be seen from the error term of figure 3, the average prediction error is -2.27%, the maximum error is -11.01%, and the result is very reliable. It is proved that CGE model can be applied to regional energy freight volume.

The following use of this model forecast Inner Mongolia in 2025, 2030 and 2035 total energy freight , as shown in Figure 4.

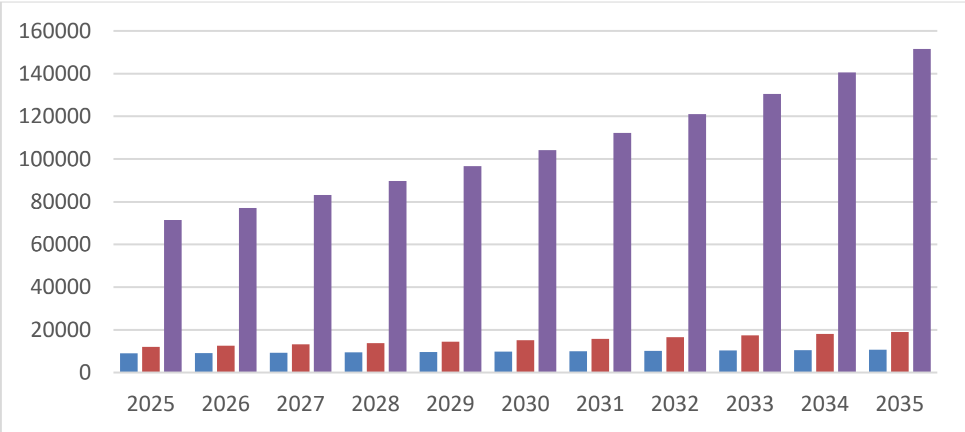

Figure 4: Forecasts total energy freight volume

Using the growth rate relationship, compensation and capital input from 2025 to 2035 is calculated, and its ratio to the base period is compiled into GAM software. The CGE model is used to forecast the total Inner Mongolia energy freight volume. Visible, Inner Mongolia future energy freight volume will continue to grow, and a higher rate of increase[19-22].

5. Summary

From the process and result of the model prediction, we can draw the following conclusions: 1 the average prediction error is -2.27%, the maximum error is -11.01%, the result is very reliable. It is proved that the CGE model is feasible in the forecast of energy freight transport, and the integration of economics and freight logistics is explored effectively. 2 forecast: Inner Mongolia Energy freight volume will continue to grow in the next decade, and the rise is high. The average growth rate every five years reached 45.56%, showing a rapid growth state.

According to the above situation, this paper puts forward the following suggestions: 1 according to the regional characteristics of Inner Mongolia, we should establish a complete energy logistics transportation network and build the corresponding logistics center. Establish and improve the green logistics management system to promote the integrated development of Green Logistics Energy. During the epidemic, we should also promote toll roads free or reduced to reduce transport costs, and promote green transport flow. 2 firstly, Inner Mongolia Energy Transport Company must give priority to developing green transportation, and combine modern transportation modes such as rail transportation and aviation, through scientific and reasonable planning of transportation channels with high efficiency and less pollution, carry out reasonable planning of transportation. Second, energy transport companies

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must research and introduce advanced means of transport, such as driverless vehicles, new energy vehicles and unmanned aerial vehicles, to reduce pollution and business costs, and jointly improve the quality of energy transmission.

References

[1] Lu Hua, Yuan Min, Wang Libiao, du Zhiping. A study on the benefits of System dynamics end-shared delivery system -- a case study of Tongzhou District, Beijing [J]. Journal of Beijing Jiaotong University (Social Sciences), 2021, 20(04): 135-145.

[2] Xu Fei, Ren Shuang. Research on railway freight demand forecast based on decomposition-integration [J]. Operations and management, 2021, 30(08): 133-138.

[3] Alexandru-eugen S T Tescu. Statistical analysis of investments in transport infrastructure, passenger numbers, and energy consumption by modes of transport in Romania [J]. Proceedings of the International Conference on Applied Statistics, January 1, 2019.

[4] Chiao Hee-Ho. Integration of urban land use model and freight transport model -- a case study of British freight transport model [J/OL]. International urban planning: 1-12[2022-10-22].

[5] Amaya Johanna, Delgado-Lindeman Maira, Arellana Julian, Allen Jaime. Urban freight logistics: What do citizens perceive? [J]. Transportation Research Part E, 2021, 152:21 -30.

[6] Qi Mingyao, Yang Kunhe, Miao lixin. Freight volume forecasting model based on computable general equilibrium [J]. Industrial technology economy, 2013, 32(03): 3-10.

[7] Guo Zhengquan. Simulation analysis of our low-carbon economic development policy based on CGE model [D]. China University of Mining and technology (Beijing), 2011.

[8] Lu Chunhua, Li Chenguang, Li Hong. Study on promoting low-carbon development of Jiangsu province by carbon tax policy based on dynamic CGE model [J]. Scientific decision-making, 2022(06): 54-72.

[9] Wei L , Gao C , Zhang S . Research on the GM(1,1)-Markov chain model of highway freight volume forecasting[C]// 2015 IEEE International Conference on Grey Systems and Intelligent Services (GSIS). IEEE, 2015.

[10] Tang X H ,   Yan Y G . Research on the Scale of Logistics Park Land Based on the Forecast of Freight Volume[J]. Logistics Sci-Tech, 2016.

[11] Wang Jun. Compilation of Sam Table of Chinas social accounting matrix based on CGE model of energy economy [J]. Statistics & decision making, 2019, 35(20): 5-10.

[12] Su Limin. The compilation of Macro Sam in 2017 and the selection of the optimal balance method [J]. Statistical theory and practice, 2020(05): 33-37.

[13] Tu Taotao, Ma Qiang. Study on the balance method of social accounting matrix -- rediscussion on the least square cross-entropy method [J]. Quantitative economics, 2021, 38(06): 166-180.

[14] Zhang Yang, Martin. China municipality social accounting matrix data set [J]. Journal of Global Change Data, 2020, 4(01): 46-51 + 46-51.

[15] Godfrey Ho, Liu Lanjuan. The improvement and comparative study of Gras method based on the adjustment of social accounting matrix and the updating of input-output table [J]. Quantitative Economics, technical economics, 2018, 35(11): 142-161.

[16] Wang Jia, Wu Xian, Ye Jun. Regional CGE model of Liaoning province [C]. Civil Engineering Construction Management: Selected Papers of Building Construction Professional Committee of Liaoning Institute of Civil Architecture. 2012:150-154.

[17] Hu Ming, Shao Xuefeng. The impact of new information infrastructure construction on Chinas economic transition: An analysis based on the dynamic recursive CGE model [J]. Economic Questions, 2022(10): 12-18.

[18] Freire-González Jaume, Ho Mun S. Policy strategies to tackle rebound effects: A comparative analysis [J]. Ecological Economics, 2022, 193.

[19] Wojciech Kamiński. Comparison of forecasting methods for freight transportation by Polish railways [J]. Pollack Periodica, 2019, 14(2).

[20] Zhang Zuomin, Ma Yiwen, Guo Huifang. Optimal structural tax reduction based on a computable general equilibrium model [J]. Finance and Economics, 2021(5): 12.

[21] Tian Shengdan. The impact of the COVID-19 epidemic and its policy on our macro-economy: An analysis based on the computable General Equilibrium Model [J]. Consumer economy, 2020, 36(3): 11.

[22] Hossain Syed Shoyeb, Delin Huang. Measuring economic impact in Korea, Japan, India, China, and ASEAN considering agricultural sectors: a dynamic CGE approach based on GAMS [J]. Review of World Economics, 2021(prepublish).