Simulations of Supply and Demand Forecasting in A Market Economy

Irina Anatolievna Kiseleva[1]; Vladimir Ivanovich Kuznetsov[2]; Natalia Alekseevna Sadovnikova[3];
Irina Sergeevna Androshina[4]

[1,2,3] Plekhanov Russian University of Economics, Moscow, Russia.

[4] Moscow Energy Institute, Moscow, Russia.

Abstract

The article deals with the current topic of modernity – simulating supply and demand forecasting. The instability of a complex socio-psychological system, such as consumers, which is virtually impossible to completely study and understand, increases in the context of a market economy. Making adequate decisions requires a deep, comprehensive assessment of the situation and a reliable forecast of the course of events. A firm that has managed to correctly predict the situation receives an additional profit compared to the one that refrained from forecasting. A firm that made the wrong forecast loses the most. The purpose of this work is to characterize the essence of models and methods that can be used to assess supply and demand. Many methods can be used to estimate supply and demand however the most powerful and versatile is using econometric models. In this article, the authors consider the main types of supply and demand models, the factors that affect them in the course of decision-making, as well as the preferences of service consumers. The approaches used in the work were the cognition method, retrospective and documentary analysis, as well as synthesis, generalization, and systematization.

Key-words: Model, Demand, Supply, Forecasting, Equilibrium, Decision-Making.

1. Introduction

Any economic phenomenon is an individual element of the economic relations system, different from others, however, at the same time, connected with them. The multiplicity of factors that determine the economic phenomenon makes it extremely difficult to study it. Today, economic and mathematical models are widely used to analyze economic phenomena. They represent a description of an economic phenomenon using mathematical formulas. Mathematical modeling

makes the phenomenon quantifiable. By abstracting from reality, researchers have access to powerful mathematical methods that allow looking further than the experience of previous years, predicting the object's behavior when changing any of the affecting factors [2, 3].

As an example of economic and mathematical models, one can cite supply and demand forecasting models, economic growth models, a model describing the formation and evaluation of an asset portfolio, a consumer choice formation model, etc.

The concept of demand forecasting is the main business process around which the company's strategic and operational plans are developed [16, 20, 22].

Classical supply and demand models include a concept of equilibrium, which is reached under certain events in the markets, i.e. it depends on certain factors. At that, price is one of the main factors. Therefore, the economic model of equilibrium, i.e. the state that is beneficial to both the seller and the buyer, is a benefactor, without taking into account numerous influences.

The very concept of equilibrium not only stabilizes markets but also creates a favorable economic climate. This condition is beneficial to the manufacturer, as it reflects the willingness of the buyer to buy all the goods produced, i.e. provides a stable sale of products or services.

Therefore, without studying the demand taking into account many influencing factors, it is difficult to determine sales, and accordingly establish effective activities. Demand forecasting is the basis for many managerial decisions.

By itself, forecasting is a kind of prediction of the state of the market and demand, based on many sources of information, taking into account numerous influencing factors.

In market conditions, supply and demand, as well as price, are the most important elements of the economy that play a balancing role. The theoretical foundations of demand formation, the nature and factors of supply development, the issues of the macroeconomic balance, and the consequences of their violation are the main problems of contemporary Russia.

The relevance of the problem of studying the areas of demand is because in the context of market relations, economic and social problems arise and deepen, which cannot be automatically solved in the market environment. Significant investments were required, which would have been unprofitable or almost unprofitable from the viewpoint of private capital, but which were necessary to continue the normal reproduction of domestic production. In other words, the demand for investment resources significantly exceeded their supply. The imbalance in the labor market has been observed for more than a decade, which means that the supply of labor significantly exceeds the demand. Unlike official statistics, when it comes to real incomes of the population, which are growing quite

dynamically, unfortunately, they have not received a proper assessment. The vast majority of the population's funds are still spent on current needs, which means that consumer demand remains quite low.

The purpose of the present work is to study the theoretical foundations of supply and demand simulation, as well as their practical application.

According to the set goal, the following problems are solved in the work:

- studying the essence of supply and demand;
- learning the methods of supply and demand forecasting;
- considering a practical example of forecasting supply and demand.

2. Literature review

The supply is the total number of goods and services available on the free market. Demand is the total amount of available goods and services needed to meet the actual demand in the free market. Demand is a concept that complements supply. Demand means the actual need for goods or services for potential business partners, such as businesses and households [1, 4]. Thus, before starting developing a product, it is necessary to calculate the actual need, since it also determines the demand.

Consumer spending increases as a result of income growth in the economy. This shifts the demand (D) to the right to a new position. Consumers are willing to pay a higher price for scarce products. Producers motivated by higher profits increase production. The price will rise until it reaches the equilibrium price of P2, at which the supply and demand (S) levels become equal. This process is called the law of demand (Fig. 1) [11, 12].

Figure 1 – The law of demand
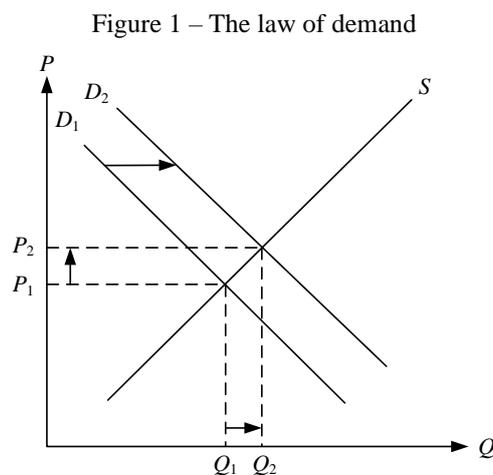
Similarly, a decline in production factor prices will shift the supply curve to the new S1 position. Producers will want to produce more products to be sold at the price of P1, resulting in a surplus of goods on the market. Manufacturers will start competing by lowering prices. As soon as the market price will fall to P2, the market reaches equilibrium. This process is called the law of supply (Fig. 2) [9].

Figure 2 – The law of supply
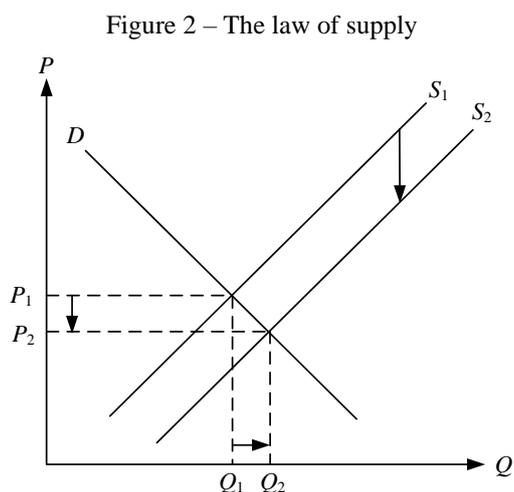
However, in the economy, these processes take place simultaneously (Fig. 3). This results in the fact that in the conditions of perfect competition, the market price always stabilizes at a level at which the amount of goods that interested buyers want to buy is equal to the number of goods that sellers want to sell, i.e., supply and demand are balanced. Mathematically, the model of such an equilibrium can be expressed as follows: for 50 rubles, the seller can and is ready to sell 50 pieces, while the buyer, accordingly, is ready and buys 50 pieces at the specified price.

This rule is called the law of supply and demand.

Figure 3 – The law of supply and demand
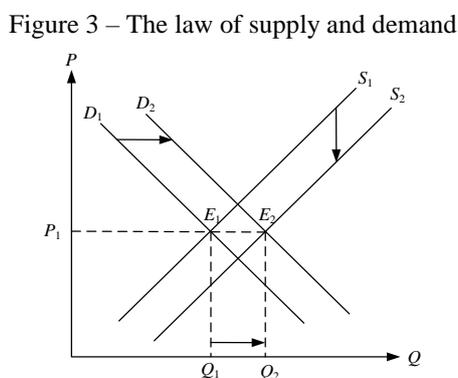
Supply and demand are paramount to the company's plans for the future. Regardless of whether the company needs to offer new products or services, or develop a business plan for further development, the current market needs (demand), as well as the actual situation (supply) determine success or failure [7, 8].

There are several ways to analyze these two indicators for a given product that have shown their effectiveness: market research, customer surveys, as well as economic analysis of price changes and production indicators.

3. Methods

Many methods can be used to estimate supply and demand, but the most powerful and versatile is using econometric models [5, 10, 21].

In this article, the authors analyzed the dependence of the demand for cars in Russia on the average per capita income according to statistical data for 10 years. As a result of the analysis, a power-law model of the third degree was constructed, which allows accurately predicting the volume of demand in the future. The analysis was carried out using MS Excel using linear programming generally used when constructing the regression model.

There are a large number of sales predicting methods [5, 6]. One of the most frequently used is the so-called Three Product Levels model by Philip Kotler [19].

The first stage of this method involves forecasting the development of the macro environment parameters. It takes into account factors, such as inflation, unemployment, interest rates, savings, investment, government spending, consumer spending, social benefits, trade, and balance of payments development, and GDP growth.

The second stage provides a forecast of aggregate demand in a given sub-market (in the market area in which the enterprise that is the forecast subject performs) using the results of the first stage.

At the third stage, the company's demand is determined based on the proportion of firms in the market and the results of the second stage.

All of these forecasts are based on information taken from three types of resources:
1. what people say – information from retailers, experts, customers, suppliers, etc.;
2. what people do – finding out how these operators behave in the market based on testing the market, making a purchase decision, and testing customer reaction;

3. what people have done – finding what was the last reality based on statistics on trends, fluctuations, seasonality in the development of realized demand, and exceptional events in the last sale.

The specific methods used for each of the stages can be divided into three categories: opinion methods, time series analysis, and causal methods [17, 18, 23].

Methods of collecting opinions, intuitive and probabilistic assessments of competent persons include the following:

1. The opinions of experts, namely, traders, distributors, suppliers, marketers, consultants, workers, marketing agencies, etc. can help or directly make a forecast of future demand. It is based on the Delphi method, in which a selected group of experts shares their opinions on the further development in the course of several rounds. After each round, the moderator gets acquainted with the anonymous results of the previous round, and in the next round, can answer the same questions in different ways. The idea of this method is that the participants influence each other with their opinions and after a certain number of rounds reach a consensus on the correct answers.

2. Statistical surveys are used to obtain quantitative information. Surveys are oriented according to the needs of opinions or facts, but most often they contain questions for individuals. Questions are usually structured and standardized in such a way that no question affects the answer to other questions. Each survey participant should receive the same questions in the same order. The platform for conducting surveys is a telephone interview, a questionnaire via email or a web form, and face-to-face meetings. If fulfilling the end-customer request is impossible, the survey is focused on sales representatives, sales employees of intermediary companies, and so on. Sometimes these estimates must be correct because they are optimistic or pessimistic, depending on the nature of the forecast.

3. Multiple scenarios are compiled images of an alternative future. Each alternative scenario is sequential and receives a certain probability of occurrence. The main purpose of this method is to make sure that the company's management is prepared for all possible scenarios, to avoid an unpleasant situation that was not foreseen in advance.

4. Technology forecasting is an assessment of the future characteristics of useful equipment, methods, and machines. Technical parameters, for example, the speed of jet fighters, the strength of future engines, the accuracy of measuring instruments, or the number of transistors on a single chip must be evaluated. Items of a luxurious nature (without general utility) should be excluded from the

1674

assessment. This method is used in the context of development environment forecasts and is suitable for long-term forecasts.

5. Demand/risk forecasting is the identification of important events that can significantly affect the company's operations. Each event is evaluated according to its convergence with the current major trends in society. The higher the convergence, the more likely it is that a given event will occur. These phenomena are likely to be investigated in the future.

6. Market testing is used when better methods of forecasting are available. For example, in connection with the implementation of a new product, a change in the distribution system, a large unstable market, or the entry of a company into a new market, it is necessary to switch to direct market testing. The goal is to figure out how to respond to customers and dealers, and how big the market is. During the testing of consumer products, a need arises to provide test purchases, first repeat purchases, product customization according to customer preferences, research of wave sales, and market modeling.

The time series analysis methods are based on the assumption that the predictions of the future development of the studied variables should have a fairly long history. This analysis does not consider external factors that may affect the quantity.

A time series is a sequence of quantitative characteristics of observations located in the time axis and directed from the past to the present. Knowing the time series development patterns and analyzing the reasons that led to them allows predicting the further development of these series.

Predictions in time series can take two forms:

1) point forecast which indicates the best estimate of the future value:

2) interval forecast which sets the interval at which the future value lies within the specified limits with a certain probability.

The time series analysis methods include:

1. Spectral analysis, i.e. time series analysis in the spectral domain. The basic principle of the method is that a time series is a mixture of countless periodic components. So the goal is to express the time series as:

$$y_t = \int_0^{\pi} \cos(\omega t)\, du(w) + \int_0^{\pi} \sin(\omega t)\, du(w)\,,$$

where $u(\omega)$ and $v(\omega)$ are random processes indexed by $\omega \in (0; \pi)$.

2. Decomposition aims to decompose a time series into its four main components:

1) trend (T), representing long-term changes in the average behavior of a series; this is the result of factors that act systematically;

2) the cyclical component (C), which has a periodic character and causes a wave-like sales;

3) the seasonal component (I) which causes cyclical sales fluctuations that occur every year;

4) a random (irregular, residual) component (E) that is not systematic, for example, strikes, climate disturbances, changes in hobbies, tragic events, etc.

5) The construction of these models is based on the additive model:

$$y_t = T_t + C_t + I_t + E_t$$

or on the multiplicative model:

$$y_t = T_t \cdot C_t \cdot I_t \cdot E_t.$$

Trend analysis is carried out based on the following methods [9-11]:

1. Subjective methods (technical analysis), at which specialists in the field of statistics study the shapes of curves that characterize the analyzed indicators. By looking at the known established shape one can supplement the shape of the patterns that have just emerged, and predict the future development of a given quantity. The graphs under study are either histograms of normal values or graphs with moving averages that blur the fluctuations of normal values and therefore best describe the trend.

2. Extrapolation methods represent an additive decomposition without cyclic and seasonal components, i.e. a time series as a combination of trend and noise:

$$y_t = T_t + E_t \quad \text{or} \quad y_t = T_t \cdot E_t.$$

The trend is estimated using mathematical curves for the entire data range or only for the last segment. This approach is applied usually to seasonally adjusted time series. The main problem with this method is choosing the right curves. This option is most often made subjectively, based on the analytic's experience and the type of the curve. After selecting the type of curve, it is necessary to evaluate its parameters so that the best curve is placed on the original graph. This is usually achieved by the least-squares or weighted least squares method.

Predicting the values of a time series at a given time $t + \tau$ for all types of curves is to estimate all the coefficients of the curve, and ensure that the resulting trend of equation t is true instead of the value $t + \tau$.

For this purpose, as a rule, the moving average method is used, which is an adaptive approach that uses the concept of a local trend and assumes that the time series is cleared of seasonal and cyclical fluctuations.

This method is mainly used to clear time series from seasonal and random effects. Other methods are recommended for trend forecasting. However, a prediction can be constructed using this method.

There are many variations of the moving average method:

1. Simple moving average (SMA) is an arithmetic mean of order 0 and length m:

$$\overline{y}_t = \frac{y_{t-m+1} + \dots + y_{t-1} + y_t}{m};$$

2. Centered moving average (CMA) indicates the arithmetic mean of order 0 and length 2m+1 with the center t:

$$\overline{y}_t = \frac{y_{t-m} + \dots + y_{t-1} + y_t + y_{t+1} + \dots + y_{t+m}}{2m+1};$$

3. Weighted moving average (WMA) indicates the weighted average with linearly decreasing weights from the last values. This means that the resulting value has the most influence on the last value, while the older sequence members have the least influence:

$$\overline{y}_t = \frac{1 \cdot y_{t-m+1} + 2 \cdot y_{t-m+2} + \dots + (m-1) \cdot y_{t-1} + m \cdot y_t}{1 + 2 + \dots + (m-1) + m};$$

4. The method of moving medians also refers to adaptive methods, since it is suitable for analyzing series with a trend component that is subject to changes over time. Its principle is the same as for the moving averages method of the $0 - t_j$ order, i.e. it balances short segments of the time series, but using median instead of the weighted average of the series members. That is why it has only one parameter – the length of the smoothing width. Compared to the moving average method, it has the advantage that it is not sensitive to randomly occurring isolated (unreasonably high or low) values of the series.

Because this method also uses with a window, which usually has a length of 2m+1, here it is necessary to deal separately with the first and last m elements. An easier way is to align the copy in place of the missing values corresponding to the values from the original series. A more complex method is based on calculations of the missing value as the median of three data, namely, the

corresponding values of the original series; the nearest aligned values; the result of a linear extrapolation of the two closest aligned values at or before the time of the missing value.

This method can be repeatedly applied to time series to achieve better alignment.

5. Simple Brown Exponential Smoothing is also called exponential moving average (EMA) or exponentially weighted moving average. Since WMA is characterized by the fact that the diameter is counted from a constant number of terms but all the terms of the series. The weights fall off the newest terms exponentially. It is suitable for a locally constant trend $T_t = \beta_0$.

6. Brown's double exponential smoothing is an adaptive method for a locally linear trend $T_t = \beta_0$.

7. The Holt method or generalized double exponential smoothing is also known as the adaptive method for a locally linear trend. Its special case is the double Brown Exponential Smoothing. This method is suitable for series with a strong trend without the presence of seasonal ingredients.

8. The adaptive weights method is a generalization of moving average methods. Forecasts are constructed as a weighted average of m terms of the time series, with scales for adapting each step.

The purpose of seasonality analysis is, firstly, to isolate the seasonal component to create better forecasts and, secondly, to clear the series of seasonal influences for more accurate trend analysis.

After evaluating the trend and its predictions based on seasonally adjusted series, one can build a more realistic forecast of a certain number by multiplying the trend predictions by the corresponding seasonal factor. The reason for this is that the seasonal factor is the ratio of the values of the original and evenly matched series in a given season. The trend and trend forecast are also balanced lines, therefore to get the most likely value of the original series in the next season, it is necessary to take into account seasonal fluctuations.

The above-described process works for an additive model, where instead of multiplication and division, there will be addition and subtraction with certain coefficients for the seasonal component. Then, using regression analysis (usually using the least-squares method), the coefficients of the model are estimated.

The method of using trigonometric curves uses a linear combination of trigonometric curves to describe the seasonal component. It uses a model $y_t = T_t + I_t + E_t$.

Causal methods assume that past data from different sources have causal relationships that can be identified using mathematical statistics. For example, when forecasting umbrella sales these methods analyze the influence of weather conditions in a given area on the past sales of umbrellas. If one was able to identify the influencing factors, then his forecast will be used as the basis for the forecasts of the studied variables. The variable under study is often a time series, and therefore these methods can also be considered for time series analysis methods.

Regression analysis (linear and nonlinear regression) is a set of statistical methods that are used to estimate the value of a certain random variable (or dependent variable of regression analysis) based on knowledge of other variables (independent variables of the regression analysis).

The dependent variable Y is a scalar or vector of a linear space. Then the role of regression is formulated as the role of the conditional mean:

$$E(Y \mid X_1, ..., X_p) = f(X_1, ..., X_p)$$,

where E is the symbol of the mean value of the variable Y with knowledge of $X_1, ..., X_p$

and f is the regression function to be evaluated. This feature is most often expressed in a general form, depending on the (unknown) regression coefficients. These coefficients are then estimated based on the values of observed data.

The most common case is a linear regression of the function that f takes as a linear combination of independent variables:

$$f(X_1, ..., X_p) = \beta_0 + \sum_{j=1}^{p} \beta_j X_j$$.

The coefficients β_j ($j = 0, ..., p$) are calculated by the least-squares method, i.e. in a way that the sum of the squared deviations of the observed original values of the f function was minimal:

$$\sum_{t=1}^{n} (Y_t - f(X_1, ..., X_p))^2 \to \min$$.

In addition to the described linear regression, there are also nonlinear regressions, where the function f is expressed as a nonlinear combination of independent variables. To calculate the regression coefficient in this model, the method of least nonlinear squares is used, which significantly complicates the calculation (an iterative process, the initial values of the coefficients are needed, the optimization process, i.e. the solution is unclear if there are more local minima, etc.).

Besides, autoregressive moving averages (ARMA) are also used. They consist of two parts: an autoregressive (AR) and a moving average (MA). It is usually called ARMA(p, q), where p is the order of the autoregressive part, and q is the order of the moving average.

After selecting the parameters p and q, one can get the ARMA(p,q) model calculated using the least-squares method. It is recommended to choose the smallest possible values of p and q, which allow getting an acceptable approximation of the obtained data.

Autoregressive integrated moving averages (ARIMA) are a generalization of ARMA methods. They have an additional parameter d for the order of difference.

− The Box-Jenkins method usually has the following advantages over decomposition-based methods [13-15]:

− Models quickly adapt to changes with time series, so the Box-Jenkins method is successful even in cases where the decomposition fails.

− This method shows the best results when analyzing economic time series.

− The method is systematic and therefore can be fully automated. It is verifiable because it has many numerical applications.

The general disadvantages of the Box-Jenkins model are as follows:

− The model is only suitable for time series with a length of at least 50 observations.

− Its practical application is much more demanding than the application of decomposition methods.

− Due to its complexity, it is difficult to implement and requires using ready-made software.

− The resulting models, in particular models with a large number of parameters, are difficult to interpret.

Using modeling, including forecasting the levels of supply and demand, is one of the main tasks of contemporary science. Various economic schools have created many models to describe the processes occurring in the economy. To bring the model closer to reality, new variables are introduced that tend to reduce the number of assumptions, however, this leads to a complication of the very model.

4. Results

Below is analyzed the dependence of the demand for cars in Russia on the level of average per capita income for 10 years.

Table 1 – Initial data

Year	Demand for cars, thousand items y	Average per capita income, rubles x
2009	1,465.9	16,895.0
2010	1,899.5	18,958.4
2011	2,650.6	20,780.0
2012	2,934.5	23,221.1
2013	2,777.2	25,928.2
2014	2,491.4	27,766.6
2015	1,601.5	30,466.6
2016	1,425.8	30,675.1
2017	1,595.7	31,367.0
2018	1,800.6	32,609.3
2019	1,759.5	35,188.0

To perform the analysis, the authors construct linear and nonlinear models of pair regression and evaluate their parameters.

To put forward a hypothesis about the communication model, the authors construct a correlation field.

Figure 4 – Field correlation
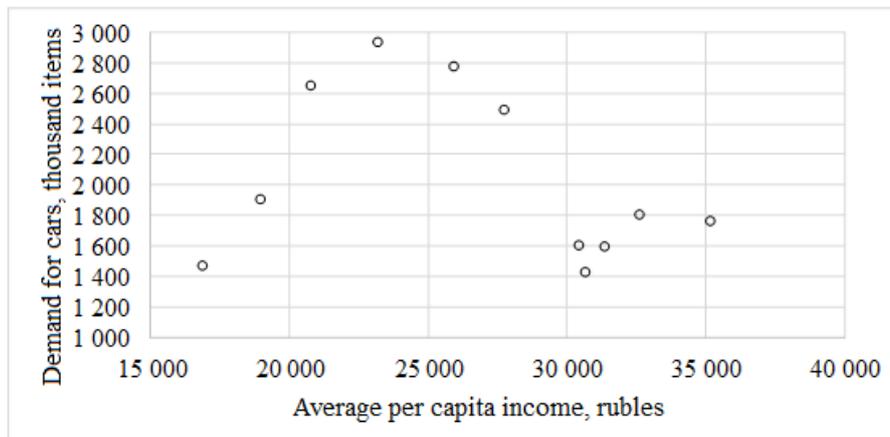
The graph shows that the points line up in a certain curve, that is, the regression equation will be south in the form:

$$\hat{y}_x = a + b_1 \cdot x + b_2 \cdot x^2 + b_3 \cdot x^3$$

The parameters of the equation are calculated using the least-squares method from the system:

$$\begin{cases} a \cdot n + b_1 \cdot \sum x_i + b_2 \cdot \sum x_i^2 + b_3 \cdot \sum x_i^3 = \sum y_i \\ a \cdot \sum x_i + b_1 \cdot \sum x_i^2 + b_2 \cdot \sum x_i^3 + b_3 \cdot \sum x_i^4 = \sum x_i y_i \\ a \cdot \sum x_i^2 + b_1 \cdot \sum x_i^3 + b_2 \cdot \sum x_i^4 + b_3 \cdot \sum x_i^5 = \sum x_i^2 y_i \\ a \cdot \sum x_i^3 + b_1 \cdot \sum x_i^4 + b_2 \cdot \sum x_i^5 + b_3 \cdot \sum x_i^6 = \sum x_i^3 y_i \end{cases}$$

Since the construction of the model will require significant calculations, the authors used the MS Excel package, which has built-in tools for solving forecasting problems using linear programming tools.

5. Conclusion

The purpose of the present work is to characterize the essence of models and methods that can be used in the assessment of supply and demand.

In practice, both supply and demand are affected by many factors that are not taken into account in the above models.

Therefore, simple correlations and calculations do not allow accurately determining the state of equilibrium, as well as giving an exact demand level.

The demand level in the future can be estimated from a forecast, which is the result of activity, such as forecasting.

Forecasting means drawing certain conclusions based on certain current initial data which assume the state or description of possible or desirable aspects, states, solutions, and problems of the future.

The study and forecasting of customer demand allow optimizing production planning. Although a 100% accurate forecast cannot be made, the higher the accuracy of the forecast, the more efficiently one will be able to run his business.

Econometric models and methods are now not only a powerful tool for obtaining new knowledge in economics but also a widely used tool for making practical decisions in various fields.

The most widely used method is the least-squares method (LSM), which is based on the linear programming problem, based on minimizing the square of the model residuals.

However, using separate methods in practice is complicated by the fact that it is necessary to have a large set of data available.

References

Jehle, G.A., Rennie, Ph.J., Advanced Microeconomic Theory. Trans. M.: *Publishing House of the State University Higher School of Economics,* 2018, - 82 p.

Dudov, S.I., Vygodchikova, I. Yu., Kuptsov, S.N. *Mathematical methods in economics: Textbook for students of economics and mathematical specialties.* - S.: Nauka Publishing Center, 2016. - 93 p.

Kolemaev V.A. *Mathematical economics: Textbook for universities.* - 4th ed., M.: UNITY-DANA, 2017, - 399 p.

Taranukha Yu.V., Zemlyakov D.N., *Microeconomics*: textbook. 4th ed., M.: KNORUS, 2018. - 320 p.

Butakova, M.M. Economic forecasting: *Methods and techniques of practical calculations*: textbook. M. KNORUS, 2016.

Kantorovich, G.G. Time series analysis. *Economic Journal*. – 2016. – No. 1.

Pikhno, D. *The law of demand and supply*. - M.: Media, 2014.

Tikhonov, E.E. *Forecasting in market conditions*. Nevinnomyssk, 2017.

Kramer, D. *Mathematical data processing in social sciences*: Contemporary methods. Moscow: Akademiya, 2007. 288 p. 23.

Timofeev V.S., Fadeenkov, A.V., Shchekoldin, V. Yu. *Econometrics*. Moscow: YURAYT, 2015. 328 p.

Tsoi, M. E., Shchekoldin, V. Yu. *Contemporary methods of research in marketing. Marketing.* 2014. No. 2. pp. 19-32.

Teichert, T., Effertz, T., Tsoi, M., Shchekoldin, V. Predicting brand perception for fast food market entry. *Theoretical Economics Letters*. 2015. V.5. No.6. pp. 697-712.

Shanshov, Yu.P, Lotov, A.V. Mathematical models in economics. Moscow: FIZMATLIT, 2019. - 304 p.

Kozeletsky, Yu. *The psychological theory of solutions*. Trans. from the Polish by G.E. Mints and V.N. Porus. Ed. by B.V. Biryukov; afterword by B.V. Biryukov and O.K. Tikhomirov. M.., Progress. 1979. 504 p.

Ringland, D. The future as an unknown space: *Integrating foresight into strategic decision-making. Foresight*. 2013. Vol. 7. No. 4. pp. 60-69.

Liang, X., Xie, L., Yan, H. Self restraining bass models. *Journal of Forecasting*. 2015.

Foss, N.J. Scientific progress in strategic management: The case of the resource-based view. International *Journal of Learning and Intellectual Capital* (IJLIC), 4(1/2), 2007.

Morrow, J.L., Sirmon, D.G., Hitt, M.A., Holcomb, T.R. Creating value in the face of declining performance: Firm strategies and organizational recovery. *Strategic Management Journal*, 8(3), 2007, 271-283.

Kotler, Ph. Kotler Marketing: *How to create, win and retain the market*. - M.: Alpina Business Books, 2008. - pp. 116-163.

Angel, J.F., Blackwell, R.D., Miniard, P.U. *Consumer behavior*. - St. Petersburg: Peter, 2001, - 768 p.

Polyansky, Yu.N. Econometrics. Economic. modeling and forecasting: Textbook. - M.: Academy of *Economic Security of the Ministry of Internal Affairs of Russia*, 2018. - 190 p.

Porter, M. Competitive advantage: *How to achieve a high result and ensure its sustainability*. - Moscow: Alpina Business Books, 2005. - pp. 314-405.

Eisenhardt, K.M., Martin, J.A. Dynamic capabilities: What are they? *Strategic Management Journal*, 21, 2000: 1pp. 105-1121.