Economic Models Ltd

Company Overview

economic MODELS
www.modelim.co.il

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Company Overviwe

1. The company

Economic Models has extensive experience with complex economic projects in a wide array of economic fields, including long-term analysis of anticipated Israeli economic trends and feasibility studies for complex economic projects. The company was founded in 1986 by Dr. Yacov Sheinin, an economist with considerable experience in applied economics and management of large projects in Israel and the United States. Dr. Sheinin has served as the CEO of the company since its establishment.

Economic Models is Israel's leading economic consulting firm. It offers services focused on its five main areas of expertise:

- Outlooks and analysis of current Israeli economic trends
- Compilation of information and assessments of the economic developments in key countries worldwide
- Analysis and demand forecasts for key products
- Feasibility studies, business analysis and valuations
- Economic opinions
- Analysis of and consulting on the capital market

Economic Models is made up of two divisions: macroeconomic and microeconomic.

The Macroeconomic Division provides subscribers with ongoing analysis of the developments and forecasted trends for the Israeli economy and key economies around the world, and sectoral analysis. We have offered this service for over 25 years.
The Microeconomic Division offers a variety of consulting services, including complex feasibility studies, company valuations, cost-benefit analysis, recovery plans, business plans and economic opinions.

Economic Models is the Israeli representative to Project LINK, a unique United Nations project that provides outlooks on global economic trends and international trade. The outlooks are performed by connecting the economic models of key countries worldwide to a single model in a consistent and comprehensive system. The project, financed jointly by the UN and University of Pennsylvania, was established and is managed by Prof. Lawrence Klein, winner of the Nobel Memorial Prize in Economic Sciences.

Economic Models regularly issues economic information and outlooks in English for international organizations that want information about the Israeli economy.

Company Overviwe

The company's website, www.modelim.co.il designed to provide information to its business clients and the general public. The website is updated regularly with analyses, assessments and other issues relevant to the economy.

Economic Models has over 25 years of experience providing consulting services to leading Israeli companies involved in the energy market. They include: Israel Electric Corporation, Israel Corporation, Oil Refineries, Delek, Sonol, Paz and Noble Energy. Furthermore, *Economic Models* has provided consulting services to companies and energy projects in Israel and globally for IPOs, capital raisings and international bond ratings (with S&P and Moody's). Some of the more prominent projects performed by the company include the valuation of Israel Chemicals, valuation of Bezeq, valuation of Elite, valuation of Israel Corporation, poor feasibility of splitting up Oil Refineries, feasibility of building a new IC fab for Tower Semiconductor and more.

2. Selected projects

Energy, gas, petroleum and electricity

- Model for forecasting electricity demand in Israel.
- Model for forecasting demand for fuel products and natural gas in Israel.
- Feasibility study for cogeneration power plant in Ashdod for Oil Refineries.
- Economic feasibility study for the Dorad power plant for Delek Group.
- Economic feasibility study for construction of a cogeneration power plant at American Israeli Paper Mills.
- Analysis of the natural gas market in Israel and sales forecast of Yam Tethys, which served as the basis for Yam Tethys' debt rating issued by international rating companies, Standard & Poor's and Moody's, prior to its capital raising on the institutional market in the US.
- Economic feasibility study of the OPC power plant at Ramat Hovav for the Ofer brothers, for their rating by Maalot and consulting to the group as they set out to secure financing from institutional, financial and strategic organizations.
- The economic significance of a merger between Delek and Sonol - economic opinion for the Antitrust Commissioner.
- Preparation of a strategic plan for Oil Refineries, valuation of Oil Refineries and analysis of the economic significance of splitting BAZAN.
- Valuation of Delek Group and Delek Energy for Delek Group.
- Economic analysis for bond raising from institutional bodies for the Yam Tethys project by Delek Drilling and Avner Oil Exploration.

- Feasibility study and ongoing consulting to EER of the Ordan and Polar Investment Group in securing strategic sources of financing overseas for a home waste treatment and electricity generation venture using plasma technology.
- Valuation of V.I.D. Desalination Company.
- Economic opinion on the economic significance of the problem at Bazan in 2004.
- Feasibility Study for Mishor Rotem Power Station – for Israel Corporation.

Communications

- Economic feasibility study of the transition of the Israel Police to a digital communications network, prepared for the Israel Police (2007).
- Consulting to the cellular operators regarding the network of cellular antennas.
- Business plan for the Channel 2 tender, prepared for Noga Communications (2005).
- Economic opinion for the Israel Bank Supervisor regarding the merger of the cable companies (2004).
- Economic opinion on the impact of the IPC arrangement on television broadcasting in Israel. Prepared in 1994 for the cable companies. The opinion served as the basis for the expert testimony in court as part of the petition to approve the ICP agreement.
- Large-scale project on the development of the Israeli telecommunications market for several key players including Bezeq, Partner, Clal, Bank Leumi, Bank Hapoalim, First International Bank, Citibank, Cellcom and Pelephone. The project including a long-term demand forecast (10 years) for communications services (landlines, cellular telephony, cable, DBS and Internet).
- Valuation of Bezeq, performed for Poalim Investments, Koor and Israel Corporation. The project including comprehensive analysis of Bezeq and the Israeli telecommunications market, and valuations of Bezeq companies, Pelephone and Bezeq International, based on a 10-year activity forecast.
- Economic feasibility of investing in the Russian television channel.
- Business plan for the new Israeli television channel (Channel 10) was prepared for Afik Rom Group (2001).
- Valuation of Partner was performed in 2001 for Poalim Investments as part of the valuation of Elbit-Elron.
- Economic opinion on the proposed competitive structure for the cable companies, prepared in 2001 for the cable companies as part of the application submitted to the Antitrust Commissioner for a merger of the cable companies.
- Comprehensive project on development of electronic commerce and services in Israel was performed in 2000 for several leading Israeli corporations such as Bank Leumi, Clal Israel, IBM, Elite, Shufersal, Super-Pharm and Bituach Yashir. The purpose of the project was to characterize the types of demand and obtain demand estimates for 10 years, for

the purchase of a group of products through e-commerce and classification of products by their potential for purchase via e-commerce. The project included analysis of the effects of e-commerce on retail commerce, the content and advertising markets, tourism services and financial services.

- Business plan for the news channel, prepared for i24 News.
- Preliminary examination of the economic significance of establishing a third television channel was conducted in 1998 for Keshet, Reshet and Telad.

Aviation and tourism

- Economic feasibility of continued development of the ATG Javelin for Israel Aerospace Industries (2007).
- Business plan for El Al (2006).
- Economic valuation of standby tickets for El Al employees (2003).
- Valuation of Elad Hotels (2003).
- Business analysis of El Al prior to privatization (2002).
- Analysis of El Al's adjustment plan (2001).
- Development of electronic commerce and services in the tourism industry (2000).
- Proposal for establishment of a consortium for the acquisition of El Al (1998).
- Valuation of Clal Tourism - Diesenhaus (1995).
- Feasibility of converting passenger planes to cargo plans (1993).
- Valuation of El Al (1992).
- Economic feasibility of continuation of the Lavi jet (1987).
- Strategic plan for Eilat.
- Feasibility study of El Al's cargo plane activity.
- Strategic plan for Knafaim.
- Valuation of Clal Tourism - Diesenhaus.
- Economic feasibility study of the Aquaria Entertainment project.

Advanced technology

- Proposed policy for accelerating growth in the advanced technology sectors.
- Economic feasibility of continued development of the ATG Javelin for Israel Aerospace Industries.
- Estimate of surplus cost components in investment in Tower Semiconductor by Israel Corporation, PPA (Purchase Price Allocation).
- Contribution of venture capital funds to Israeli economy.
- The defense industry as an economic growth driver.

- Valuation of Elisra Group, prepared for Elisra and Koor.
- Examination of the Lumenis business plan.
- Feasibility study of shift by First International Bank to outsourced IT services, for IBM.
- Feasibility study and ongoing consulting to EER (of the Ordan and Polar Investment Group) in securing strategic sources of financing overseas for a home waste treatment and electricity generation venture using plasma technology.
- Kolber's business policy.
- Economic study of the hydrogen project.

Transportation and infrastructures

- The National Road Safety Program that was submitted by the Sheinin Committee to the Minister of Transport and the government (2005).
- Vehicle importers - demand forecast for private vehicles.
- Valuation of Albar (car rental and leasing company).
- NTA - economic feasibility of light rail in Israel.
- Valuation of employee rights in Egged.
- Analysis of Egged's bus fares.
- Business analysis of El Al prior to privatization.
- Economic feasibility and financing sources for tunneling of the green line in Tel Aviv.

Valuations and business plans

- Valuation of Malrag.
- Valuation of Semiconductors for Israel Corporation.
- Valuation of Bazan (Bazan Oil Refineries Ltd.) and Israel Petrochemical Enterprises (Carmel Olefins).
- Valuation of Elite, prepared for Strauss Group.
- Valuation of Ashdod Oil Refineries.
- Valuation of Delek Group and Delek Energy for Delek Group.
- Valuation of Elad Hotels.
- Valuation of Elisra Group.
- Valuation of Bezeq and Pelephone.
- Education services for foreign students

Economic opinions (expert opinions)

- Opinion on the derivative lawsuit against Israel Corporation.
- Opinion on the damage incurred by Danya Cebus due to Israel's closed sky policy.
- Opinion on revised city tax rates.
- Opinion on the malfunction at MAZAG 4 at Bazan in 2004.
- Opinion on the estimated economic value of flight tickets with guaranteed seating for El Al employees.
- Opinion on the estimated economic value of standby flight tickets for El Al employees.
- Opinion on the Elite-Tami merger.
- Opinion on the cable television market.
- Opinion on hospitalization rates.
- Opinion on gas stations.

Business plans for tenders

- Business plan for the tender for a third television channel.
- Business plan for the tender for the news channel.
- Preparation of a plan for the Israel Chemicals tender.
- Opinion on the Skikun U'Pituach tender.

Consulting on the capital market

- Valuations of publicly traded companies.
- Evaluations of developments in global markets.
- Analysis of trends on the Israeli capital market.
- Review of capital markets around the world.

The Structure of the Company's Models

The global outlook

Economic Models receives long-term outlooks for the global economy from four key sources: (A) Global Insight, as US company engaged primarily in economic forecasts for the US market and other key global markets; (B) Project LINK (a joint project of the UN and University of Pennsylvania); (C) The World Bank, and (D) the International Monetary Fund. Others sources include the big investment firms in the US.

The global economy, and particularly the US economy, has a major impact on global economic trends with respect to exchange rates and short-term and long term interest rates, growth, unemployment, excess production capacity and more. Economic Model's databases are currently directly connected to Global Insight's databases and outlooks, and it uses them as the basis for its long- and short-term outlooks. Economic Models represents Israel in Project LINK, which provides outlooks on global economic trends and international trade. The outlooks are performed by connecting the economic models of key countries worldwide to a single model in a consistent and comprehensive system. This project, financed jointly by the UN and University of Pennsylvania, was established and is managed by Prof. Lawrence Klein, an economist and winner of the Nobel Memorial Prize in Economic Sciences.

The macroeconomic model

The key model used by Economic Models is the macroeconomic model developed to provide estimates and forecasts related to the main characteristics of the economy. The model provides an outlook for development of GDP, salary and employment in various industries, components of private consumption and savings, and the breakdown of investments by type and industry. The model lists the items in the Israel's balance of payments and foreign trade components.

It includes 1,000 equations, which represent a wide array of fields in the economic. It was created and is maintained through AREMOS, Global Insight's proprietary software that includes a sophisticated graphics system and enables immediate solutions for complex mathematical problems.

The macroeconomic model is a model of a real economy, in which the GDP is influenced by demand on the one hand and feasibility of production of negotiable products for export and the local market, on the other hand. The GDP in Israel, which is a small and open economy, is influenced by limitations on the supply side. The uniqueness of the model is its high level of detail (15 industries). This enables detailed analysis of the system of production in the Israeli economy. Special emphasis is placed on the technology industries (electronics and software, chemistry, transportation vehicles, and equipment and machinery). At the same time, demand is also divided into numerous secondary uses, which facilitates analysis of the impact of structural changes in demand on structural changes in the sectors of the economy.

The supply side is based on analysis of 15 key economic sectors. Each industry has a Cobb-Douglas production function with two production factors - capital and labor and a productivity factor. The cost for use of capital is determined according to the Users Cost of Capital equation, and is dependent upon the real interest rate, depreciation rate, corporate tax rate and prices of the investment assets. The ratio between the cost of labor and cost of capital determines the optimal ratio between the capital inventory and labor. The levels of demand and production determine the capital inventory needed the amount of labor required. Production is determined in the model endogenously and is dependent on the additional investments per employee.

The model assumes that existing capital inventory cannot be immediately adapted to the level demanded and, therefore, there is an adjustment process for the capital inventory. The difference between actual capital inventory in each industry and the inventory from the previous year (less depreciation) is the demand for gross investment in that industry, based on the production function. The total number of employees in the economy is derived from the total number of employees in the various sectors of the economy and the public sector. Unemployment is the difference between the civilian labor force (which grows according to the demographic model) and the total number employed in the economy.

Final uses: Private consumption is dependent on the size of the population, real national income per consumer with real salary and the relative price of each of the consumption groups relative to the derived price of the total expense for private consumption. Public consumption is a policy variable that is determined outside the model. The demand for investments is determined through optimization of the production processes. Residential construction is determined directly in the construction model, which is based on the housing inventory model. The demand for export is based on a system of behavioral equations that correlate actual exports in each industry with the growth forecasts of the global economy.

The demographic model

Another important model for Economic Models is the demographic model, which was developed to provide estimates and forecasts for development of the population by cross-sections of gender, age and population sectors. In addition to the population outlook, the demographic model also includes outlooks for the development of the number of households, labor force and rate of participation in the labor force.

Additional models

Other unique models, some of which were designed for the company's clients, are "offshoots" of the two main models. They include the demand for electricity, demand for energy and fuels, demand for vehicles, demand for residential housing, and forecast of loading and unloading of general cargo at ports, and more. Let us emphasize that the models are tailored simultaneously, with consideration of the interactions between the various forms of demand (vehicles, electricity, fuels, etc.) and between the outputs of the various industries in the macroeconomic model.

Energy and fuel demand model

The energy model estimates the development of demand for energy products in the economy according to the supply and price of energy sources available to the market. The model quantifies the development of anticipated market demand for energy uses and is based on industry demand equations for the industrial, construction, agriculture, transportation (land, air, sea) and electricity industries.

The model divides demand according to the various energy sources available to the market such as natural gas, petroleum products, coal and alternative energy sources. Additionally, the model provides an outlook for demand for the various petroleum products such as gasoline, diesel, kerosene, mazut, LPG and naphtha.

Demand for natural gas

The outlook for demand for natural gas according to a breakdown of electricity generation by production unit (coal, mazut, diesel, gasoline). This model also estimates demand for gas for industry, desalination and the Palestinian market.

Vehicle demand model

The vehicle demand model is a sectoral model that measures the demand for motor vehicles by type of vehicle and engine capacity. The model includes all types of motor vehicles: Private and commercial vehicles, trucks by total weight and buses. The demand equations are based on an inventory model that determines the demand for motor vehicle inventory as a function of their use for travel. The development of travel demand is derived for a series of variables such as income, population structure, vehicle and gasoline cost, engine capacity, etc. The model quantifies cross-influences of demand for the various motor vehicles (commercial and private vehicles).

Residential housing demand model

Was created at the beginning of the 1990s, at the start of the current wave of immigration, to enable development of an outlook for demand for residential housing. The model calculates the existing

residential housing inventory, while distinguishing between occupied housing and empty housing, and estimates the development of demand for residential housing in light of the development of economic variables (income and prices) and demographic variables (composition of the population and household growth rate).

Cargo model

The cargo model was designed to provide an outlook for total loading and unloading (in tons) of general cargo at Israeli ports. The model is fed from export and import forecasts that are derived from the macroeconomic model developed by Economic Models and therefore relies on the outlook for global economic activity, government policy, technological development, exogenous events (such as immigration) and more.

Food and beverage demand model

Based on expense flexibility according to a family expense survey, broken down by deciles over several years. The model facilitates detailed outlooks for various food products based on the parameters derived from the family expense surveys (income, age, sex, residence, population sector, number of children and more).

Demand for electricity

Analysis of the structure of demand for electricity by economic sector shows that there are significant differences in electricity demand trends between the various sectors. Therefore, the electricity demand model provides an estimate at a high level of detail for the economic sectors. This level of detail includes the following 32 equations:

The home sector: According to the main uses of the inventory of air conditioners, refrigerators, ovens, washing machines, water heaters, dryers, etc.

The industrial sector: According to a breakdown by the following main industries: mining and excavation, chemistry, electronics, food, textile, clothing, rubber and plastic, metal products, transportation vehicles, diamond and others.

The trade and services sector: By secondary breakdown into trade, transportation, financial services and others.

The public sector: By secondary breakdown into health services, education and others.

Other sectors: Agriculture, water pumping, exports to the Palestinian Authority.

The Structure of the Company's Models

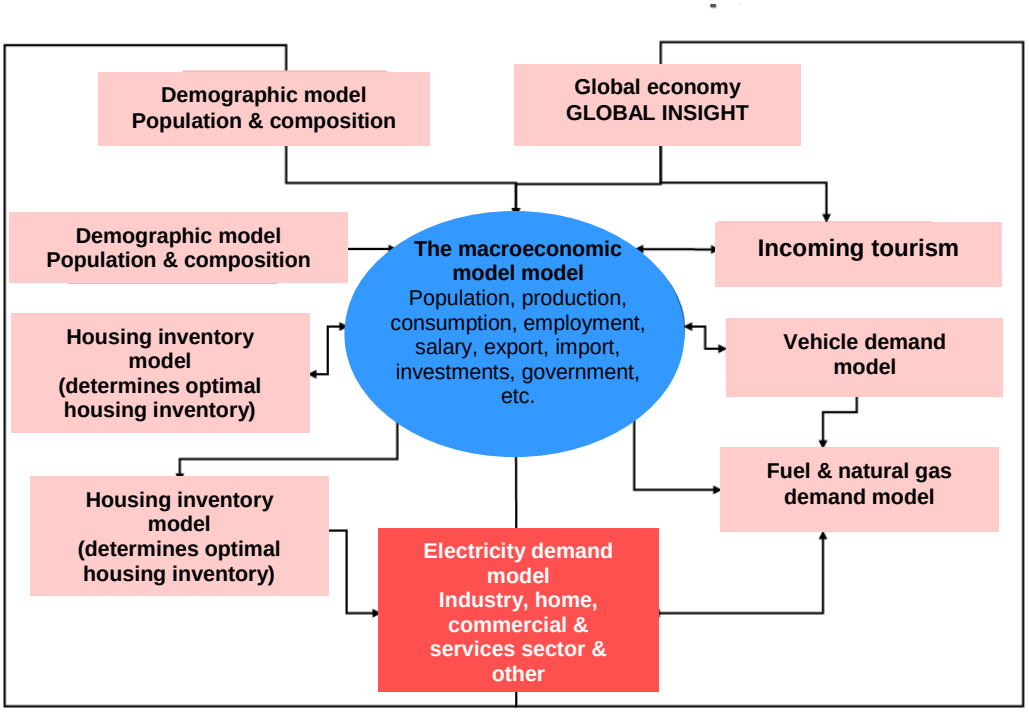
This level of detail is virtually the maximum possible with the data. Only when no good statistical correlations are found between the demand for electricity and indicators for a specific industry were the electricity data compiled into aggregated groups of industries.

The advantage of this level of detail is that it enables use of a unique activity variable for each sector, and the outlooks for development of demand for electricity in the sector are dependent upon the economic developments anticipated for this sector. As there is no reason to assume that all sectors of the economy will develop the same way, this disintegration offers greater precision in the forecasts.

The model is estimated quarterly, using weather data and other seasonal influences, as weather is a key factor in fluctuation of demand for electricity both at the quarterly and annual levels.

Please note that the electricity demand model is an integral component of the macroeconomic model of the Israeli economy. As a result, all scenarios are presented within a consistent macroeconomic system.

Structure of the Models Used by Economic Models



Management Team- DR. Yacov Sheinin

Personal information:

Degree: Ph.D.

Year of birth: 1947, Jerusalem

Married + 2, resident of Ramat Hasharon, Israel

E-mail: eml@modelim.co.il

Education:

- Ph.D. in economics, University of Pennsylvania. Specialization in econometrics and economic theory. Advisor: Lawrence Klein, winner of the Nobel Memorial Prize in Economic Sciences.
- MA in economics, Bar-Ilan University (1975).
- BA in economics and business administration, Bar-Ilan University (1969-1971).

Positions held:

1986 - present	Chairman and CEO of **Economic Models Ltd.** (an economic consulting firm).
1996 - present	Chairman of **Capital Market Models** (a financial asset management company).
1996 - present	Chairman of the Board and Chairman of the Investment Committee of **Mutual Fund Models Ltd.**
2012 - 2015	Chairman, **The Israel National Road Safety Authority** (a government agency).
1982 - present	Lecturer of economics at **Tel Aviv University** and **IDC Herzliya**.
2009 - 2013	Member of advisory forum to the **Minister of Finance**.
2003 - 2009	Vice Chairman of the Advisory Committee to the **Bank of Israel**.
2008 - 2009	Chairman of a committee for the **Minister of the Interior**, appointed to develop a formula for distribution of balance grants to local authorities.
2007 - 2008	Member and Chairman of a subcommittee for the **Minister of Industry, Trade and Labor**, appointed to examine the means for empowering the periphery and traditional industry (Makov Committee).
2004 - 2005	Chairman of the Public Committee for the **Minister of Transportation and the Prime Minister**, appointed to develop the National Road Safety Plan ("The Sheinin Committee").
1993 - 1997	Chairman of the Investment Committee of the provident funds managed by the **First International Bank of Israel**.
1976 - 1982	Senior Economist and R&D Director of US Macroeconomic Models at the consulting and forecasting company, **Global Insight** (a merger of DRI and Wharton Econometric Forecasting).
1971 - 1975	Economist and Senior Economist for a leading economic consulting firm at the time (belonged to Prof. Haim Ben-Shachar).

Management Team- DR. Yacov Sheinin

Professional Experience:

- Over 40 years of experience (7 in the US), as a manager of large and complex consulting projects, and designer of microeconomic and macroeconomic models.
- Lecturer at universities for over 40 years.
- Economic consulting to Israeli prime ministers and finance ministers since 1992.
- Expert on the Israeli economy and its economic sectors.
- Expert on the US economy and its main economic sectors, particularly the energy sector .
- Designer of detailed long-term macro-econometric model for the US economy.
- Designer of detailed long-term macro-econometric model for the Israeli economy.
- Long-term forecast of key indicators for the Israeli economy: demand for electricity, demand for natural gas, international cargo shipping, motor vehicles.
- Expertise in working with companies in the fields of energy, communications, aviation, integrated circuits, construction and defense industries.
- Expertise in performing economic valuations and feasibility studies for leading companies: Israel Chemicals, Delek Group, ELTA, Elite, Tower Semiconductor, Knafaim (El-Al).
- Expertise in preparing strategic plans: Clal Israel Group (merged into IDB), Israel Corporation, Israel Aerospace Industries, Israel Military Industries, Oil Refineries, Israel Discount Bank.
- Capital market expert. Over 20 years of expertise in the capital markets, both as the chairman of investment committees and as a macroeconomic strategist.
- Expert analyst for large publicly traded companies in Israel and the US.
- Extensive experience writing economic opinions for courts.
- Founder, developer and manager (since 1986) of Economic Models, an economic consulting firm engaged in a very wide array of economic issues, including macroeconomic and industrial forecasts for the Israeli economy, feasibility studies,economic valuations and business plans for Israel's most prominent companies.
- Founder of Capital Market Models Ltd. in 1995, an investment house for management of financial assets.
- Founder of Mutual Fund Models Ltd. in 1996, a company that manages 11 mutual funds.
- Expertise in road safety since 2004. Chairman of a committee appointed by the Minister of Transportation to draft the National Road Safety Plan (Sheinin Committee). Submitted recommendation to the government to establish the **Israel National Road Safety Authority**. The report was accepted in full by the late Prime Minister Ariel Sharon's government, legislation in Knesset (2006) and enactment of the **National Road Safety Authority Law** and the **Authority** itself. Chairman of the **National Road Safety Authority** since May 2012 untill 2015.

Management Team- DR. Rachel Sheinin

Executive Vice President, Economic Models Ltd.

Areas of Expertise:

Consulting on economic matters, the capital market, company analysis, feasibility studies, the Israeli economy and its various sectors, creating and implementing macroeconomic models and computerized databases.

- **One of the founders of Economic Models, Capital Markets Models and Modelim Mutual Funds**
- **Licensed by the Israel Securities Authority for marketing investments**
- **Member, Investment Committee - Modelim Mutual Funds**
- **Member, Appointment Review Committee (Shpanitz Committee)**
- **Writes an economic column in *Maariv***
- **Founder of the women's economic forum, *Thinking Economics*** http://econmind.co.il

Education:

Ph.D, 2002 - Economics, Tel Aviv University.

MA, 1989 - Economics, Tel Aviv University.

BA, 1985 - Economics and Art History, Tel Aviv University.

Professional Experience:

2011 - **Lecturer in economics, College of Management**

2011 - **Member, Appointment Review Committee (Shpanitz Committee)**

2009 - **Executive Vice President, Economic Models, Ltd.**

Vice Chairman of the Board - Capital Markets Models Ltd.

2002 - 2009 **CEO, Capital Markets Models Ltd.**

The company was founded in 1995. Investment boutique that serves as a practical mode for management of established and economic forecast-oriented investments.

1986 - 2002 **Senior Economist - Economic Models Ltd.**

The company was founded in 1986. One of Israel's leading consulting companies. Key activities: Assessment and analysis of trends in the Israeli economy, collection of information on the economic development of key countries worldwide and their impact on Israel, industry analysis, forecast of demand for key products, feasibility studies and business analysis as well as analysis and consulting related to the capital market