THE EFFECTS OF THE ECONOMIC CRISIS ON THE ELECTRICITY SECTOR IN TURKEY

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Abstract- One of the largest economies in the World, Turkey is an energy bridge between the energy demand of Europe and supplies of Caspian and the Middle East.The economic crises of the last two decades have also affected the electricity sector as well as the economy of Turkey.During the process of liberalization in Turkey's the economy,the electricity sector has been restructured. In this study, the effects of economic crises on electricity sector in Turkey areexaminedbased on the macroeconomic indicators.

KeyWords- Turkey,Electricity Sector, Economic Crisis.

I. INTRODUCTION

Turkey is the 17th largest economy in the World on purchasing power parity (PPP) calculations according to 2013 list of International Monetary Fund (IMF) and the World Bank. As regards international development indicators, Turkey is in the high human development groupofthe Human Development Index (HDI) and one of the upper middle-income countries of the World Bank, also placed in the group of developing countries of the IMF[1-4].

The economic crisisis forms of disruption to economic life, a key issue of macroeconomics. It is ultimately a state of difficulty, a dramatic change ineconomic activities, a serious moment for the whole economy, characterized bystagnation or decline in macroeconomic performance.Two theories exist that explain economic crises, internal and external theories. External theories consider the proposition that economic cycles originate in the fluctuation of factors outside the economic system, such as the occurrence of wars, revolutions and elections, the price of oil, the migration of populations. Internal theories deal with mechanisms within the economic system that make economic cycles self-generate. According to these theories, expansion fuels contraction and recession, while contraction triggers the expansion of recovery supplies - in a cycle that repeats regularly. On the result, an economic crisis is a phenomenon that has strong negative consequences on nations and institutions[5,6].

As a potential candidate country for European Union accession, Turkey is an energy bridge between the energy demand of Europe and supplies of Caspian and the Middle East[7]. In recent years, energy demand of Turkey has rapidly risen as a result of social and economic development. After the 1980s, the governments in Turkeyimplemented to instigate a free-market economy and the policies adopted public enterprise reform and privatization,

Historical progress of electricity sector in the world began with the concept of private ownership. Following the emergence of a state-owned structure and the establishment of vertically-integrated monopolies, with the influence of liberalization movements, the sector became private-owned again[8]. Meanwhile, the electricity sector in Turkey was undergoing similar, if slower, steps, imultaneously. The Turkish Power System has 64 GW installed capacity and generated 240 billion kWh in 2013[9]. Last year, the buyingvalueof the consumed electric energy in Turkey was about 40 billion dollars. This study is examined the effects of electricity sector of economic crisesin Turkey for the last 20 years.Especially, it is related to the macroeconomic indicators of the economy in Turkey.

II. THE ELECTRICITY SECTOR IN TURKEY

The Turkish Electricity Institution (TEK) was the establishedin 1970, as a vertically-integrated monopoly in charge of generation- transmission-distribution activities in Turkey. The monopoly of TEK was abolished in 1984, with law no.3096.With this law the right to conduct generation-transmission-distributionactivitieswas enacted to private sector companies. As a result of these efforts to regulate the sector, private sector investments, if limited, were realized in the 1984-1994 period. In 1993, in order to facilitate the privatization process, the vertically-integrated state-owned structure of the sector was split into two companies by the government. Two separate state establishments; an electricity generation and transmission company (TEAS) and an electricity distribution company (TEDAS), were founded. In 1994, law no. 3996 was enacted in order to develop the Build-Operate-Transfer (BOT) model; in 1997, law no. 4283 was enacted, which introduced the Build-Operate (BO) model, granting private entrepreneurs the right to establish, manage and own energy generation facilities. However, despite the efforts to deregulate the sector beginning in 1984, i.e. the implementation of different financial models such as BOT, BO and transferring of operation rights (TOR), expected results were not achieved. The Electricity Market Law (EML), which was passed on

to the Turkish Parliament by the government as a result of political, economic and social developments, became operative on March 3rd, 2001. After the enactment of the EML, the sector was restructured with the separation of the vertically-integrated formation. Generation and transmission activities were vertically separated; leading to the establishment of Electricity Generation Co. Inc. (EUAS).
Turkish Electricity Transmission Co. Inc. (TEIAS)is the system operator and owner of all transmission facilities. The other one is Turkish Electricity Trading and Contracting Co. Inc.

(TETAS), which is in charge of all contracting and wholesale activities. In addition, distribution was also aimed to be vertically separated into two activities; power distribution and distribution with retail sale license. The Electricity Market Law (new EML) was revised on March 30th, 2013. The aim of the new EML isa stable and transparent market. Therefore,
it is to provide consumers adequate, secure, quality, continual,
cheap and environmental friendly electricity in competitive environment in accordance with provisions. The restructured electricity sectorhas been changing significantly, in the electricity market the level of competition has been increasing and more and more players have been entering into the market every day.In this period, the state-owned distribution companies were privatized. Fig.1 shows producers share in electricity generation in Turkey in 2013[9].

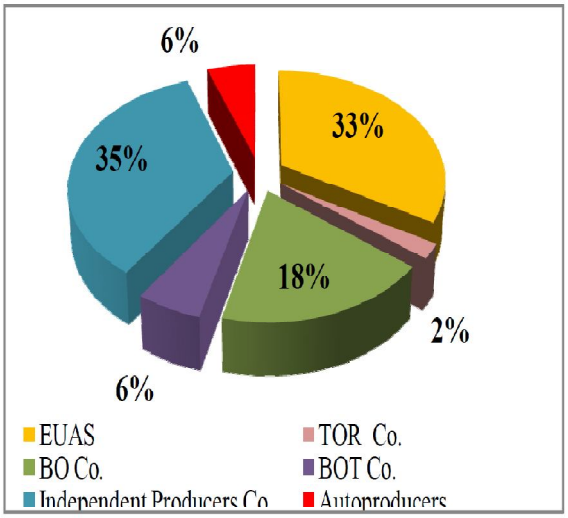

Fig.1 Electricity Generation by Producers in Turkey

In 1980, Turkey generated 23.2TWh electricity with 11.3 TWhhydroelectric power plants in the supply, while the country generated 240TWh electricity in 2013, with the natural gas an important primer energy source. According to IEA Key world 2014 statistics, Turkey ranks the sixth in the world with 45 billion m^3 natural gas imports[10]. Fig.2 shows primer energy source share in electricity generation in Turkey in 2013[9].

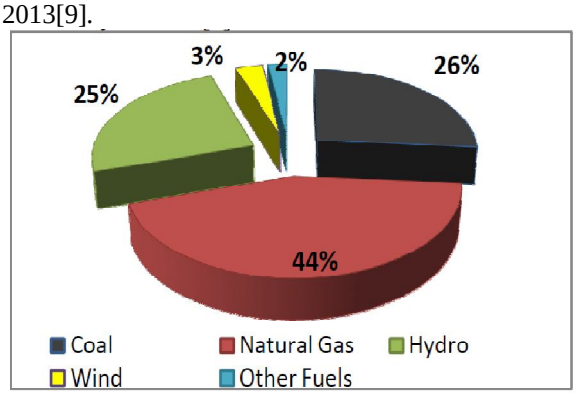

Fig. 2Electricity Generation by Fuel Type in Turkey

3The Economic Crises in Turkey

Considering the global effects;in terms of initial conditions and geographical origin of the crisis,there are clear similarities between the crises [6]:

- The Financial Panic of 1907,
- Great Depression in 1929,
- The Global Economic Crisis in 2008.

Economic crisis seem to have become the norm rather than the exception since 1990. The 1990s witnessed the near breakdown of the European Monetary System (EMS), the Latin-American Tequila crisis following devaluation in Mexico, the sudden problem in the fortunes of Asia, currency crisis in 2001, global turbulence in 2006 and most recently currency crisis "Global Economic Crisis" in 2008.
In last twenty years, Turkey has experienced several economic crises the most notable of which were those erupting in 1994, 1999, 2001 and 2008 [11].Fig.3 shows the change of GDP in Turkey between 1990 and 2013 years. The economic crises emphasizesin the depressions of the curve [12].

In early 1994, a post-liberalization financial crisis started,about a year beforethe Mexican crisis,with a sharp reversal ofnonresident capital flows by 12% of GDP. Theeconomy went into a deep recession as the liracollapsed, inflation and interest ratesreached three-digit levels.The crisis followed by another stabilization program that was supported with an IMF stand-by agreement in April 1994[13, 14].

The contagion effects of the Asian, particularly the Russian crises and a devastatingearthquake in 1999 pushed the economyinto a deep recession. The process brought about a protracted crisis in Turkey in 1998 and 1999.While a currency crisiswas averted over the turbulent years of 1998–99, the banking sector felt the squeeze fromtightened external financial conditions andcontraction in economic activity.Negative growth in these years, combined with an inflation of over 60%, led to the announcement of a "disinflation program",

accompanied by the 17th stand-by agreement with the IMF at the end of 1999 [13, 14].

In early 2001, the economic crisis erupted with the collapse of an exchange rate stabilization program.The interest rates rose sharply and the economy contracted at an unprecedented rate. In terms of also political and social effects, the crisis was one of the biggest that Turkey has experienced in the history of the Republic.The reaction to the 2001 crisis was not simply due to external structural conditions.The crisis of 2001 was particularly far-reaching in terms of its impact, resultingin a major collapse of output and employment.The economic crisis entailed significant political ramifications, with the ensuing elections effectively penalizing all the established political parties represented in Parliament. The crawling-peg system was ended to be replaced by a floating exchange rate system. Thus came in the 18th stand-by agreement accompanied by a sizeable IMF credit[14,15].

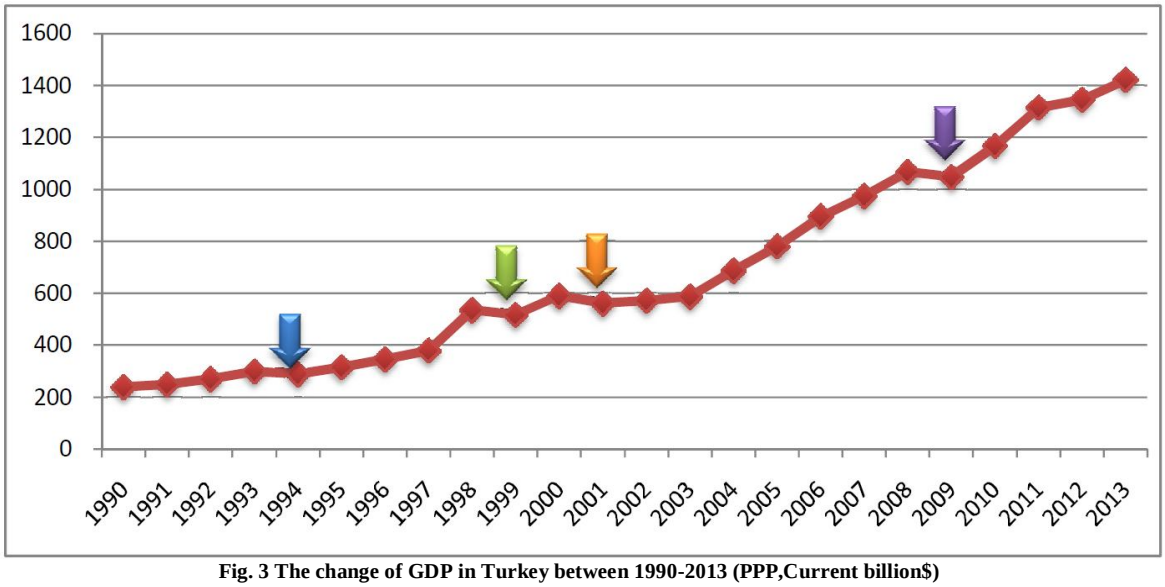

Fig. 3 The change of GDP in Turkey between 1990-2013 (PPP,Current billion$)

In 2008 with U.S. mortgage loans started and the whole world has affected in the short time.In the two years following the 2008 crisis, trade fell faster than during the first two years of the Great Depression[16].Turkey was one of the few countries to emerge from the global recession of 2008 relatively quickly.In the fourth quarter of 2009 the GDP growth was 5.9%. Therefore, the process of the crisis shortened the impact of the financial crisis in Turkey. The external conditions were not favorable at all in contrast to the 2001 crisis[17,18].

4The Macroeconomic Effects

An economic crisis affects the psychology and expectations of allconsumers.They can encounter with the risk of loss of their jobs or the diminishing income.The employed consumers face the uncertainty about being able to keep their jobs.The degree of uncertainty depends on the severity of crisis. Increasing uncertainty leads to a reduction in consumption, particularly in the consumption of discretionary goods.Consequently, consumers try to reduce their expenditures [17].

An economic crisishasdirectly or indirectlynegative impact on the macroeconomic indicators. There are the different macroeconomic indicators. Fig. 4 shows the changeof annual growth rate of GDP and electric power consumption between 1990 and 2013years[12]. The economic crises emphasizes on the curves.As shown in the graph, GDP growth rates are minus in all the economic crises. Theelectricpower consumptiongrowth rates in the 2001 and 2008 crises are minus. After the volatility in the economic crises, the Turkish economy recorded a relatively high and stable growth.

Although the electricpower consumption generally followed an upward trend over the period 1990 to 2013 some falls didoccur; consistent with the economic crises, a very marginal fall in 2001 and 2009. The except for 2004-2006 period, theelectricpower consumptiongrowth rates is aboveGDP growth rates.Before 2000, these differencesare approximately 1.5–2 times between two groups. After the crises,the economy recovered and attained high growth rates.The economy accelerated again to a 6 % rate of growth in 2001.

For the analysis of the whole period, Fig. 5 is presented[20]. The figure showsthe rate of industry sector in total electricity consumption and the capacity utilization rates between 1990 and 2013years. The rate of industry sector in total electricity consumptiongenerally followed a downward trend in the period. After 2000, the rate is under 50%.

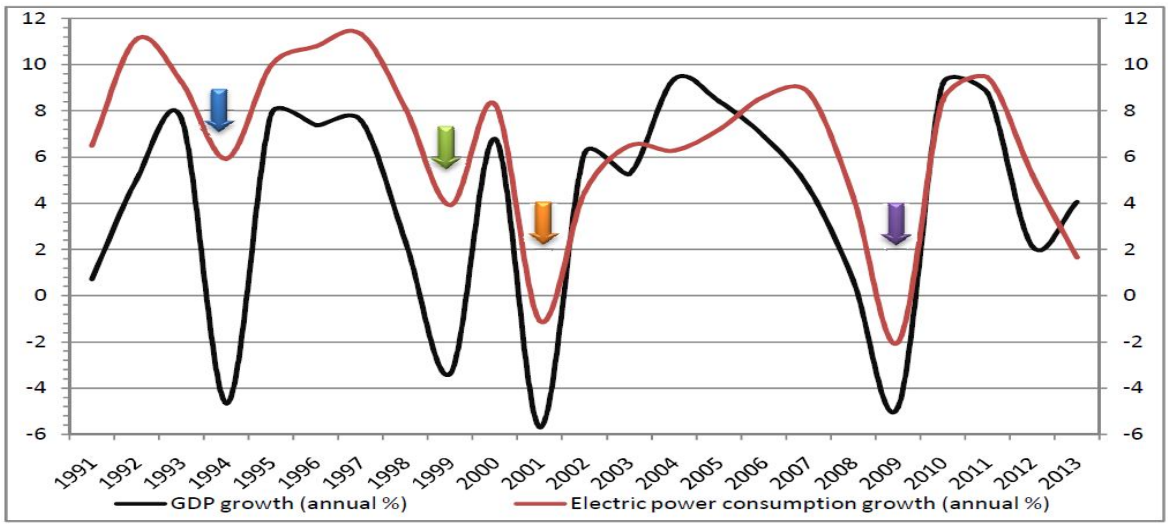

Fig. 4 GDP and Electric Power Consumption Growth Rate in Turkey 1990-2013

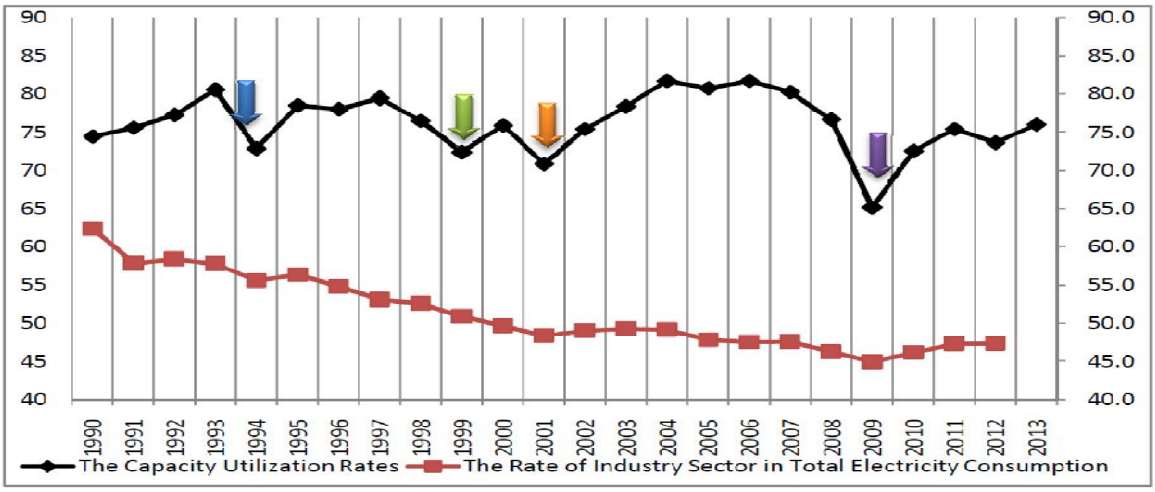

Fig. 5 The Capacity Utilization and The Rate of Industry Sector in Total Electricity Consumption in Turkey 1990-2013

Therefore, the relationship between theelectricpower consumptiongrowth ratesandGDP growth rates is changed. The difference is decreased. The capacity utilization rates aren't strongly marked with the rate of industry sector in total electricity consumption.

About the sector investment, it is presented Fig.6 [12]. The depressionsof the curve emphasize not only the economic crises but also political uncertainty and the legal loopholes.

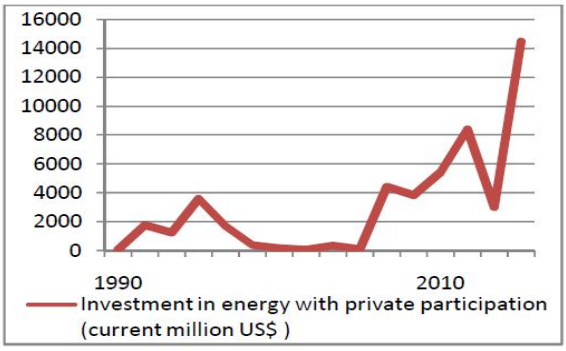

Fig. 6The change of investment in Energy with Private Participation according to 1990-2013

CONCLUSION

In the last two decades, the economic crises have also affected the electricity sector.Although the steady increase has declined in the crises years, the electric power consumption growth is mostly increasedexcept for 2008 and 2009. One of the important features,the rate of industry sector in total electricity consumptionis always decreasing in the period, except the crises years. In particular, the proportional relationship between GDP and the electric power consumption growth rate fell when the rate of industry sector in total electricity consumption is less than 50%. The changes of the capacity utilization rates are similar to the graphical structure with the growth rate of GDP. However, the relationship between the rates of industry sector in total electricity consumption and the capacity utilization rate are weakness. When restructuring of the electricity sector takesinto considering and with the realization of the transition to a fully competitive structure, indicators of the private sector participation and foreign direct investments need to revalue. The private sector

participation and foreign direct investmentswill contribute to interpret as a whole.

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