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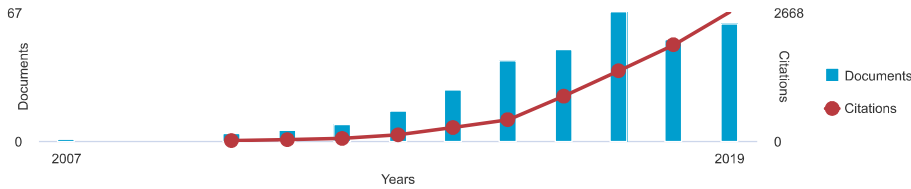
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Estimates of energy subsidies in China and impact of energy subsidy reform

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ABSTRACT

For a transitional economy such as China, some energy subsidies are reasonable, and sometimes even necessary for achieving social goals. However, with rising energy prices and environmental concerns, we see conflicts emerging between energy subsidies, energy demand/supply fundamentals and climate change considerations. Energy subsidies have important implications for sustainable development through their effects on energy use, efficiency and the choice of fuel source. This paper applies the price-gap approach to estimate China's energy subsidies. Results indicate that China's energy subsidies amounted to CNY 356.73 billion in 2007, equivalent to 1.43% of GDP. Subsidies for oil products consumption are the largest, followed by subsidies for the electricity and coal sectors. Furthermore, a CGE model is used to analyze the economic impacts of energy subsidy reforms. Our findings show that removing energy subsidies will result in a significant fall in energy demand and emissions, but will have negative impacts on macroeconomic variables. We conclude that offsetting policies could be adopted such that certain shares of these subsidies are reallocated to support other sustainable development measures, which could lead to reducing energy intensity and favoring the environment.

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1. Introduction

The rapid growth of China's economy has accelerated its energy demand, posing a difficult question about how non-renewable energy resources are to be efficiently used, given their scarcity. Wu (2009) indicates that energy price hikes could improve energy efficiency significantly. Thus, the energy price mechanism is at the core of energy reform, and energy subsidies are an important determinant of energy prices. There is some confusion about what an energy subsidy actually is. The narrow and perhaps most commonly used definition of an energy subsidy is a direct cash payment by a government to an energy producer or consumer. The broader definition is any government action that raises the price received by energy producers, lowers the cost of energy production, or lowers the price paid by energy consumers (OECD, 1998; IEA, 1999). In China, energy subsidies are mainly due to the fact that the government artificially holds the price of energy below the full economic cost of production.¹

Common reasons politicians give for justifying an energy subsidy include energy market failure caused by externalities; protecting a particular domestic industry against international competition; avoiding potential unemployment; and making modern energy services more affordable for specific social groups (UNEP/IEA, 2002). Therefore, governments, especially in developing countries, consider energy subsidies as an essential ingredient of macroeconomic policy, vis-à-vis social and environmental targets, as well as the internalization of any welfare losses resulting from externalities. For example: in the Czech Republic, energy subsidies amounted to \$7 billion between 1994 and 1998, where 80.3% of the total subsidies were given to fossil fuels; in Indonesia, the net economic cost of subsidies to kerosene, diesel, gasoline and heavy fuel oil amounted to \$4 billion in 2002; in Iran, the total value of energy subsidies in 2000 was roughly \$15.6 billion. Globally, gas, oil and electricity are the most heavily subsidized energy types, each receiving more than a quarter of total energy subsidies (UNEP, 2003).

Given significant social inequalities that seem to inevitably result from an economy's transitional friction (that is, transitioning from a developing to a developed country, and in China's case, from socialist to market-oriented), transitional energy subsidies could arguably be both reasonable, and to a certain degree, necessary (given the importance of energy in both consumption and production-input bundles). However, due to the rigidity and inertia of many subsidies in practice, along with institutional and political barriers, subsidies have not always been successful. In fact, energy subsidies have generally hindered the progress of energy price

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¹ As subsidies to renewable energy can promote renewable commercialization, and this is important for low-carbon development. Therefore, the impact of subsidies on renewable energy is different from that of fossil fuels. China's subsidies discussed in the paper only consider the subsidies on fossil fuels and electricity.



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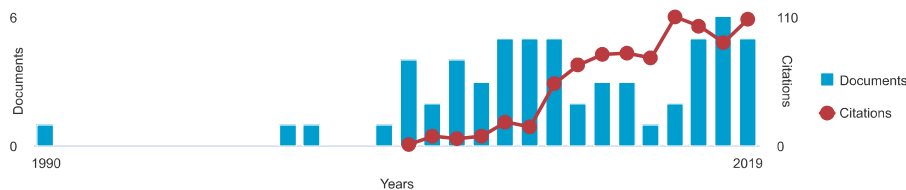
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An evaluation of the impact of reducing energy subsidies on living expenses of households

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Abstract

A policy of subsidizing energy has been pursued in the Islamic Republic of Iran to help the poor and to utilize the relative advantages of the country. But it has been realized that energy subsidy has led to market distortion and welfare loss. Hence, elimination of energy subsidy is considered as a crucial matter. Changes in energy policy are hindered by the uncertainty on the impact of reducing energy subsidy on the living expenses of population. In the present article the distribution of resources through energy subsidy is evaluated; and, the direct and indirect effect of eliminating energy subsidies on the living expenses is estimated with the help of an analytical tool that has been developed. It is then concluded that additional financial resources obtained from reduction of energy subsidies could be allocated for compensating the decrease in purchasing power of households. The results of analysis reveal that more egalitarian distribution of resources and helping the poor could be achieved through implementation of a progressive policy of social security that is supported by financial resources available from elimination of energy subsidies. © 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Energy subsidy; Gini coefficient; Iran

1. Introduction

Subsidization of energy has been pursued in Iran since early 1970s. Prices of energy carriers have been exempted from changes and expansion of energy sector have been mainly financed by the government. Oil export revenue has provided financial means of supporting increasing energy supply costs in the last three decades. Consequently, consumption of energy carriers has grown rapidly and primary energy intensity has increased from 17.2 boe/Mio.Rs in 1971 to 54.0 boe/Mio.Rs¹ in 1997, which corresponds to an average annual growth rate of 4.5%/a in that period.

Rapid increase in energy demand has necessitated expansion of energy supply system. But the national economy has faced severe condition in the last two decades due to costs of the Iraq's war in 1980s, high growth rate of population and low world energy prices in the mid 1980s and 1990s. Financing capital requirement of en-

ergy sector has, then, faced with difficulties. Therefore, promotion of rational use of energy and improving energy efficiency has been considered as the most important energy issue of the country since early 1990s. Public discussions in the course of preparing development plans concluded that the implementation of a policy of structural changes in the energy sector based on the elimination of energy subsidies would be a prerequisite for promotion of rational use of energy.

The issues of energy subsidies and their impact on the living standard of households will be discussed in the present paper. The fundamentals of the analytical tool for studying the impact of energy prices will be outlined in the following section and the results of its application shall be presented. Final part of the paper will be devoted to a discussion on the policy implications of reducing energy subsidies.

2. Impact of energy subsidy on the economy and living standard

Social discussions supporting subsidization of energy prices may be categorized in the following

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¹ boe/Mio.Rs is barrels of oil equivalent per 1 Million Rials (in constant prices of 1982).



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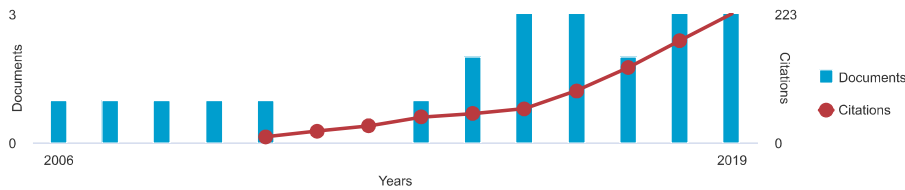
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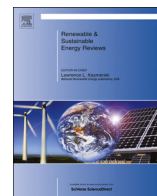
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Factors Affecting the Severity of Motor Vehicle Traffic Crashes in Tunisia	Belloumi, M., Ouni, F.	2019	SAE International Journal of Transportation Safety 7(1)	0
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Energy consumption, carbon dioxide emissions and economic growth: The case of Saudi Arabia

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ABSTRACT

This paper investigates the dynamic causal relationships between energy consumption, energy price and economic activity in Saudi Arabia based on a demand side approach. We use a Johansen multivariate cointegration approach and incorporate CO₂ emissions as a control variable. The results indicate that there exists at least a long-run relationship between energy consumption, energy price, carbon dioxide emissions, and economic growth. Furthermore, a long-run unidirectional causality stands from energy consumption to economic growth and CO₂ emissions, bidirectional causality between carbon dioxide emissions and economic growth, and a long-run unidirectional causality runs from energy price to economic growth and CO₂ emissions. In the short-run, there is unidirectional causality running from CO₂ emissions to energy consumption and economic output and from energy price to CO₂ emissions. Even though, the energy-led growth hypothesis is valid, the share of energy consumption in explaining economic growth is minimal. Energy price is the most important factor in explaining economic growth. Hence, policies aimed at reducing energy consumption and controlling for CO₂ emissions may not reduce significantly Saudi's economic growth. Investing in the use of renewable energy sources like solar and wind power is an urgent necessity to control for fossil fuel consumption and CO₂ emissions.

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1. Introduction

Energy use is essential to all economic activities and to human well-being. Lack of access to reliable and affordable modern energy represents a constraint to economic and social development in many parts of the world. By contrast, Saudi Arabia is from the countries

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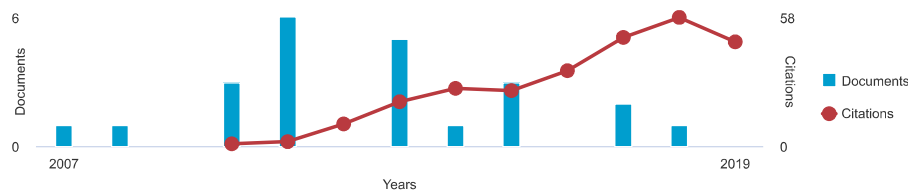
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Evaluating organizational change in health care: The patient-centered hospital model Open Access	Fiorio, C.V., Gorli, M., Verzillo, S.	2018	BMC Health Services Research 18(1),95	0
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The targets of state capitalism: evidence from M&A deals	Clò, S., Fiorio, C.V., Florio, M.	2017	European Journal of Political Economy 47, pp. 61-74	6



Electricity prices and public ownership: Evidence from the EU15 over thirty years



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ABSTRACT

This paper studies the impact of corporate ownership on residential net-of-tax electricity prices, when the ownership effect is separated from the liberalisation effect and from other drivers of change. After a discussion of a simple conceptual model, and of earlier literature, we use IEA and OECD data for the EU15 over nearly three decades. Panel econometrics suggests that, after controlling for other factors, public ownership is associated with lower residential net-of-tax electricity prices in Western Europe. The impact of liberalisation on prices is smaller and more uncertain.

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1. Introduction

In the past two decades privatisation and liberalisation of network industries providing services of general economic interest, particularly in the energy sector, have been particularly significant in the European Union (EU).

In the 1990s the United Kingdom was the front-runner of electricity reforms, while, among the EU Member States, France has often been regarded as a country averse to moving away from public monopoly. In fact, in the last 20 years virtually all European countries have undertaken dramatic regulatory reforms of their electricity industries. Wide variations around a common policy trend can, however, be observed across countries, allowing us to assess the effects of the policy reform, and to study its effects on users.

A typical 'British-style' reform package has four main dimensions (see e.g. Helm, 2007; Newbery, 2000; Newbery and Pollitt, 1997; Pollitt, 2008; Rutledge, 2011): divestiture of public ownership; unbundling of the transmission network from generation and supply; price regulation by an independent office (usually in the form of price capping of certain services); and lifting of restrictions to market entry. According to some early views, price controls had to be considered as a transitory mechanism to protect the consumer before full liberalisation, so that only gener-

ally anti-trust vigilance was needed at the end of the process or only regulation of access to the network.

In general, the EU institutions have been strongly supportive of this reform approach, but more neutral on public ownership divestiture. Over the years the European Commission has proposed a number of important directives on the electricity sector, that push the Member States towards a homogenous pattern of regulatory legislation (see e.g. CEC, 2007). We want to test the "British-style" paradigm on empirical grounds, disentangling the effect of ownership from that of other regulatory dimensions and other shifts.

In this paper, we consider EU15 only, because data for the New Member States are less reliable, the time series are shorter, and privatisation and regulatory change from former planned economies is less comparable with change in industrial organisation elsewhere. We also limit our analysis to the electricity industry, a core public utility for most consumers. Government-owned providers of electricity were (and are) usually not loss makers in Western Europe, i.e. their average prices covered average costs (with a mark-up). In spite of cross-subsidies, comparison with pricing of private firms is more meaningful in electricity than in other sectors, where budgetary transfers may allow lower prices, e.g. public transport or water supply. Moreover, under market opening, public and private electricity firms actually compete for the same potential customers.

Our main research question is simple: Are consumer prices of electricity lower (after controlling for market opening, country and industry specific factors) in countries that implemented privatisation in the electricity industry? Previous empirical research shows that it is unlikely that there is a positive net benefit of a policy reform if consumers do

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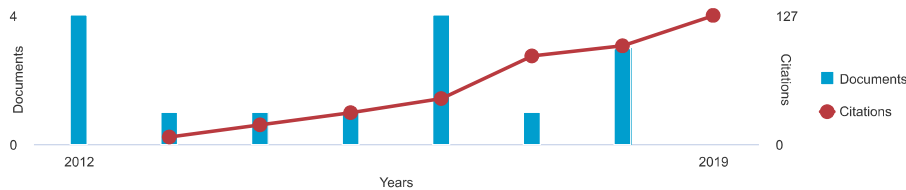
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Total, renewable and non-renewable energy consumption and economic growth: Revisiting the issue with an asymmetric point of view	Tugcu, C.T., Topcu, M.	2018	Energy 152, pp. 64-74	15
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Two versions of the Index of Sustainable Economic Welfare (ISEW) in the energy-growth nexus for selected Asian countries	Menegaki, A.N., Tugcu, C.T.	2018	Sustainable Production and Consumption 14, pp. 21-35	5
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Panel Data Analysis in the Energy-Growth Nexus (EGN) (Book Chapter)	Tugcu, C.T.	2018	The Economics and Econometrics of the Energy-Growth Nexus pp. 255-271	0



Renewable and non-renewable energy consumption and economic growth relationship revisited: Evidence from G7 countries

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ABSTRACT

The aim of this study is to investigate the long-run and causal relationships between renewable and non-renewable energy consumption and economic growth by using classical and augmented production functions, and making a comparison between renewable and non-renewable energy sources in order to determine which type of energy consumption is more important for economic growth in G7 countries for 1980–2009 period. Autoregressive Distributed Lag approach to cointegration was employed for this purpose. Also, causality among energy consumption and economic growth was investigated by employing a recently developed causality test by Hatemi-J (2012). The long-run estimates showed that either renewable or non-renewable energy consumption matters for economic growth and augmented production function is more effective on explaining the considered relationship. On the other hand, although bidirectional causality is found for all countries in case of classical production function, mixed results are found for each country when the production function is augmented.

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1. Introduction

Energy consumption and economic growth nexus is one of the most popular topics in the literature of energy economics (Ozturk, 2010; Payne, 2010). One of the reasons behind focusing on this topic is that energy consumption shows considerable promise understanding the role of energy consumption in economic growth. At the first glance, the link between energy consumption and economic growth is clear. However, the empirical outcomes of the studies which investigate the relationship between these variables are sometimes inconsistent with each other. According to Ozturk (2010), using different data sets, alternative econometric methodologies and different countries' characteristics are the main reasons of this conflicting result.

If one looks at the studies, it is seen that the relationship between energy consumption and economic growth is set around four different hypotheses (Apergis and Payne, 2009a, 2011b; Bowden and

Payne, 2010; Ewing et al., 2007; Lee, 2006; Ozturk, 2010; Payne, 2010; Soytaş and Sari, 2003):

- i) *The growth hypothesis* refers to a situation in which energy consumption plays a vital role in the economic growth process directly and/or as a complement to capital and labor. *The growth hypothesis* is supported, if uni-directional causality is found from energy consumption to economic growth. In this case, energy conservation policies aimed at reducing energy consumption will have negative impacts on economic growth.
- ii) *The conservation hypothesis* means that economic growth is the dynamic which causes the consumption of energy sources. The validity of *the conservation hypothesis* is proved if there is uni-directional causality from economic growth to energy consumption. In this situation, energy conservation policies which may prevent energy consumption will not have negative impact on economic growth.
- iii) *The feedback hypothesis* states a mutual relationship among energy consumption and economic growth. *The feedback hypothesis* is supported if there exists bi-directional causality between energy consumption and economic growth. In case of the validity of this hypothesis, energy conservation policies designed to reduce energy consumption may decrease

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