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INFLUENCE OF ELECTRICITY PRIVATIZATION ON THE LIVING STANDARD IN TRANSITION ECONOMIES

Introduction

Like many other former Soviet Union republics, by the late 1990s Moldova was facing a severe energy crisis. Entirely dependent on imported energy, the country found itself unable to pay rapidly rising international fuel prices. Debt to foreign oil and gas suppliers ballooned, and per capita electricity consumption plunged to the lowest levels in Europe (Figure 1). Per capita monthly electricity consumption in 2001 was about 51 kWh—just a quarter of the average consumption in Europe and Central Asia countries [*World Energy* …, 2003].

Residential energy tariffs remained low until 1998, and sector revenue no longer covered the cost of imports. The government subsidized tariffs and covered the debt, but consumers paid a price, too. Access was universal, but it was rationed, with many localities outside the capital receiving electricity just a few hours a day [Dodonu, 1999]. Power was often interrupted without warning.

To address the urgent problems in the sector, in 1997 Moldova launched a reform program, with strong donor support. In early 2000 the Spanish company Union Fenosa purchased almost two-thirds of the electricity distribution network, a highly visible privatization that made it the country's largest foreign investor. Since then, accusations, counteraccusations, and lawsuits led to a climate of uncertainty for continued reform. Union Fenosa electricity tariffs were about 10 percent higher than those

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of state companies, fueling concerns that the profit motive has left consumers, particularly the poor, worse off.

Some opponents of the reform argued that only the public sector, whose main operational objectives should be different from profit maximization, can provide equal and reliable electricity service in areas where maintaining electricity connections might actually appear uneconomic. Others were more afraid of being overcharged and of lack of control over the private companies due to a weak regulatory system.

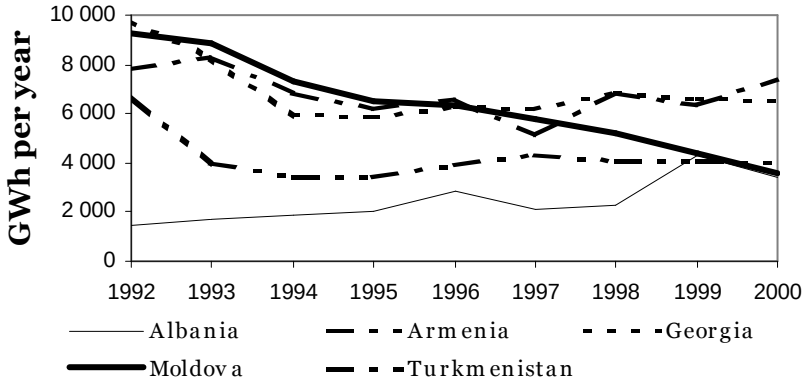

Figure 1. Electricity consumption in Moldova plunged between 1992 and 2000 (average total electricity consumption per year)
Source: International Energy Agency.

Proponents of the privatization claimed that it would make the electricity sector more efficient and financially stable, improve quality of the service, and bring strongly needed investments in infrastructure.

Based on the data for Household Budget Survey 1997-2003, this paper focuses on the residential sector and tries to answer the following two questions:

1. Did privatization hurt the poor?
2. Did privatization have different implications for residential consumers served by private and public power distribution companies?

First we analyze pre- and post privatization trends for various income groups using the following household welfare indicators: expenditure on electricity, consumption of electricity, and share of income spent on electricity. This should allow us to see if the poor benefited or suffered

more compared to the nonpoor from the new architecture of power sector. Second, we assess if household consumption patterns differed depending on the type of electricity provider to verify if concerns about private operator "squeezing" its customers were valid. As a benchmark for this test, we used two electricity distribution networks that remain state-owned, despite numerous privatization attempts.

Formerly a middle-income member of the Commonwealth of Independent States, Moldova is now the poorest country in Europe. In 2003 per capita Gross Domestic Product (GDP) in Moldova was $543, among the lowest in the Europe and Central Asia [*National Bank* …]. Over the past decade, in the face of decreasing opportunities and rising poverty, large numbers of Moldovans emigrated to find work abroad. Up to one quarter of the country's 4.2 million are estimated to have left the country [*Recession* …, 2004].

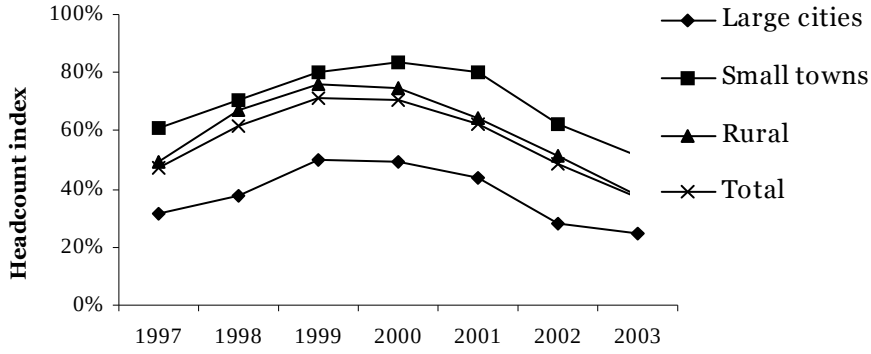

Figure 2. Absolute poverty has declined since 2000, although it remains high in small towns
Source: Moldova Household Budget Survey.

Following a promising beginning in the early 1990s, the Moldovan economy experienced a dramatic decline. In addition to deteriorating trade links, poor governance, and growing inflation, corruption had a corrosive effect on the economy. The war in Transnistria also contributed to economic decline. Although the conflict was brief, the central government, based in Chisinau, lost control over Transnistria, which now functions as a breakaway region, with its own government. This had further undermined stability of the power sector as a significant share of Moldova's electricity transmission and generation infrastructure, as well as a number of key industrial enterprises, located in Transnistria.

The economy has improved steadily since 2000. GDP expanded from $1.3 in 2000 to $1.9 billion in 2003 [*Moldova Country ...*, 2004], wages climbed, and inflation fell. Unemployment dropped from 11.1 percent in 1999 to 6.8 percent in 2002 [*Moldova's Economic*…, 2004], although it continues to be a leading cause of emigration [*Recession* …, 2004]. After several years of continuous economic growth, the poverty rate decreased considerably, from 71 percent in 2000 to 37 percent in 2003 [*Recession* …, 2004].

Despite visible improvements in the economy, residential electricity consumption remained very low as a result of poorly functioning power infrastructure and steadily rising tariffs. Monthly household electricity consumption in Moldova averaged 61–84 kWh between 1997 and 2003 (these figures are based on household-level data collected from the Household Survey and Union Fenosa databased), an extremely low level of consumption even if compared with other relatively poor countries in Europe and Central Asia (Table 1).

Table 1. Per capita electricity consumption in selected countries, 2002

Country	GDP per capita, PPP (current dollars)	Yearly electricity consumption per capita (kWh)	Average residential customer end-user price
Former Soviet republice			
Armenia	3,120	1,059	4.32
Estonia	12,260	3,499	5.16
Georgia	2,260	1,694	4.81
Kazakhstan	5,870	4,106	2.86
Kyrgyz Republic	1,620	1,442	0.92
Latvia	9,210	2,201	6.31
Lithuania	10,320	2,120	7.25
Moldova	1,470	612	5.47
Eastern and Central Europe			
Albania	4,830	1,008	3.97
Bulgaria	7,130	2,675	4.56
Croatia	10,240	2,809	8.34
Czech Republic	15,780	5,249	8.10
Hungary	13,400	3,199	7.98
Poland	10,560	2,586	8.54
Romania	6,560	1,894	6.70
Slovak Republic	12,840	5,319	6.23

Source: Energy Regulators Regional Association; World Bank.

The Soviet legacy left Moldova with a state-owned vertically integrated power sector, designed to provide reliable electricity to all house-

holds at little or no cost to consumers. Although state subsidized heavily electricity tariffs, payment discipline was strikingly low even before the reform commenced. This indeed had to change as the country embarked upon developing a market economy, particularly since energy prices increased sharply and investment in the sector was badly needed to prevent it from collapsing.

Importing more than 95 percent of its energy, Moldova is extremely vulnerable to fluctuations in world energy prices. About 30 percent of electricity is imported, with the remainder generated from gas and oil purchased from the Russian Federation and Ukraine (this number excludes Transnistria. Together with Transnistria, Moldova imports 30 percent of its electricity, with the remainder produced by Moldova GRES, located in southern Transnistria.). The movement of previously low Russian and Ukrainian gas and oil prices toward international levels contributed to the rapid accumulation of large debts ($300 million by 1995) by Moldenergo, the state energy company [*Project Appraisal…*, 2003]. Cash flow problems led to supply shortages and neglect of maintenance, resulting in scheduled and often unscheduled power interruptions and reduced quality of power service. With swiftly increasing energy debts, the government had no other choice but to launch an unpopular gradual transition to a cost recovery level tariff for electricity.

Moldova began power sector reform program in 1997, unbundling the state energy company into 16 different entities (generation, transmission, distribution, and debt-holding companies). A legal and regulatory framework was implemented, covering state regulation of generation, transmission, dispatching, distribution, and supply of electricity [*Implementation …*, 1998]. In 1998 an electricity law was passed and an independent regulator, the National Energy Regulatory Agency (ANRE), established to regulate gas and electricity. Debt was restructured and transferred to Moldtranselectro, a state-owned debt-holding company [*Implementation …*, 1996]. To mitigate the impact of rising tariffs for selected population categories, the government established a system of targeted compensations for energy use in 2000.

Electricity tariffs rose most rapidly compared to other types of energy, although prices for all energy products increased over the past decade. In 1997-2003 gas tariffs also increased, albeit not as rapidly as inflation. This, however, is likely to change given the recent jump in gas prices. At the same time district heating tariffs increased even more than electricity, but payments were well below 100% till 2005. In addition, the district heating system has collapsed in most towns: out of 36 urban cen-

ters that once had district heating, only 6 (including those in Chisinau and Balti – two largest cities in Moldova) still have functioning systems.

Rebalancing electricity tariffs to cost recovery levels laid the groundwork for eventual privatization of the distribution system, part of which was privatized in 2000. Five regional electricity distribution companies (REDs) emerged from the 16 unbundled entities. Three – RED Chisinau (serving the capital region), RED Centru (serving central Moldova), and RED Sud (serving southern Moldova) – were sold for $26 million in an open tender to the Spanish utility Union Fenosa, which also committed to invest $56 million in infrastructure rehabilitation over five years. The Union Fenosa service area covers 694,000 residential and 33,000 nonresidential customers (60 percent of Moldova's population) [*ANRE*]. Two regional distribution companies, RED Nord (serving the northern Moldova) and RED Nord Vest (serving the north-west region) – collectively known as the NRED – remain state owned.

In addition to tariff rebalancing, sector reform called for increased investment in infrastructure. Power infrastructure assets were decapitalized during the 1990s, as funds for maintenance and repairs dried up or were diverted. An ice storm in 2000 heavily damaged NRED power lines, poles, and transformers, and repairs appear to have been patchy. Since reform began, new investment in infrastructure has not been as rapid as planned. Union Fenosa covered only 38 percent of its investment commitments from 2000 to 2002 [*Ministry of Energy*]. Union Fenosa's delay in fulfilling investment commitments may be related to uncertainty in the investment climate. For a number of years a lawsuit was pending stemming from a review by the Court of Accounts alleging gross irregularities in the privatization procedure. Eventually the Court threw out the case, but the uncertainty may have discouraged capital investment.

As reform of the power sector was unfolding, service availability improved substantially. During the 1990s, system operators regularly interrupted electricity through rotating blackouts (load shedding and other measures to reduce consumption by disconnecting or reducing quality of power supply), primarily in small urban and rural areas. The number and duration of blackouts was dramatically reduced nationwide resulting in improved service in terms of power availability as well as quality. Once daily occurrences, blackouts became rare and were caused mostly by storms or scheduled repair work.

Methodology, data and results of researches

The quantitative analysis relies primarily on time series data from the Moldova Household Budget Surveys and records provided by Union Fenosa. The Household Budget Survey is a yearly survey of more than 6,000 households conducted since 1997 and is representative for three strata: Large Cities (Chisinau and Balti), Small Towns (other urban areas), and Rural areas. Data from the survey were compared with data provided by Union Fenosa to test the reliability of responses to questions about electricity consumption, billing, and payment. After a lengthy consultations and careful addressing of technical issues related to confidentiality of both utility and survey data, it was possible to identify Union Fenosa customers who participated in the HBS. Electricity consumption and expenditure indicators computed on these datasets were highly correlated, increasing confidence in the Household Budget Survey (Figure 3). Unfortunately, it was not possible to obtain household level data for NRED customers.

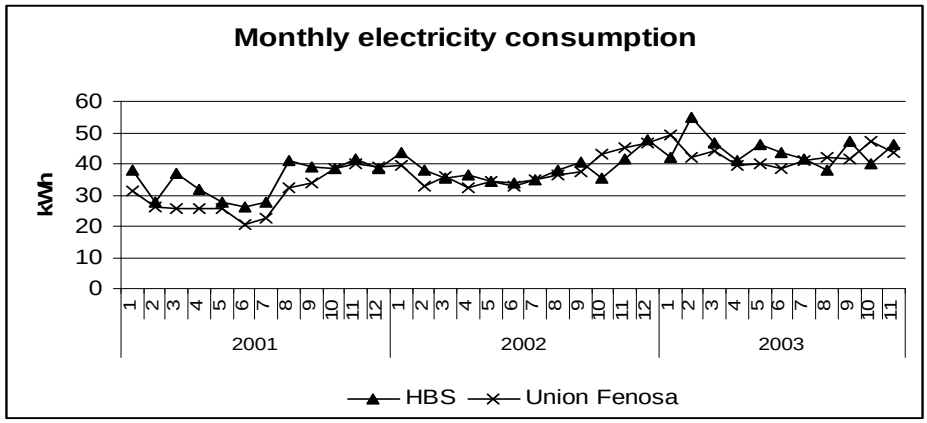

Figure 3. Monthly electricity consumption
Source: Moldova Household Budget Survey, Union Fenosa.

Relying on the Household Budget Survey also allowed using the similar household welfare estimates (household consumption) as those used in the poverty assessment. The only modification involves adding utility expenditure to household consumption, a category excluded in poverty assessment consumption aggregate. Three quantitative welfare indicators were examined - electricity consumption, electricity expenditures (payments), and share of electricity expenditures in income (where income is proxied by household consumption expenditures).

Better quality and reliability of electricity supply came along with tougher payment enforcement, which left many households cut off from the network. Union Fenosa reportedly disconnected 3.4 percent of its customers in 2003, while state-owned Northern REDs disconnected 0.4 percent of their customers. By 2003 collection rates reached 100 percent and in some cases even slightly exceeded this level (e.g. a portion of previously accumulated arrears was collected). This has an extremely important implication for our analysis. Electricity consumption is estimated based on expenditure and with 100 percent collection rate consumption patterns of various household groups are not contaminated by the non-payment rate.

The analysis covers a period between the beginning of 1997 (only half a year of data is available for 1997) and end of 2003. Three important limitations should be immediately noted as they have serious implications for empirical findings. The first limitation pertains to the reference period. Since households were asked to report their expenditure for the last month, in the beginning of the period they were likely to indicate payments that covered more than one month of consumption due to weaker bill collection enforcement. Second, only households which reported their electricity expenditure are included in the analysis, which could cause either upward or downward bias of the estimates, depending on the power consumption of not responding households. Third, since April 2000 different electricity tariffs were introduced in three privatized and two state-owned networks (Figure 4). In 2003 tariffs were about 10% higher for Union Fenosa customers, which probably created a stronger incentive for customers served by privatized networks to limit electricity consumption. Furthermore, starting July 1, 2002 NRED launched optional block tariff (0.5 lei for the first 50 kWh/month, 1.5 lei for the consumption exceeding this amount), while it was not offered to Union Fenosa customers. However, only around 10% of NRED residential clients used signed up for this optional tariff by the end of 2003.

To determine relative impacts of the reform for the poor, we create four income groups (poorest, poor, rich, and richest) by the three strata mentioned previously and examine trends over time. To answer the second question, we compare averages of selected indicators for customers served by Union Fenosa with those served by NRED.

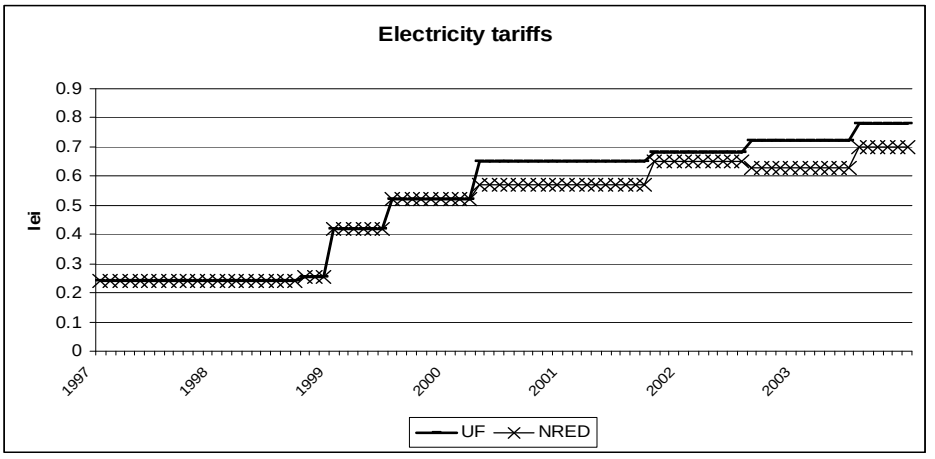

Figure 4. Dynamics of electricity tariff
Source: ANRE.

Did privatization hurt the poor? We first examine the trend in electricity expenditure for all welfare quartiles in three strata (Annex 2). Large Cities historically appear to have the highest expenditure levels. The post-privatization increase, however, was most significant for households residing in Small Towns and Rural areas, where mean expenditure more than doubled for all quartiles between 2000 and 2003. During the same period electricity expenditure in Large Cities grew by only about 50%. Since expenditure is a function of consumption and tariff levels, both of these factors have to be analyzed.

Despite rising power tariffs, monthly household consumption of electricity increased in all locations. That it increased the least in Large Cities (Annex 3) is consistent with expectations since, as mentioned earlier, providing a reliable supply to the population centers was a top priority even during the peak of the energy crises. Consumption trends were quite different for households in Small Towns and Rural areas. After a systematic decline until 1999, the year of de facto collapse of power sector, electricity consumption set on a track of consistent growth. Importantly, discrepancies in consumption between the poorest and the richest quartiles were increasing over time, indicating that richer households could afford to increase their consumption more than poorer ones in absolute terms.

This, however, should not be interpreted as disproportionately negative affect for the poor. First, between 2000 and 2003 consumption of the poor increased by more than 200% for the poorest quartile in Small towns and by about 125% in Rural areas (Annex 4). Second, the two

poorest quartiles were consistently showing the highest rate of growth in consumption, e.g. the largest increase in relative terms. Though, it should not be forgotten that electricity consumption remains extremely low in Moldova in general, and especially in the poorest quartiles.

The two poorest quartiles were spending consistently larger shares of their income on electricity compared to the richer ones in Large Cities and post-privatization Rural areas, while in Small Towns the patterns for were surprisingly similar for all quartiles till 2002 (Annex 5). More importantly, the differences between shares of the poorest and the richest quartile seem to decline and narrow in Large Cities and Rural areas, reflecting convergence in terms of burden on household budget. The opposite is true for Small Towns, where the burden of electricity expenditure appears to increase for the poorest households.

To better understand the reasons for growing electricity expenditure shares in Small Towns we need to look at electricity consumption (Annex 4) and changes in income (Annex 6). Income increased most in Small Towns and Rural areas, where nominal household consumption grew by about 150% between 2000 and 2003. In terms of income growth, it was somewhat slower for the richest households in Large Cities and Rural areas. While rate of growth of electricity consumption was higher than income growth for the two poorest quartiles, the opposite was true for households in the richest quartile. Thus the increase in the budget shares spent on electricity in Small Towns by poorer households can be fully attributed to an upsurge of electricity consumption and not to a feeble income growth. This was possible due a significant improvement of service delivery. Perhaps even more importantly, this indicates that in relative terms Small Towns poorer households are willing to increase their electricity consumption more than nonpoor, although it requires larger proportions of their income to be spent on power.

Did privatization have different implications for residential consumers served by private and public power distribution companies?

We now examine the implications of privatization for residential customers served by different electricity providers – private company Union Fenosa and state-owned NRED. Household power expenditure did not differ considerably between Union Fenosa and NRED in all locations, except for Rural areas where NRED residential customers on average spend more than Union Fenosa clients starting in 2001 (Annex 7). Also, by 2003 Union Fenosa customers were spending a little more for the electricity in both Large Cities and Small Towns.

As it was mentioned earlier, post-privatization power tariffs were systematically higher in Union Fenosa networks. Although this could be potentially restricting factor, electricity consumption varied in a very similar manner for Union Fenosa and NRED customers in Large Cities (Annex 8). Furthermore, by 2003 customers in Union Fenosa Small Town areas reached consumption levels similar to those in NRED networks, a change in a historical trend.

Even though consumption increased in Rural areas overall, NRED customers seem to have benefited more in both absolute and relative terms (Annex 9). In absolute terms, the difference in average residential electricity consumption between NRED and Union Fenosa grew from 2 kWh in 2000 to 13 kWh in 2003. In relative terms, average residential consumption increased by 100% in NRED areas and only by 66% in Union Fenosa over the same period. Electricity consumption was growing more rapidly in Union Fenosa Small Town areas, reaching the highest rate of change among all three locations, while in NRED networks growth was less impressive, which suggests that the benefits of improved service outweigh the higher tariffs.

Though the strength of their impact is hard to test empirically, two factors are likely to have contributed to the observed electricity consumption trends. The first one is related to the natural incentives of private company and objectives set for the public utility. With the primary aim of commercial viability, Union Fenosa could have chosen to focus its initial wave of modifications on Small Towns instead of Rural areas due to a higher density of population, easier collection enforcement, lower levels of required infrastructure investments, and higher average household consumption. It is not to say that Rural areas were neglected, but rather that this might have been a strategic choice. NRED probably experienced a strong external pressure to provide equitable access to the service, irrelevant of the costs. As the situation in Small Towns was relatively better than in Rural areas, it was possible to devote more resources to the improvement of service in Rural areas.

The second factor is the level of power infrastructure development. Two state-owned NRED inherited an undoubtedly better developed infrastructure than “Center” and “South” networks of Union Fenosa. This is, in fact, reflected by more stable consumption levels in NRED areas, particularly in the years preceding privatization. Notably, Union Fenosa initially intended to purchase only “Chisinau” distribution network, but was pressured into a package sale of best performing “Chisinau” plus “Centru” and “South”, networks considerably less developed and most severely hit by the lack of maintenance in investments.

The shares of household budget spent on electricity are fairly similar in Union Fenosa and NRED areas (Annex 10). They seem to converge in Large Cities and Rural settlements, but diverge in Small Towns. The explanation for this is in a swifter change of residential electricity consumption in comparison with total income growth (Annex 11). On average, household consumption of electricity in Small Towns grows faster than total income in the areas served by Union Fenosa, while this does not hold for NRED. Consequently, the gap in electricity consumption between Union Fenosa and NRED customers disappeared.

Conclusions

Despite rising power tariffs, monthly household consumption of electricity increased in all locations, but it grew more quickly in absolute terms for rich households. This, however, should not be interpreted as disproportionately hurting the poor. First, between 2000 and 2003 consumption of the poor increased by more than 200% for the poorest quartile in Small towns and by about 125% in Rural areas. Second, two poor quartiles were consistently showing the highest consumption rate of change, e.g. the largest improvements in relative terms.

In addition to increasing electricity consumption, differences between shares of the poorest and the richest quartile seemed to decline and narrow in Large Cities and Rural areas, reflecting convergence in terms of burden on household budget. The opposite was true for Small Towns.

A larger increase in the budget shares spent on electricity in Small Towns by poorer households is found to be fully attributed to an upsurge of electricity consumption and not to a feeble income growth. Most importantly, this indicates that in Small Towns poorer households are willing to increase their consumption at a faster rate than nonpoor, even though it requires larger proportions of their income to be spent on power.

In spite of systematically higher tariffs in Union Fenosa networks, electricity consumption varied in a very similar manner for Union Fenosa and NRED customers in Large Cities. Breaking a historical trend, customers in Union Fenosa Small Town areas reached consumption levels similar to those covered by NRED in 2003. Even though consumption increased in Rural areas overall, NRED customers seem to have benefited more in both absolute and relative terms.

The burden of electricity expenditure on household budget is fairly similar for households in Union Fenosa and NRED areas. In Small Towns, Union Fenosa customers appear to increase electricity consumption at a faster rate comparatively to those served by NRED. As a result,

the gap in terms of electricity consumption between UNION FENOSA and NRED residential clients disappeared by 2003.

Overall privatization brought positive outcomes to all population groups in Moldova, bringing back reliability and better quality of electricity service. In addition, it could have created two important positive spillovers. The first one is substantial performance improvement of state-owned utility. The presence and higher service standards of a private operator in the sector put pressure on the NRED to improve their performance as well.

The second probable positive spillover effect of privatization is related with a rapid remonetization of the economy. Similarly to the trends in Russia and Ukraine, the barter system was beginning to disappear in Moldova even before privatization. But it is likely that by refusing to engage in this highly inefficient but widespread method of in-kind payment, Union Fenosa hastened its demise in Moldova.

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Summary

In the article researches results of influence of electricity branch privatization on a living standard of the population in the large cities, small towns and in a rural are submitted by the example of Moldova.

Wpływ prywatyzacji elektroenergetyki na poziom życia w gospodarkach przejściowych

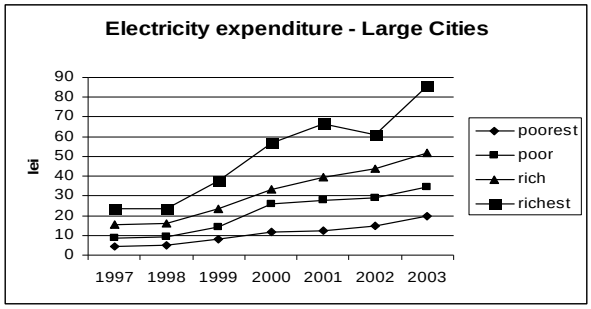
Streszczenie

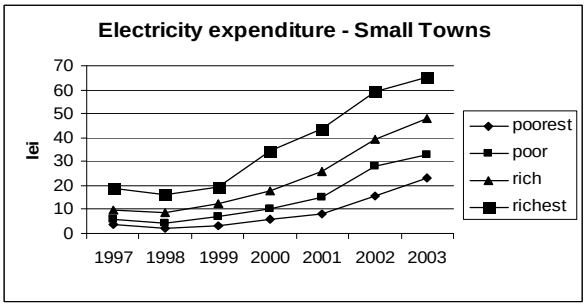
W artykule przedstawiono wyniki badań dotyczących wpływu prywatyzacji branży elektroenergetycznej na poziom życia ludności w dużych miastach, małych miasteczkach i w wiejskich miejscowościach na przykładzie Mołdawii.

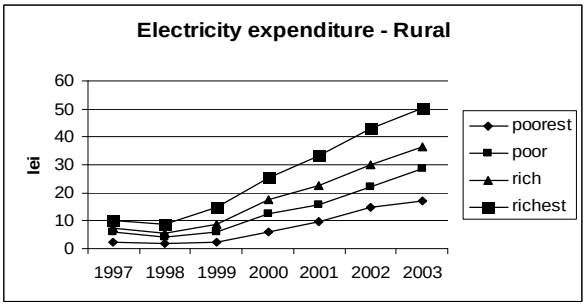
Annex 1. Frequencies of observation

OBSERVATIONS		1997	1998	1999	2000	2001	2002	2003
	Large Cities	279	367	337	352	356	353	340
	Small Towns	214	271	273	262	265	263	260
1	Rural	696	928	918	916	929	921	913
	Large Cities	280	361	342	345	346	336	326
	Small Towns	210	275	275	270	272	272	267
2	Rural	690	928	915	927	929	923	922
	Large Cities	286	366	338	341	340	325	334
	Small Towns	219	286	286	279	275	280	274
3	Rural	692	930	931	924	931	914	926
	Large Cities	295	373	342	333	331	315	323
	Small Towns	214	296	293	298	302	292	292
4	Rural	699	916	910	924	889	901	902
	Large Cities	1,140	1,467	1,359	1,371	1,373	1,329	1,323
	Small Towns	857	1,128	1,127	1,109	1,114	1,107	1,093
TOTAL	Rural	2,777	3,702	3,674	3,691	3,678	3,659	3,663
OBSERVATIONS								
	Large Cities	926	1,181	1,080	1,091	1,089	1,051	1,040
	Small Towns	426	560	559	546	549	543	523
UF	Rural	1,703	2,269	2,244	2,266	2,252	2,238	2,234
	Large Cities	214	286	279	280	284	278	283
	Small Towns	431	568	568	563	565	564	570
NRED	Rural	1,074	1,433	1,430	1,425	1,426	1,421	1,429
	Large Cities	1,140	1,467	1,359	1,371	1,373	1,329	1,323
	Small Towns	857	1,128	1,127	1,109	1,114	1,107	1,093
TOTAL	Rural	2,777	3,702	3,674	3,691	3,678	3,659	3,663

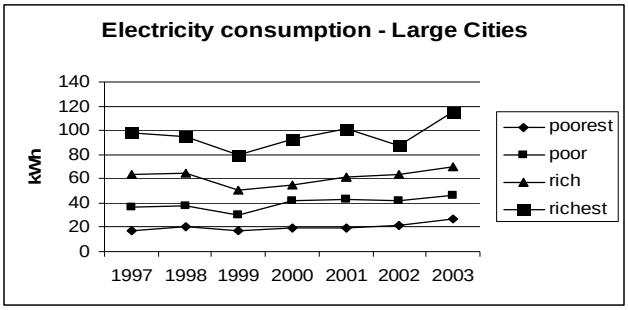
Annex 2. Monthly household expenditure on electricity: poor vs. nonpoor

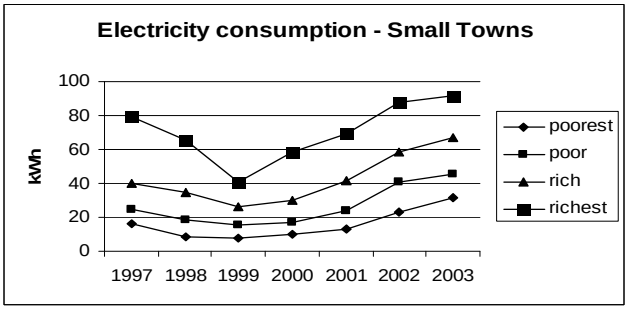


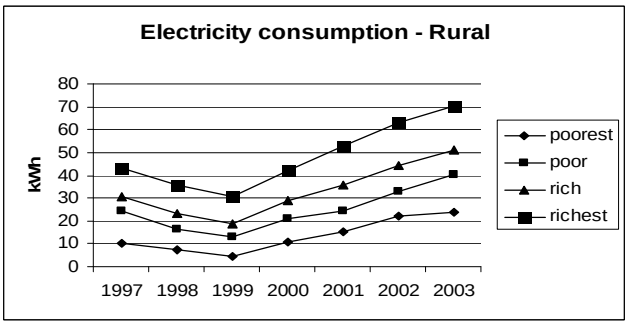




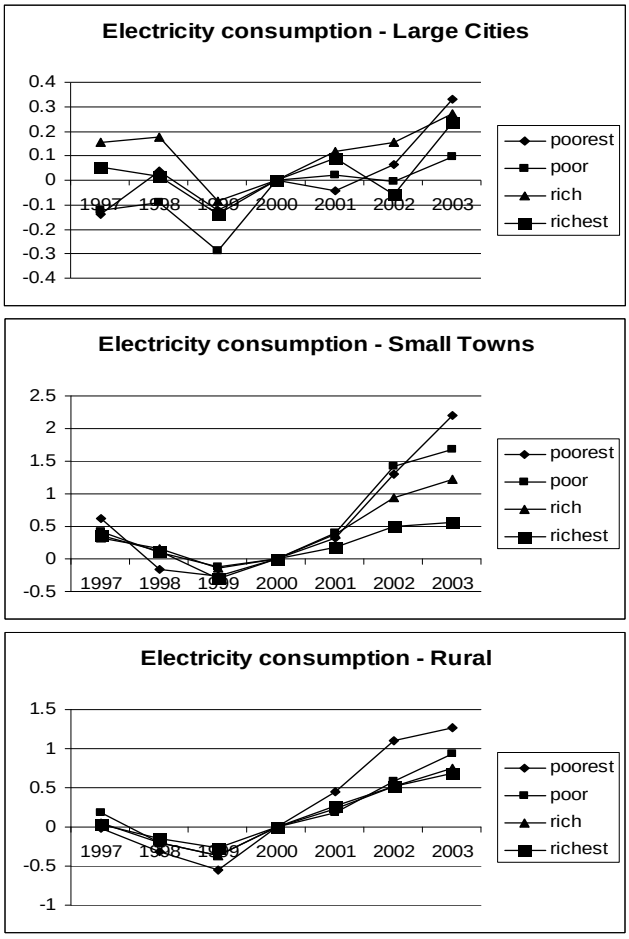
Annex 3. Monthly household consumption of electricity: poor vs. nonpoor



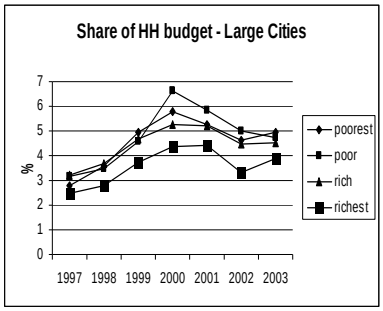


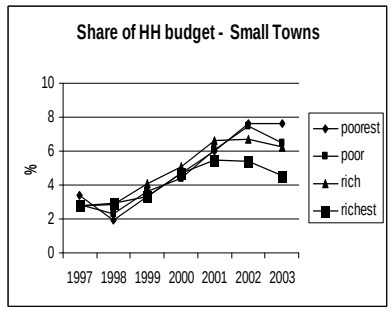


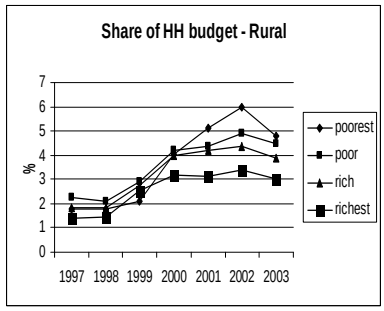
Annex 4. Change of household consumption of electricity: poor vs. non-poor (2000=100)



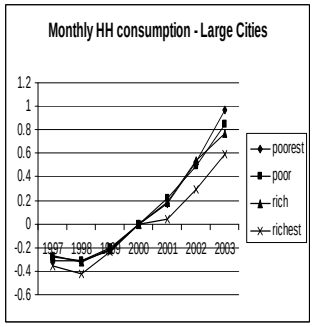
Annex 5. Share of spending on electricity in total household consumption: poor vs. nonpoor, (%)

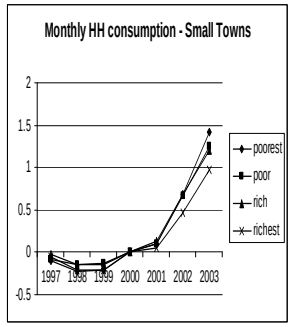


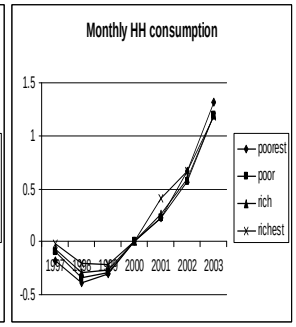




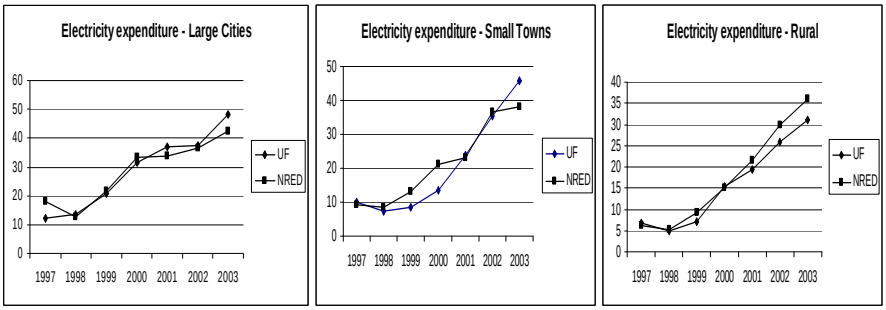
Annex 6. Change of nominal monthly household consumption: poor vs. nonpoor, (2000=100)



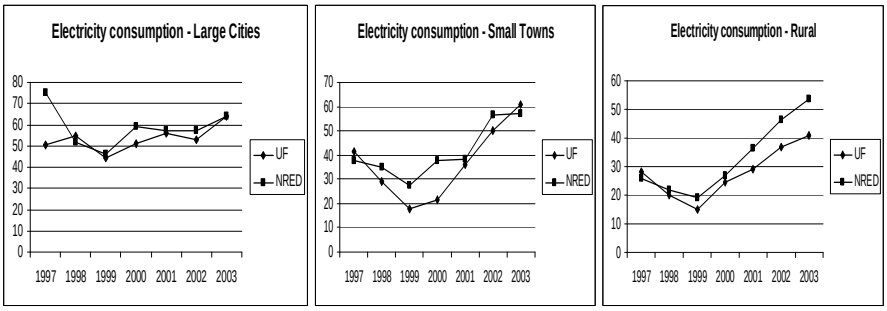




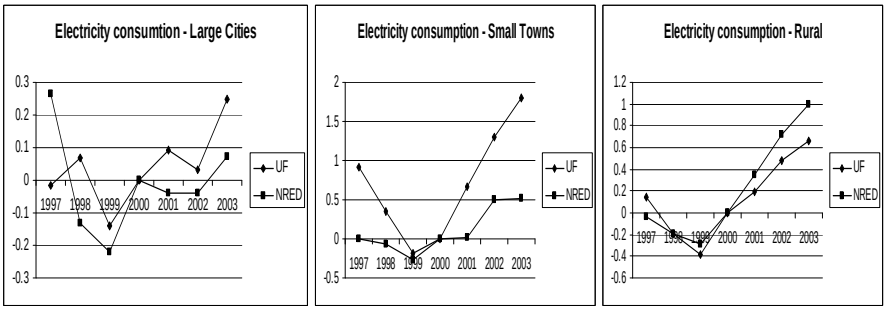
Annex 7. Monthly household expenditure on electricity: UF vs. NRED



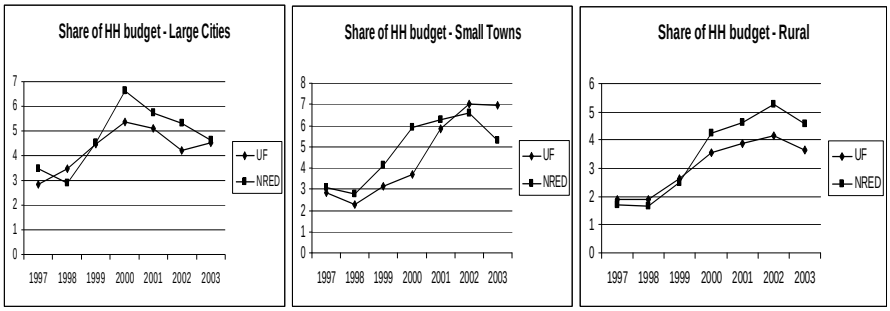
Annex 8. Monthly household consumption of electricity: Union Fenosa vs. NRED



Annex 9. Change of household consumption of electricity: Union Fenosa vs. NRED (2000=100)



Annex 10. Share of spending on electricity in total household consumption: Union Fenosa vs. NRED, (%)



Annex 11. Change of nominal monthly household consumption: Union Fenosa vs. NRED, (2000=100)