



Do energy prices converge across Russian regions?

Alisher Akhmedjonov*, Chi Keung Lau

Zirve University, Turkey

ARTICLE INFO

Article history:
Accepted 12 May 2012

JEL classification:
C22
O18

Keywords:
Russian energy markets
Price convergence
Non-linear panel unit root test

ABSTRACT

This paper tests for price convergence in Russian energy markets from January 2003 to October 2010. Monthly energy prices for four energy products (diesel, gasoline, electricity and coal) for 83 Russian regions are drawn from Russia's statistical agency Rosstat. The study contributes to the existing literature by using the Exponential Smooth Auto-Regressive Augmented Dickey–Fuller unit root test in a panel setup, which encompasses cross-section dependence. We find that there are no fully integrated national energy markets in Russia, possibly due to the peripheral position of diverging regions, unbalanced distribution of energy reserves and limited cross-border transmission capacity.

© 2012 Elsevier B.V. All rights reserved.

1. Introduction

In 1991, Russia's economy fell along with that of the Soviet Union. The Russian currency, the Ruble, lost its value. Certain goods were scarce, inflation rose, and living standards fell. Millions of Russians suffered severe hardships, including job loss and food shortages.

Since then, Russia's economy has been undergoing a difficult transition from a planned economy controlled by the state to a market economy based on private ownership. In 1998, Russia suffered a severe financial crisis. Thereafter, its economy picked up and has since shown strong and steady growth. The recovery was, in part, the result of reforms in banking, labor, and private property rules, followed by rising world oil prices. The economy made real gains of an average of 7.4% per year from 2000 to 2008, making it the 6th largest economy in the world in term of gross domestic product, adjusted by purchasing power parity.

Rapid economic growth in the 2000s and increased financial capabilities of government have enabled a more even spread of economic benefits between the Russian regions. Economic growth more than halved the income deficit and lessened its regional differentiation. All Russian regions reported a reduction of infant, maternal and child mortality due to increased financing of the healthcare system and other modernization. Regional gaps in these indicators also narrowed significantly. Cellular communications developed rapidly and spread from the center to peripheral areas: access to mobile telecommunications has increased more than five times and indicators of outsider regions have moved closer to those of the national leaders.

Between 2000 and 2008, Russia was able to halve its poverty. This resulted from economic growth, a significant increase in wage levels, especially in low-paid industries, and improved social support. According to the [2010 National Human Development Report for the Russian Federation](#), in 2000 the poverty rate was over 20% in all regions except for the two autonomous districts of the Tyumen Region specializing in the extraction of oil and natural gas. By 2008, there were only 14 regions with poverty rates over 20% (17% of the total number of regions in Russia). There was also an increase in the number of regions with less than 10% of the population below the poverty line: the two autonomous districts of the Tyumen Region, which have traditionally shown the best statistics thanks to high personal incomes and big budgets, were joined by the Tatarstan and Moscow regions. In the city of Moscow, the poverty level fell by 50% (from 24 to 15%) between 2000 and 2008 thanks to rising incomes and social support measures.

As the country moves toward a free market economy with strong market institutions, one might expect that price divergence across the regions of the country should give way to price convergence. This paper is concerned with testing for evidence of integration in energy markets in Russia from 2003 to 2010. In particular, using monthly energy prices for four energy types (diesel, gasoline, electricity and coal) drawn from [Russia's statistical agency Rosstat](#) (formerly Goskomstat), we test for whether there is evidence of price convergence in energy markets across all 83 Russian regions over a maximum of 94 months from January 2003 to October 2010.

Our contribution to the literature on price convergence is two-fold. First, most empirical studies on price convergence focus only on developed countries, and the literature on post-Soviet and transition economies is limited, mainly due to the lack of quality data. We fill in this gap in the research and empirically estimate the degree of

* Corresponding author.

E-mail addresses: alisher.akhmedjonov@zirve.edu.tr (A. Akhmedjonov), marco.lau@zirve.edu.tr (C.K. Lau).

price convergence in the Russian energy markets using panel data obtained from Rosstat. Second, and more importantly, it tests the convergence hypothesis using a nonlinear panel unit root test as advocated by Cerrato et al. (2009). This novel econometric technique is preferred in modeling price convergence both due to its sound theoretical base and estimation power. The results show evidence of price divergence in the Russian energy markets from 2003 to 2010.

The remainder of the paper is organized as follows. The next section provides a brief overview of the existing literature on price convergence and market integration, with special reference to Russia. Section 3 presents a theoretical and econometrical framework as well as the data used for the analysis. Empirical results are presented in Section 4 and Section 5 concludes the study.

2. Previous studies on price convergence

Differences in the price of a given product across regional markets can be interpreted as a signal of the degree of market integration in a general equilibrium sense: a shortage in one regional market increases the price, which then attracts suppliers from neighboring markets. The resultant increase in supply in one market and increases in price in source markets continues until the differentials are eliminated, net of transport cost differentials. Gibson and Smout (1995) identify four trends in a regional price series as a result of increased integration:

- 1) A increase in synchronicity of price movements for a given product across regional markets;
- 2) A decrease in synchronicity between products (e.g., between different energy products) for a given regional market as consumers are increasingly able to call on alternative supply sources of a given product rather than switching to a substitute;
- 3) A decrease in price volatility for a given product due to increased arbitrage;
- 4) A reduction in the price differential between regional markets until they represent nothing more than transport cost differences.

Indeed, Engel and Rogers (1996) and Parsley and Wei (1996) analyze US domestic market integration and find price dispersion among US cities to depend strongly on distance. Metin-Özcan and Kalafatcilar (2009) investigate relative price movements in Turkey. They suggest that these movements are explained by economic factors, including inter-sectoral productivity differences, transmission from the exchange rate, exposure to global competition and higher income elasticity of the services sector. Conway (1999), using data from 1993 to 1996 for three commodities, examines price convergence among four market locations within Kiev, Ukraine. He finds significant evidence of price convergence due to arbitrage by buyers and sellers at these markets, but sizeable and sustained divergences from the law of one price have remained as well. Cushman et al. (2001) examine the law of one price with 5 food prices over an 11-month period in Kiev during the early 1991 to 1992 period of Ukraine's transition to independence. They compare these prices with the prices of similar goods in the US. Cointegration between Ukrainian and US price time series with a (linear) trend is deemed as evidence of price convergence. Although the law of one price did not hold during the period, the commodity real exchange rates are found to have possessed deterministic trends that were in the direction of closing the initial considerable price gap.

Previous studies devoted to market integration in Russia do find evidence of diminishing price differences across Russian regions over time. With the use of a relationship between price dispersion and distances, Berkowitz and DeJong (1999) find that there is a cluster of regions, the so-called Red Belt, which accounts for a significant share of the market fragmentation; controlling for this, the Russian economy operates in some sense like a market economy. Gluschenko (2001) tests the Law of One Price across the West-Siberian regions over 1992

to 1998 with the use of cointegration techniques. The pattern obtained is mixed; both convergence and divergence of prices take place in this part of the Russian internal market.

Other studies show vast price divergence within the country. For example, Gardner and Brooks (1994) as well as De Masi and Koen (1995) examine the early stage of Russia's transition. They find large price differences across locations that could not be assigned to transportation costs. Gluschenko (2002) finds that, in December 1999, the cost of a basket of 25 basic food goods varied 1.7-fold across the regions of European Russia (without its northern territories): from 76% of the Russian average in the Ulyanovsk Oblast to 132% in Moscow. Spatial consumer price indices calculated by Surinov (1999) show that the dispersion range of the food price level across these regions was equal to 32% in January 1998 (Moscow vs. the Kaliningrad Oblast), and that of the industrial goods level was 62% (with the Smolensk Oblast and the Stavropol Krai as the low and high ends, respectively). This more closely resembles the pattern of an international economic union (e.g., Morgan, 1998 estimates food price differences across the Euro-zone as ranging up to 1.43) than the pattern of a single country. More recent work by Gluschenko (2004) suggests that the Russian market still is not near being completely integrated. He concludes that integration in Russia is spatially heterogeneous and difficult-to-access regions markedly contribute to the overall disconnectedness of the regional markets.

As we can see from the above, findings from the existing literature on price convergence in Russia are rather mixed and often inconclusive. Therefore, in the next sections of our paper, we investigate this effect empirically using an advanced empirical strategy, which is based on a sound theoretical base, to find out if prices on energy

Table 1
National aggregate average energy prices, 2003–2010.

Period	Diesel (Ruble/liter)	Gasoline (Ruble/liter)	Coal (Ruble/ton)	Electricity (Ruble/100 kWh)
2003 Q1	n/a	8.47	832.36	83.19
2003 Q2	n/a	8.57	857.39	85.51
2003 Q3	n/a	8.76	872.25	85.48
2003 Q4	n/a	9.29	904.05	85.65
2004 Q1	n/a	9.35	962.49	94.42
2004 Q2	n/a	10.03	1005.64	95.42
2004 Q3	n/a	11.34	1062.87	96.02
2004 Q4	n/a	12.59	1133.94	96.23
2005 Q1	n/a	12.43	1261.48	111.75
2005 Q2	n/a	12.87	1297.87	112.18
2005 Q3	n/a	13.61	1329.48	112.39
2005 Q4	n/a	14.51	1384.29	112.47
2006 Q1	16.71	14.79	1499.60	129.32
2006 Q2	16.71	15.00	1534.69	129.76
2006 Q3	17.17	15.82	1566.62	129.99
2006 Q4	17.26	16.12	1616.93	129.99
2007 Q1	17.19	15.99	1663.66	144.49
2007 Q2	17.17	16.11	1682.83	144.79
2007 Q3	17.28	16.38	1705.13	144.69
2007 Q4	18.44	16.92	1734.19	144.32
2008 Q1	20.72	17.92	1843.22	163.10
2008 Q2	22.92	19.68	1880.47	163.20
2008 Q3	25.56	21.41	2000.38	163.51
2008 Q4	23.30	19.52	2185.64	163.63
2009 Q1	20.50	17.15	2466.28	203.15
2009 Q2	19.07	16.87	2471.39	203.21
2009 Q3	18.95	19.37	2476.68	203.91
2009 Q4	19.06	19.97	2505.35	203.91
2010 Q1	19.50	19.59	2585.89	226.40
2010 Q2	19.67	19.93	2606.82	227.13
2010 Q3	19.80	20.13	2657.72	227.61
2003 Q1–2010 Q3:				
% change	18.50	137.59	219.30	173.62
% annual growth rate	3.45	11.42	15.62	13.41

Source: authors' calculation based on price series published by Rosstat.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات