***USING PANZAR-ROSSE MODEL FOR SELECTING ELECTRICITY MARKETS REGULATION TOOLS: THE CASE OF RUSSIAN WHOLESALE ELECTRICITY MARKET***

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## Overview

## There are wholesale and retail electricity markets in Russia. We considered a part of wholesale market, where elecrtirical energy trades. This part of wholesale market divided into free flow zones (ZSP), inside ZSP electrical energy can be transferred in almost any volumes, between ZSPs electricity transmission volume is limited. We supposed that competition level vary among ZSPs and the same regulation tolls produce different results. Testing this hypothesis included 2 stages. At the first stage we shared all ZSPs into two groups by their competition levels using Panzar-Rosse model and then, at the second stage, we analysed how price determinants affected prices in each group. Panzar-Rosse model was modifaed for electricity market: we used factors’ prices in separate ZSP, not for individual firms, because firms operate much generating facilities at different ZSPs and don’t distinguish costs by generating facilities at open access data.

## We find 2 important consequences: the competition level at wholesale electricity markets does not affect the competition level at retail market; price influencing factors act different at ZSP with different competition levels. So we showed necessity of finer policy tools tuning at different parts of wholesale electricity market to achieve the same overall market goals. We understood that situation with different competition levels at the parts of markets had origins in path dependence and plants allocation, so easy resolution is impossible.

## Methods

Graphical and econometric data analysis methods, including cluster analysis and panel data regresion analysis

## Results

## We find 2 important results: the competition level at wholesale electricity markets does not affect the competition level at retail market; price influencing factors act different at ZSP with different competition levels. Also we determined the influence of factors at price level in ZSP with monopolistic competition and with monopoly. The degree of costs influence differs by zones’ type, as well as relevance of costs differs. For example, wages influence on price only at monopoly ZSP. Cross-subsidy at electricity prices influences at both ZSP types, but influence of components of cross-subsidy differ. So the same regulation tool may lead to opposite results. So increase in share of non-price offers (hydroelectric power station or cogeneration plants) will reduce wholesale prices at monopoly ZSP and increase wholesale prices at monopolistic ZSP. So the same regulation tools can’t lead the similar results in each ZSP and regulation methods should be diversified for different ZSP.

## Conclusions

We demonstrated the applicability of Panzar-Rosse model for Russia wholesale electricity market. Our results in price determinant influenced by different ZSP types and our results corresponded to economic theory. We showed necessity of finer policy tools tuning at different parts of wholesale electricity markets to achieve the same market goals.

## References

Panzar, JC, Rosse, JN, 1987, Testing for monopoly equilibrium, Journal of Industrial Economics, V. 35, pp. 443-456