

EFFICIENCY OF ELECTRICITY MARKETS AND VESTING CONTRACTS

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Extended Abstract

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Abstract Summary

This study incorporates a volatility-based perspective through a Generalized Autoregressive Conditional Heteroskedasticity (GARCH) framework to compare price dynamics between Singapore and Australia. While Singapore's electricity market operates under a vesting contract regime designed to mitigate market power and stabilize prices, Australia relies more heavily on financial hedging instruments within a market featuring higher renewable energy penetration. This analysis provides insights into how different market designs and energy mixes influence price stability. This comparative perspective is particularly relevant for energy and electricity markets that are transitioning toward greater renewable integration, where managing price volatility becomes an increasingly important policy concern. For Singapore, both the baseline and ECM estimates show a negative and significant effect of vesting quantity on USEP, alongside a negative deterministic trend, indicating that vesting contracts reduce prices and that prices have declined structurally after controlling for key fundamentals. The GARCH(1,1) results are expected to reinforce this, with vesting quantity reducing volatility and persistence remaining high. In Australia, using a comparable specification without vesting variables, we expect weaker fuel-cost pass-through, a stronger role for VRE in driving volatility, and higher volatility persistence, reflecting its more liberalized and renewable-intensive market design, although greater market size and diversification may help absorb common shocks more smoothly. Vesting contracts appear to enhance market efficiency in Singapore by reducing both the level and volatility of the USEP. However, the comparison with Australia suggests that a liberalized, hedge-based market structure can achieve similar, or even greater, resilience through diversification and higher renewable penetration. This indicates that vesting contracts are only one of several policy tools. Improvements in Singapore's market efficiency may, therefore, depend on the further development of hedging markets alongside a more extensive integration of renewable energy, drawing on the experience of the Australian NEM.

Presenting Author Biography

Youngho Chang is an Associate Professor of Economics at the School of Business, the Singapore University of Social Sciences in Singapore. He specializes in the economics of climate change, energy and security, oil and economy, and the economics of electricity market. He has published his research output in various internationally referred journals such as *Energy Journal*, *Energy Economics*, *Energy Policy*, *Economic Modeling*, *Economics Letters*, *Empirical Economics*, *Resources Policy* and *Econometrics Journal*. He received his Ph.D. in Economics (Environmental and Resource Economics) from the University of Hawaii at Manoa, U.S.A.