



The productivity and efficiency of the Australian electricity supply industry

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Abstract

Australia's electricity supply industry has been through a period of reform over the last 10 years. The purpose of this paper is to analyse the changes that have occurred to the Australian electricity supply industry over the past 30 years, in order to evaluate to what degree these reforms have improved the productivity and efficiency performance of the industry.

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1. Introduction

Over the past 20 years, the Australian Federal and State governments have made considerable efforts to improve the efficiency and productivity of the electricity supply industry. Before 1991, the Australian electricity supply industry consisted of a series of state-based, government owned, mainly vertically integrated electricity authorities. Since the 1991 publication of the [Industry Commission's \(1991\)](#) report on energy generation and distribution, these entities have been broken up into their constituent parts (generation, transmission, distribution and retail): the majority of states linked into a national market, competition introduced into the wholesale electricity market, and retail competition introduced for large consumers. In two states, electricity assets have also been privatised.

The basic purpose of the restructuring and introduction of competition into the electricity supply industry has been to promote the more efficient operation of the industry, which in turn

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will lead to lower prices for electricity. The purpose of this paper is to use the data envelopment analysis (DEA) Malmquist approach to estimate total factor productivity (TFP) of the electricity supply industry, broken down into its state-based constituent parts over the long term (1969 to 1999). By looking at the long-term changes in productivity levels, it will be possible to get a more realistic view of the degree of change that has occurred to electricity industry productivity and efficiency that has been brought about by the restructuring that occurred during the 1990s. The paper is outlined as follows. In the Section 2, a description of the broad structure of the industry over the past 30 years is presented. Past studies are reviewed, the data employed and the estimation methodology are outlined in Section 3. The results are analysed in Section 4 and some conclusions are made in Section 5.

2. Industry structure

Between 1969 and 1990, the Australian electricity supply industry was dominated in each state by a single vertically integrated State government-owned authority or a collection of State government-owned authorities. These bodies were also responsible for regulating electrical safety of the industry in such areas. Under these arrangements, investment in the new generation was largely the responsibility of State governments and their electricity authorities. Electricity prices were set by the State governments and were designed to cover the industry's costs, plus any return required by them as owners. Often politically motivated cross-subsidies were built into price structures. The six main electricity supply companies for the six states were, respectively, the Electricity Commission of New South Wales, the State Electricity Commission of Victoria, the Queensland Electricity Commission, the Electricity Trust of South Australia, the State Energy Commission of Western Australia (included gas as well as electricity), and the Hydro-Electric Commission of Tasmania. With the exception of the States of New South Wales and Queensland, each company run a vertically integrated operation including generation, transmission and distribution of electricity. In New South Wales and Queensland, distribution was carried out by a series of local power boards. Moreover, the Federal Government operated the Snowy Mountains Hydro-Electric Authority as a purely generation company.

After 1991, State governments began working to restructure their electricity authorities, although the pace of this reform has varied across the different States.¹ The first state to introduce a wholesale electricity market was Victoria, which opened the Victorian Power Exchange in 1994. This was followed in 1996 when Transgrid began operating the New South Wales wholesale electricity market. These two major markets were subsequently joined and, in 1998, the National Electricity Market (NEM) commenced. The NEM is a wholesale market for the supply and purchase of electricity, combined with an open access regime for use of transmission and distribution networks in the participating jurisdictions of the Australian Capital Territory, New South Wales, Queensland, South Australia and Victoria. Two companies, the National Electricity Code Administrator Limited (NECA) and the National Electricity Market Management Company Limited (NEMMCO), were formed in March 1996 by the participating jurisdictions to implement the NEM. NECA supervises, administers and

¹ This process was initiated in May 1991 when the Industry Commission delivered its report entitled *Energy generation and distribution* which recommended a major restructure of the electricity industry by disaggregating existing utilities into generation, transmission and distribution components. It also recommended that each element be corporatised and a competitive market established.

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