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Metering and the principal–agent problem in restructured energy markets☆

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ABSTRACT

Metrology services, commonly known as the provision of electricity and gas metering, have traditionally been the domain of monopoly distribution network operators. Logic dictates that it is more efficient for a single entity to physically attend each home and business to read electricity and gas meters. However, when we tested this thesis in Australia's National Energy Market (NEM) by examining service quality and costs arising from the interaction between agent (monopoly distribution networks) and principal (energy retailers), we found a classic principal–agent problem. Service quality is poor, with one-in-13 meter reads being estimated or erroneous. We find NEM wide agency costs of $16 million per annum and deadweight losses of $118 million per annum being accumulated by principals, let alone what must be a much higher cost of consumer inconvenience. We establish that the regulatory framework, rather than asymmetric information, is the root cause of the problem and that a sound case exists for policymakers to review the entire metering framework to correct adverse implications for energy customers. This case is strengthened by the emergence of new metering and embedded generation technologies which are fundamentally changing the nature of consumer interaction with the energy industry.

1. Introduction

The principal–agent problem has long been established as a means by which to analyze situations where contracts exist between parties with different objectives or quantity and quality of information, dating back as least as far as Berle and Means (1932). Principal–agent relationships can create losses of allocative and productive economic efficiency as a result of the agent performing functions in a way that are not in the best interests of the principal. Agency theory notes that this situation can arise for a number of reasons including information asymmetry, split incentives and regulatory requirements amongst others (Murtishaw and Sathaye, 2006).

In this article, we argue that the definition of roles within electricity and gas metering has been an overlooked element of the reform process in the Australian energy industry. To date, reforms have focused on industrial organization and the establishment of a real-time wholesale energy market with an objective of increasing productive, allocative and dynamic

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efficiency — especially as it relates to wholesale prices and the allocation of scarce capital (Parer, 2002). Monopoly distribution network businesses were made responsible for traditional metering services at the household level through a prescribed regulatory framework underpinning the operation of the National Energy Market (NEM). The historic and dominant economic logic relates to the efficiency benefits of having a single entity physically attending properties in a street to read the mechanical meters. This logic is prima facie sound. But we believe that little attention has been paid to the costs that arise through the principal–agent problem that such a regulatory entitlement creates. Furthermore, the advent of digital metering and lower-cost embedded generation creates even greater impetus for policy change to ensure that the regulatory framework keeps pace with technological change.

In this article, we analyze data from AGL Energy Ltd's billing engine and Customer Call Centre, which at the time of writing services 3.4 million electricity and gas customers in the NEM. The period provided by AGL relates to a 12 month sample period of meter reads and translates to just over 16 million meter readings and 4 million customer telephone inquiries. Our analysis is structured as follows. Section 2 reviews industry structural reforms while Section 3 frames the regulatory responsibilities of electricity and gas network operators and energy retailers within the principal–agent problem. In Section 4, we analyze the service quality of electricity and gas metering and assess the transfer of costs between the principal and the agent. The prevalence of estimated and wrong reads is considered within Section 5 including estimates of inefficient intra-industry costs and costs to society as a result. Section 6 analyses completion rates of non-metering related orders raised by retailers and completed by distributors. Policy recommendations and concluding remarks are provided in Section 7.

2. Structural reforms

Australia's microeconomic policy agenda in the 1990s led to the structural reform of the electricity and gas industries.[3] Once vertically integrated and owned by the state, State Electricity Commissions disaggregated their power generation, transmission grid, distribution network and retail supply functions and in many cases these newly created businesses were privatized. The mid- and downstream gas industry was also divided on similar lines. However, the industry structural reform 'blueprint' from the 1990s bears little resemblance to industrial organization in 2014. Taking electricity as an example, the generation fleet and the transmission grid were structurally separated from the outset, but initially, franchise retail supply businesses were stapled to a host monopoly distribution network. This "retail-distributor model" was quite common at the time of reforms in the mid-1990s, with the British electricity market providing the template. Retail suppliers and monopoly distribution networks had a key characteristic in common — the customer meter. However, this was where the commonality generally ended. Distribution network companies, or 'pipes, poles and wires' businesses as they are often referred to, are regulated monopoly infrastructure investments characterized by relatively stable financial returns on a highly capital-intensive asset stock, involving a vast asset management and maintenance task with a focus on the efficient and reliable (physical) supply of energy to society. Energy retailers on the other hand are customer-focused marketing businesses, operating within a competitive environment with acute real-time energy commodity market exposures — the financial returns from which are dramatically less stable. Over time, all monopoly distribution network companies in the NEM divested their retail supply businesses due to the vastly different risk profiles and skills-sets required.[4]

For the purposes of our subsequent analysis, this structural history is quite important. When retail supply and monopoly distribution networks were stapled together at NEM commencement, no intra-industry principal–agent problem existed because any metering problems encountered by an integrated retailer–distributor would be resolved internally. And when customers first became contestable in the NEM, commencing with the very largest industrial consumers, retail suppliers could operate outside their franchise monopoly distribution network 'patch' without any real principal–agent metering issue because 'at the large end of town', remotely-read interval meters had long been the norm. Additionally, the meter reading services required to operate successfully in the early phases of retail contestability were 'contestable'. Meter Data Providers have clear contractual arrangements and a customer service focus and are engaged by the 'Financially Responsible Market Participant' under commercial arrangements. Households on the other hand had mechanical or 'dumb' meters, and physical attendance was required to read the meters. And it is important to note that Australia's microeconomic reform of the east-coast energy market preceded the development of relatively low-cost smart metering that exists today.

In the reform of any energy market, customer liberalization typically follows a carefully scheduled timetable to ensure an orderly transition from monopoly supply to contestability. Only the largest industrial customers are made contestable in the first instance. Then, typically 12 months later, medium sized commercial and industrial customers become contestable. Following this, small business would be liberalized. And then eventually, 'Full Retail Contestability' would be reached whereby all households were able to choose their retail supplier. In the NEM, this process commenced from the mid-1990s and was completed in Victoria and New South Wales in 2002, South Australia in 2003, and Queensland in 2007 (ESAA, 2008).[5] The adverse consequences of the principal–agent problem as it relates to customer metering can be loosely traced back to

[3] Structural reforms also involved horizontal separation of generation and retail.

[4] The two exceptions to this are Ergon Energy (due to its remote franchise customer base) and Aurora Energy in Tasmania. We note however that one recommendation in the 2011–2012 inquiry into the state of the Tasmanian electricity market recommended divesting the retail business.

[5] Tasmania has not yet implemented Full Retail Contestability although a process is currently on-foot (at the time of writing) with a view to removing the last customer franchise.

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