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## On the long-term impact price caps: investment, uncertainty, imperfect competition, and rationing



Thomas-Olivier Leautier<sup>1</sup>

*Toulouse School of Economics (IAE, IDEI, CRM), France*

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### ABSTRACT

Price caps are often used by policy makers to “regulate markets”, and have been found to have conflicting effects on net surplus. First, a price cap leads to rationing, which reduces the net surplus in the short-term. Second, under imperfect competition, which is precisely when price caps are required, imposing a price cap may lead to higher installed capacity in the long-term, which could then increase net surplus. To my best knowledge, this article is the first to examine the total impact of price caps on net surplus, combining their impact on rationing and on investment incentives. This analysis clarifies the difference between capacity- and surplus-maximizing caps, and provides a sufficient condition for the existence of price cap yielding higher net surplus than no price cap. On the simple example presented in Section 3, a price cap low enough to be politically acceptable reduces surplus compared to no price cap. Should further research confirms this finding for other specifications, the appeal of price caps for policy makers would be reduced.

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*E-mail address:* [thomas.leautier@tse-fr.eu](mailto:thomas.leautier@tse-fr.eu)

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## 1. Introduction

Price caps are widely used to limit exercise of market power in oligopolistic industries. In electricity markets for example, System Operators and policy makers impose caps on prices: in the US, the Federal Energy Regulatory Commission (FERC) issued in November 2016 Order 831 requiring each regional transmission organization (RTO) and independent system operator (ISO) to implement caps on power producers' offers.<sup>2</sup> Rent controls, in place in various jurisdictions, constitute a form of price cap (Glaeser and Luttmer, 2003). Natural gas prices were capped in the United States until 1989 (Davis and Kilian, 2011). Regulation of infrastructure, for example telecommunication and electric power networks, often relies on price caps. Prices of medical procedures and drugs are capped in many countries (see Dubois and Saethre, 2016 and their references).

Price caps have been extensively examined in the economic literature (reviewed next), and found to have conflicting effects on net surplus. First, a price cap leads to rationing, which reduces the net surplus in the short-term. Second, under imperfect competition, which is precisely when price caps are required, imposing a price cap may lead to higher installed capacity in the long-term, which could then increase net surplus. To my best knowledge, this article is the first to examine the total impact of price caps on net surplus, combining their impact on rationing and on investment incentives. This analysis provides new insights, discussed later in this Introduction.

The short term impact of price caps on net surplus is well understood theoretically and well documented empirically (see for example the introduction of Bulow and Klemperer, 2012). Caps reduce surplus through three channels. First, rationing: setting a price cap below the equilibrium price leads to excess demand which requires rationing. Second, allocative inefficiency: due to rationing, the good may not be allocated to the highest valuation users. Third, rationing may lead to rent-seeking behavior, such as queuing, lobbying, and search costs. Focussing on the first and second channels, Bulow and Klemperer (2012) derive sufficient conditions for a cap to reduce consumers surplus. Empirically, Glaeser and Luttmer (2003) examine allocative inefficiency due to rent control in New York, and find that “21 percent of New York apartment renters live in apartments with more or fewer rooms than they would if they were living in a free-market city”. Davis and Kilian (2011) estimate that the cost of allocative inefficiency attributable to price caps in the natural gas market “averaged \$3.6 billion annually, nearly tripling previous estimates of the net welfare loss to U.S. consumers”.

The impact of a price cap on output under imperfect competition has also been extensively studied, and differs depending on the setting considered. Suppose producers compete à la Cournot. If demand is deterministic, imposing a cap lower than the Cournot equilibrium price forces them to increase their output, since they cannot benefit from a price increase. This then increases the net surplus compared to no price cap.

<sup>2</sup> FERC Order No. 831, Offer Caps in Markets Operated by Regional Transmission Organizations and Independent System Operators, issued November 17, 2016.

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