



# Control of vehicle ownership and market competition: theory and Singapore's experience with the vehicle quota system

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## Abstract

This paper studies the impact of vehicle quota system on the market structure of Singapore's car distributorship industry. Using recently available data, we analyzed the populations and new registrations of different brands of passenger car and motorcycle. We found an increase in market concentration in the car distributorship industry, as the market shares of the top distributors have increased steadily, even though the annual growth rate of vehicle population is capped at 3% per annum. We also found that average dealership markups for passenger cars for the period August–September 2002 are similar to those reported in earlier studies. We relate these empirical findings to a theoretical model of a differentiated-good oligopoly operating under an industry sales constraint.

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## 1. Introduction

Singapore's success in controlling traffic congestion and in introducing revolutionary schemes—such as the area licensing scheme (ALS), the vehicle quota system (VQS) and the electronic road pricing (ERP) Scheme—to achieve this policy objective over the past three decades had been well documented (see Phang and Asher (1997), Toh and Phang (1997) and Willoughby

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(2001) for recent surveys). While the ERP scheme has its antecedent in the ALS scheme<sup>1</sup> and represents a sophisticated form of toll charging, the VQS remains the only kind in the world so far. Since its introduction in 1990, there had been a number of studies that assessed the mechanics, equity and efficiency of the VQS (among them, Phang (1993), Koh and Lee (1994), Chin and Smith (1997), Chu and Goh (1997), Chu (2002) and Tan (2001)). The VQS itself has also undergone a number of modifications; some of the major changes include: (i) the quota licenses were initially transferable but later made non-transferable following public outcry over speculative activities; (ii) a “weekend” car category was introduced in May 1991, but discontinued in 1994; (iii) the number of quota categories was reduced from seven to five in 1999; and (iv) the introduction of an open bidding format for quota licenses since July 2001.

This paper studies the impact of the VQS on Singapore’s car distributorship industry. While previous studies on the VQS had commented on the changing nature of market competition in the car distributorship industry, the limited availability of data on the sales, market shares and pricing policies of car distributorships prevented a more in-depth analysis of various aspects of the distributorship market. Using data recently made available by the Land Transport Authority of Singapore (LTA) on its website (at <http://www.lta.gov.sg>), we analyzed the new registrations of different brands of passenger car and motorcycle, and found an increase in industry concentration from 1998 to 2002, as the market shares of the top distributors have increased steadily. We also found that average dealership markups for the period of August 2002 to September 2003 are similar to those reported in earlier studies. We relate these empirical findings to a theoretical model of a differentiated-good oligopoly operating under an industry sales constraint.

The rest of the paper is organized as follows. In Section 2, we present a brief review of the VQS. This is followed in Section 3 by a discussion of the impact of the VQS on market competition and a presentation of the theoretical model. We also present a simple model of the optimal vehicle quota based on a number of simplifying assumptions, to illustrate the possibility of complementing the existing method of determining the annual license quota with an empirical estimate of the optimal quota. Next in Section 4, we discuss empirical findings on car sales, market shares and dealership markups. Section 5 concludes the paper with a discussion on the likely impact on market competition following the recent switch to an open on-line auction format.

## 2. The vehicle quota system

The primary objective of the VQS was to better control the growth in the vehicle population and reduce the volatility in its annual growth rate. The means to do so was to directly controlling the number of new vehicle licenses issued each year. Before the VQS was implemented in 1990, the growth of motor vehicle population in the 1970s and 1980s was controlled primarily through price-based measures, including a road tax (calculated based on engine capacity), an import duty

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<sup>1</sup> See Olszewski et al. (1995) and Li (1999) for a review of the ALS, and an analysis of its efficiency in controlling congestion. The ALS was replaced by the ERP Scheme in 1999.

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