



The South Korean auto industry's path to maturity



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ABSTRACT

Since 1962, South Korea has recognized the motor vehicle industry as a critical industry for economic development. The government has been closely involved in the industry's growth from infancy to its current position among the top five motor vehicle producers in the world. In its early years, the industry also gained technological knowhow through licensing agreements rather than investing heavily in research and development. The results of this study strongly suggest that the industry as a whole has achieved a minimum efficient scale of operations. However, cross price elasticity estimates indicate that many rigidities exist in the input markets, particularly with respect to outsourced intermediate products. The restrictions on imports of these products may have to be reduced as South Korea seeks to expand its global trade footprint by participating in bilateral preferential trade agreements, presenting challenges for the industry.

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1. Introduction

The South Korean motor vehicle industry has grown rapidly from its infancy in 1962 to the fifth largest world producer of motor vehicles. However, the industry still has some protection from international competition in the recently negotiated bilateral trade pacts between South Korea and the United States and South Korea and the European Union. Given that they exist, an important question is whether these trade preferences can continue to be justified by an infant industry designation. In this paper we attempt to provide an answer to this issue by investigating the presence of economies of scale in the industry. In addition, we also examine other matters involving input relationships and their implications for South Korea's international trade prospects.

The structure of the paper is as follows. The next section presents a brief history of the South Korean motor vehicle industry and a summary of the relevant literature. Section 3 contains a discussion of the statistical model and the data. Section 4 details the estimation results, and Section 5 concludes.

2. History and literature review

South Korea officially recognized the strategic importance of a domestic motor vehicle industry in 1962 with the Automotive Industry Promotion Law, a part of the First Five Year Development Plan. The Ministry of Trade and Industry had the authority to determine which companies could be a part of the industry. Government support for the domestic industry was expressed

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through measures that prohibited imports of cars, subsidized loans, gave export subsidies and tax incentives, and a policy that allowed components to be imported tariff-free. At the time, Kia, Ha-Dong-Hwan, and Saenara (purchased by Shinjin Motors and later becoming a joint venture with General Motors and Daewoo) were the only operating South Korean motor vehicle firms. Hyundai joined the industry in 1967 (Ebert & Montoney, 2007, p. 12; Kim, 1998, p. 507; Ravenhill, 2001, p. 5). Through a series of takeovers and mergers as a result of financial difficulties, by 2007 the South Korean auto industry consisted primarily of Hyundai-Kia (the largest producer), Daewoo, Renault Samsung Motors (formerly Samsung Motors and purchased by Renault in 2000), and Ssangyong Motor Company, a small manufacturer of sport utility vehicles (Ebert & Montoney, 2007, pp. 13–14).

Starting with the assembly of knockdown kits, the South Korean motor vehicle industry was a minuscule player on the international stage until the 1980s. In the early 1970s, it produced only a few thousand vehicles, far fewer than Brazil, Mexico, or Argentina (Green, 1992, pp. 412–413). For example, in 1971 it produced only 23,000 motor vehicles, amounting to only 0.06% of world output (Ebert & Montoney, 2007, p. 12). However, in the mid-1970s, the South Korean government implemented a policy change that required the industry to change from completely knocked down (CDK) kits to the production of cars with substantial domestic content. The government was intimately involved with the production process, even dictating to a substantial extent the specifications of the domestic models that were to be built. The government also required that the capacity of each plant should be in excess of 50,000 vehicles annually, at a time when the *total* domestic automobile output was 12,751 cars. The new rules included exclusion of new entrants to the domestic market, tax reductions and concessions, promotion of vertical integration, preferential financing, and a decree that guaranteed a large market share for domestically-produced cars (Kim, 1998, p. 511). At the end of 1979, the automobile industry faced a crisis caused by domestic uncertainty after the assassination of Park Chung Hee. The Korean Institute of Economics issued a study that argued the domestic motor vehicle industry could survive only if it exported sufficient vehicles to achieve economies of scale. The Automobile Industry Rationalisation Plan: 1981–1989, which had the goals of cost reduction through economies of scale and entry into the North American market, was one outcome of these developments (Catalan, 2010, pp. 224–225; Green, 1992, p. 415; Waitt, 1993, pp. 201–202).

As a result of these events, by 1985, South Korea was producing nearly 265,000 vehicles annually and poised to become a major player in the motor vehicle industry (Associazione Nazionale Fra Industrie Automobilistiche (ANFIA), 1996, p. 269). By 2008, production had dramatically increased to over 3.8 million units, and South Korea ranked fifth after the United States, Japan, China, and Germany in total number of motor vehicles manufactured. In that year it produced about 6.3% of the total motor vehicle output produced by the top 21 countries (ANFIA, 2009, pp. 68–70).¹

As described above, for several decades the South Korean government has considered the automotive industry to be a critical element of its development strategies. As a result, the government has been involved in the industry through a variety of policies, including export promotion and, early in the life of the industry, promoting the obtainment of technology through licensing rather than domestic research and development (Lautier, 2001, p. 209). Moreover, the government intervened in this industry and others with policies designed to lower costs of both production materials and financing and had the goal of getting the industry rapidly to a point where it could take advantage of the available economies of scale (Lautier, 2001, pp. 207–209; Park, 1990; Park, 2003; Waitt, 1993, pp. 200–202; Waverman & Murphy, 1992, pp. 287–288, 297).

In this paper we will investigate whether as a result of all these efforts, the Korean motor vehicle industry as a whole has in fact reached a minimum efficient scale of plant, where economies of scale have been exhausted. In addition, we will look at direct and cross price elasticities between inputs of domestic capital and labor and intermediate goods as well as imported intermediate products to examine how global trade has impacted the industry and will likely impact it in the future. We use a translog cost function to accomplish these goals. There have been some descriptive papers, for example Ellison et al. (1995), that have argued the Korean auto industry has developed competitive lead times and productivity, but we are unaware of any previous econometric studies regarding these issues for that industry. Park (2003) and Waitt (1993) discuss the importance of economies of scale issues in the determination of South Korean government policies toward the industry. However, they did not do empirical analyses regarding whether or not such economies existed.

In previous research regarding the motor vehicle industry in other countries, the results regarding the economies of scale issue have been mixed. For example, Péridy (2003, p. 399) found statistically significant diseconomies of scale in the French automotive industry. Truett & Truett (2007), found economies of scale at lower output levels but diseconomies of scale at mean and maximum output levels in a later study of the French industry. Bloch and Tang (2000, pp. 44–49) found evidence consistent with economies of scale in the relatively small (by international standards) Singapore transport equipment industry. Fuss and Waverman (1992, p. 122) found statistically significant economies of scale in automobile production in Canada, the United States, Japan, and Germany, although Burnside (1996, p. 184) obtained results consistent with constant returns to scale for the United States. The findings of Tybout, de Melo, and Corbo (1991, p. 248) using Chilean transport equipment data were also consistent with constant returns to scale. Westbrook and Tybout (1993, pp. 103–104) had similar results for the Chilean automobile industry. Using Mexican data, Tybout and Westbrook (1995) and Truett and Truett (1996) found evidence of economies of scale in the Mexican motor vehicle industry. Truett and Truett (2006) also found evidence of economies of scale in the South African

¹ More detailed histories of the Korean automobile industry can be found in Catalan (2010); Kim (1998); Lee & Jung (2009); Lee, Lee, Kim, & Lim (1996); Ravenhill (2001).

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