Performance of the South Korean Automobile Industry in the Domestic and United States Markets

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The South Korean automobile industry has undergone considerable growth since its inception in the 1960s. That growth was initially driven by domestic demand. Since the Asian financial crisis of 1997, however, production increases for the South Korean automobile industry have been primarily a function of export sales. The research presented here explores changes in the structure of demand in its two principal markets- domestic South Korean market and the United States market. Two models of demand are developed- one for each of the markets. Several macro economic variables are identified that have a statistically significant relationship with the demand for automobiles in each of the markets. An interesting finding of the research is that the factors apparently driving demand are different in the two markets suggesting the structure of automobile demand in South Korea differs significantly from the demand for that country's vehicles in the United States. A major challenge facing the South Korean automobile industry is how to utilize its capacity when confronted with slowing growth in sales in both the domestic and United States markets.

Key words: Economics of Korea; Automobile Industry; United States Markets; Domestic Markets

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The Republic of South Korea (RSK) produced 23,000 motor vehicles in 1971, which was 0.06 percent of world output. In 2005, South Korea produced nearly 3.7 million motor vehicles or 5.6 percent of the world output (*Ward's Auto World, 2007*). During the twenty years from the mid 1980's to 2005, both the domestic South Korean automobile market and the market for South Korean vehicles in the United States expanded significantly. Korean domestic sales of automobiles quadrupled in that time period.

While the literature provides considerable background on the globalization process of the South Korean automobile industry (see for example, Hyun, 2003) there has not been significant analysis of the development of demand in the Korean domestic auto market or in principal foreign markets for Korean automobiles such as the United States. Here, recent developments in the South Korean Automobile Industry are summarized with the principal question addressed being; what factors have led to the expansion of South Korean domestic demand and United States demand for Korean Vehicles?

LITERATURE REVIEW

Between the years of 1998 and 2005, South Korean automobile production increased annually by 6.86% and by 59.1% overall (see Table A-1 in the Appendix). Helping stimulate the growth of the South Korean Automobile Industry were its exports to the United States market during the past twenty years, but especially during the 1998 through 2005 period, when the sales of South Korean built vehicles increased 22.6% annually and 316.4% overall (see Table A-2 in the Appendix).

The South Korean automobile industry emerged around 1962 with South Korea's first national economic development plan. In this early stage, most vehicles were knock down models; i.e., a kit containing most components which was shipped from another country such as Japan. At this time, Kia Industry Co., Ha-Dong-Hwan Motors, and Saenara (which later was taken over by Shinjin Motors) were the only established South Korean automobile firms.

The South Korean government put its second national economic development plan into effect between 1967 and 1971. This was the time during the Park regime when the government began to play an active role in trying to stimulate the economy. Government regulations designed to stimulate the achievement of economies of scale in the auto industry led to local content reaching 90% by the early 1980. At this time, Hyundai and Asia Motors joined the industry. Shinjin Motors allied with GM (General Motors) and became known as General Motors Korea, which was then taken over by the Daewoo Auto Group. Kia took over Asia Motors, but continued to produce vehicles from knock down kits (Hyun, 2003).

The domestic market in South Korea was protected until the late 1990's due to the government's nationalist and protectionist policies and its placing of restrictive regulatory barriers on Foreign Direct Investment inflows into the automobile sector (Park, 2003). Therefore, South Korean automobile firms dominated their domestic market with little foreign competition until 1999.

Along with the influence the South Korean government has, the chaebol have played an important role in the development of the South Korean automobile industry. The role of the chaebol in the South Korean economy is discussed elsewhere (see, for example, Kennett, 2004). Only a brief description is offered here. Chaebol can be formally defined as large, diversified industrial groups. These groups benefited mainly from government controlled entry into the industry, access to raw material and imports, and financing from the government.

SOUTH KOREAN AUTOMOBILE INDUSTRY PROFILE

A thorough discussion of the history and structure of the South Korean Automobile Industry (SKAI) is beyond the scope of this paper. However, a brief profile of the existing firms is helpful in understanding the nature of the industry and its marketing efforts as well as the restructuring of the industry since the South Korean market was liberalized. The current structure of the SKAI consists of both relatively small and very large firms and is a result of firm failures and consolidations over a period of approximately forty years.

Ssangyong Motor Company is a relatively small sport utility motor vehicle builder that sold only 121,196 units in 2006. It traces its history to 1954 when jeeps were built for the U.S. Army by the Ha-Dong-Hwan Motor Workshops. That firm was sold to the Ssangyong Group in 1988 which sold controlling interest to Daewoo in 1997. When Daewoo faced financial problems in 2000, it sold its interest in Ssangyong which then became independent. In 2004, a 49 percent interest in Ssangyong was purchased by Ssangyong Automotive Industry Corporation of China (Ssangyong).

The Samsung Business Group attempted to enter the SKAI in 1995 and built a plant with annual capacity of 500,000 units (Gadacz, 1996). Overcapacity in the SKAI created financial problems for Samsung which went bankrupt in 1999. Controlling interest in Samsung Motors was purchased by Renault of France in 2000. Renault Samsung Motors built 118,438 vehicles in 2005, primarily for the South Korean Market (Renault, 2007).

General Motors Daewoo (*GM Daewoo, 2003*) is a result of General Motors taking over the then bankrupt Daewoo in 2002 (Kirk, 2002). Daewoo entered the SKAI in 1962 as Saenara Motor Company which was taken over by Shinjin Motor in 1965 (Kang, 1997). By the 1970s, Shinjin was South Korea's leading automobile builder. In 1972, GM took a 50 percent investment share in the firm. Faced with increasing competition in the SKAI in 1982, GM sold the majority interest in the firm to the Daewoo Group chaebol (*Asia Pulse, 2002*). The Daewoo – GM relationship ended in 1992, over management disagreements (*Business Week, 1999*). Faced with debt problems and weakening markets due to the Asian Financial Crisis of 1997-1998, Daweoo put the automobile operations up for sale. General Motors showed renewed interest in Daewoo and completed a takeover of what is now known as GM Daewoo in 2002 (Kirk, 2002). For the domestic and global markets, including the United States, GM Daewoo builds vehicles that compete with low-priced Kias and Hyundais (*GM Daewoo, 2003*). The GM Daewoo operation is successful with combined domestic and export sales exceeding 1.5 million units in 2006 (Choe, 2006).

The dominant SKAI auto producer is Hyundai-Kia. In 2006, the SKAI produced 3.8 million motor vehicles of which 2.7 million or 71 percent were built by Hyundai-Kia (*Automotive News, 2007*).

Hyundai and Kia had been separate companies until 1998 when Hyundai purchased Kia after the latter had gone through bankruptcy (*New York Times, 1998*). Kia began in 1944 as Kyungsung Precision Industry. After building motorcycles and a three-wheeled truck, it produced its first passenger car in 1974. Kia became the second largest South Korean auto producer after Hyundai and expanded rapidly until the Asian financial crisis of 1997-98 caused a decline of 49 percent in domestic South Korean auto sales in 1998. Kia was declared bankrupt in 1998 (Cho, 1998).

Hyundai Motor Company was founded in 1967 as the automotive affiliate of the Hyundai Group chaebol. Hyundai Motor expanded rapidly in its first decade and was able to attain a 54 percent domestic South Korean market share by 1977 (Hyun, 2003). The Hyundai plant in Ulsan is one of the largest automobile manufacturing complexes in the world with an annual capacity of 1.6 million units (*Hyundai Annual Report, 2005*).

The Hyundai Group's Engineering and Construction Company was reorganized in 2000 to restructure its debt. That restructuring led to the separation of the Hyundai Motor Company from its chaebol partner and Hyundai Motor becoming an independent company (*New York Times, 2000*). In the first decade of the 21st Century, Hyundai has continued its global expansion which included establishment of assembly plants in Turkey, China, India, and Alabama in the U.S. (Hyundai Annual Report, 2005).

Hyundai began importing cars into the U.S. market in 1986 and Kia entered the U.S. market in 1994. The Hyundai-Kia combined sales in the U.S. exceeded 730,000 units in 2005. Expanding demand for its vehicles in the U.S. led Hyundai to establish an assembly plant in Alabama which began production in 2005 and Kia has begun work on a U.S. assembly plant in Georgia (*Hyundai, 2005; Automotive News, 2006*).

SOUTH KOREAN DOMESTIC AUTOMOBILE MARKET

The development of the domestic market for motor vehicles (automobiles and trucks) in South Korea is the focus of this section. Macroeconomic data on the South Korean economy from the *World Economic Outlook* of the International Monetary Fund, data from the United States Energy Information Administration, the Korea Automobile Manufacturers Association (KAMA), and Korea Automobile Import and Distributors Association (KAIDA) constitute the sources of the statistics used in developing a basic multiple regression model of demand for automobiles in South Korea.

The analysis is based on the assumption that basic macro economic variables are significant determinants of demand for motor vehicles in South Korea. The significance of cyclical forces and macroeconomic variables is suggested by publications of the Korean Automobile Manufacturer Association (KAMA). For example, the KAMA explanation for weakness in vehicle sales in South Korea in 2006 was economic recession, an unstable employment situation, and higher oil prices (KAMA, January 10, 2007).

Figures 1 and 2 show automobile sales in South Korea compared to the unemployment rate and Gross Domestic Product volume index. The data plotted in Figures 1 and 2 suggest a cyclical relationship exists between the indicated economic variables and auto sales in South Korea.

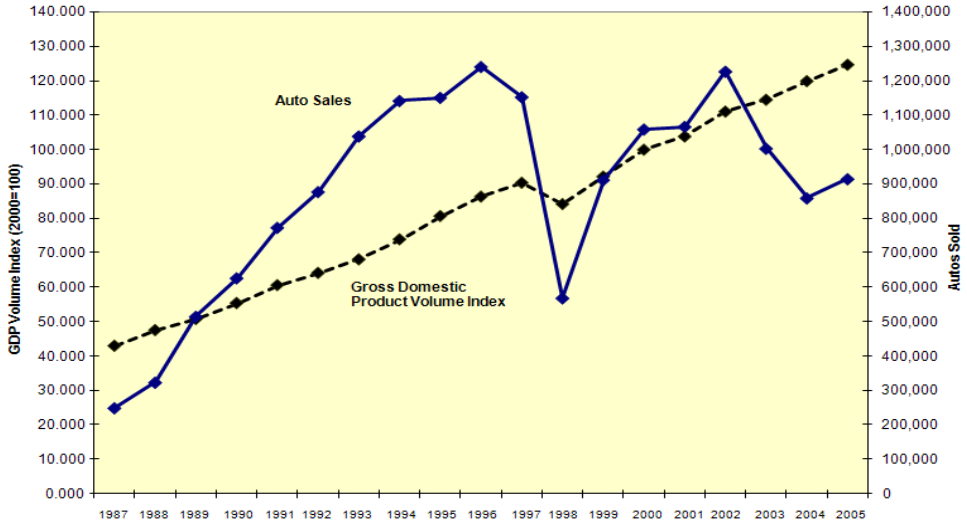

Figure 1. South Korean Domestic Automobile Sales and Unemployment Rate

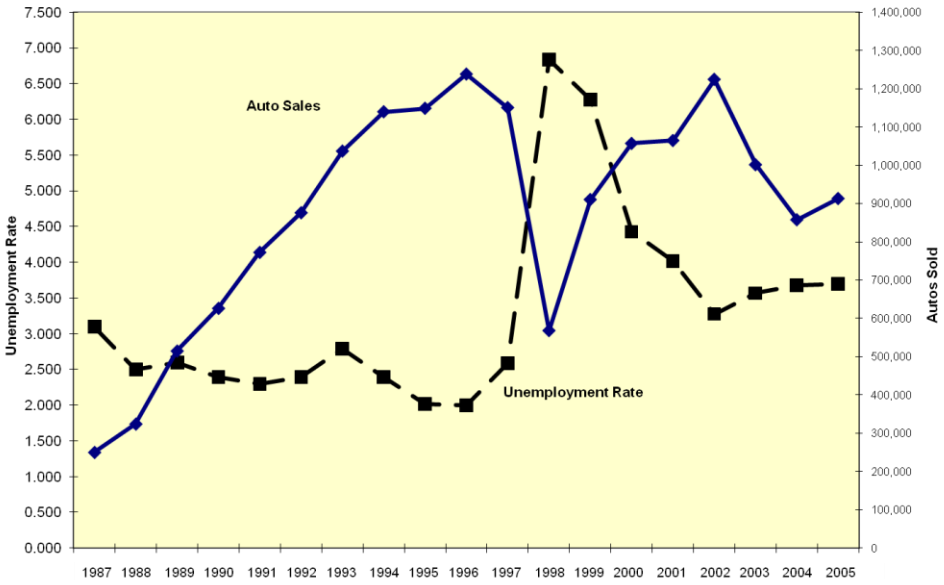

Figure 2. South Korean Domestic Automobile Sales and Gross Domestic Product

Based on the evidence, therefore, a model was developed to test the hypothesis that the sales of vehicles in South Korea are a function of the Real Gross Domestic Product, the unemployment rate, the bank lending rate, and the market price of a barrel of oil. The expected relationship of the variables is given below. The reliability of statistical data on the South Korean automobile industry prior to 1987 is problematic. Therefore the time frame that is covered for the development of the model is 1987 through 2005. The analysis concludes with 2005 because that was the last year for which macroeconomic data were available at the time the study was undertaken.

TOTSALES: the dependent variable is the sum of all automobile, commercial vehicle and imported vehicle sales in South Korea, annual data 1987 through 2005 (KAMA and KAIDA).

RGDP: Real Gross Domestic Product of South Korea, annual data 1987 through 2005 on an index number basis with the volume of Real GDP in 2000 equal to an index number of 100 (IMF). There is a suggested positive relationship between RGDP and the total sales of motor vehicles in South Korea. That is, as RGDP volume increases it is expected that economic conditions are expanding which establishes an environment where motor vehicle sales will increase.

UNEMPR: the percentage of unemployment in South Korea, annual rate, 1987 through 2005 (IMF). There is a suggested negative relationship between UNEMPR and the total sales of motor vehicles in South Korea. That is, as UNEMPR rate increases, rising unemployment will reduce the number of potential purchasers of motor vehicles and, therefore, contribute to a decline in the vehicle sales.

LENDRATE: The bank lending rate in South Korea, annual average rate, 1987 through 2005 (IMF). There is a suggested negative relationship between LENDRATE and the total sales of motor vehicles in South Korea. That is, as LENDRATE increases, the higher cost of borrowing is expected to increase the cost of motor vehicle ownership and decrease the sales of vehicles.

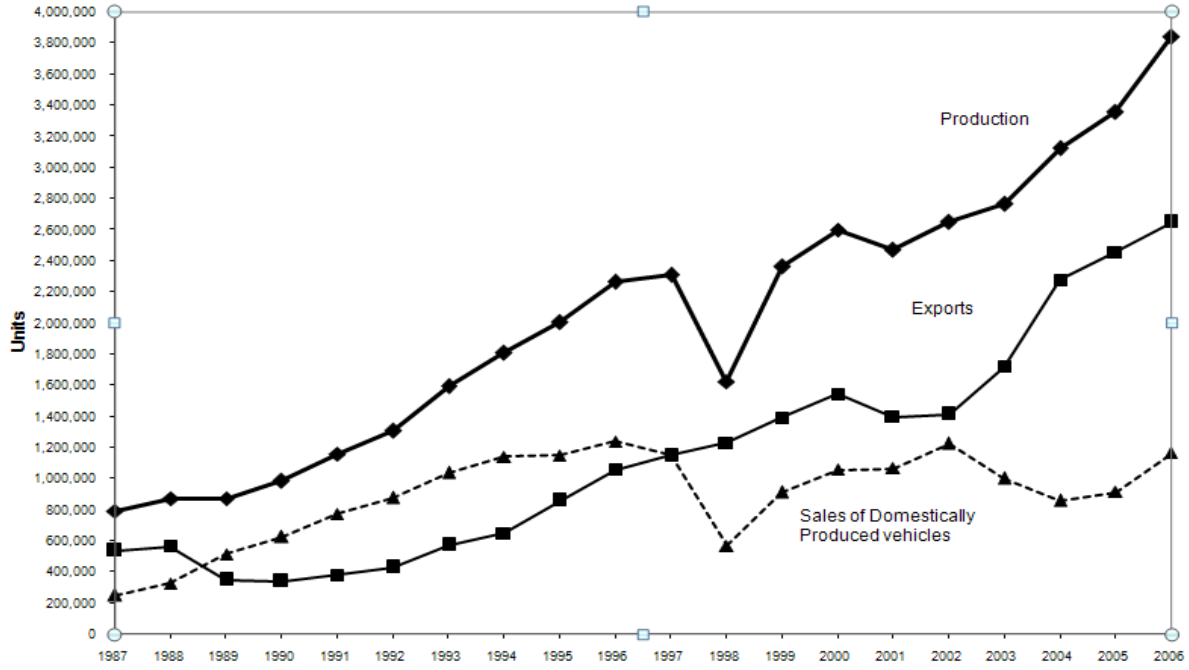

Figure 3. South Korean Automobile Production, Exports and Domestic Sales

OILPRR: The real (inflation adjusted) price of oil per barrel, average annual price in the United States, 1987-2005 (USEIA). It is assumed the price of a barrel in the U.S. reflects general price trends for oil as a commodity on world markets in general. There is a suggested negative relationship between OILPRR and the sales of motor vehicles in South Korea. An increase in the price of a barrel of oil gets reflected in rising prices for motor fuel which increases the cost of operating motor vehicles. An increase in the cost of motor vehicle operation is expected to depress the demand for new vehicles.

An initial multiple regression analysis of TOTSALES against the four independent variables was promising. Signs on all the variable were in the expected direction. The adjusted R-Squared was 0.849. However, the t-statistic on LENDRATE was low and not significant at the 95 percent confidence level. Further analysis revealed the existence of multicolinearity between LENDRATE and OILPRR with an R value of -.70. There were no other multicolinearity issues among the other independent variables. Therefore, subsequent analysis omitted the LENDRATE variable.

Results of the model showing promising statistical association between TOTSALES and the independent variables RGDP, UNEMPR, and OILPR are given in Table 1. The results confirm a significant statistical association exists between the dependent variable of total sales of vehicles in South Korea and the independent variables at the 95 percent confidence level. The *P* values are extremely low indicating the probability of obtaining the *t* statistic values shown would be very low if there was no statistical significance. Furthermore, the directions of the signs on the independent variables are consistent with expectations. Therefore, it is concluded that the hypothesis that sales of vehicles in the South Korean domestic market are dependent on macroeconomic variables including growth in the Real Gross Domestic Product, changes in the rate of unemployment, and the price of oil is accepted. Although the model reveals strength in explaining historical demand in the South Korean market, it should be noted that the predictive strength of the model may be weakened by both an inconclusive Durbin-Watson statistic suggesting at least the possible existence of serial correlation and the existence of a relatively large standard error of the

estimate, both of which could be a function of the small number of observations.
Figure 3 shows the pattern of production and demand for vehicles in the South Korean domestic market. Production for the SKAI has been on a steady upward trend over the period covered by this study, except for the sharp decline during the Asian financial crisis of 1998. Domestic sales of vehicles have not kept up with production with the result that the SKAI is highly dependent on its export markets. Figure 4 shows that domestic sales as a percent of production have declined from the range of 70 percent in the early 1990's to 30 percent by 2006. The SKAI views the world market as being intensely competitive. The strong Korean won in recent years led to more sluggish growth of exports than in the 2000 to 2004 period. Even with these potentially negative factors in the market, the export demand for South Korean vehicles is expected to remain relatively strong because of expansion of sales networks and an improved quality image for South Korean cars in the global market (KAMA, January 10, 2007).

Since 2002, domestic sales of vehicles in South Korea have been relatively weak due to macroeconomic and cyclical factors in the country's economy. The evidence suggests that, at least in the near term, continued output expansion for the SKAI within South Korea is going to be dependent on the industry expanding and strengthening its global operations in markets such as the United States.

SOUTH KOREAN AUTOMOBILE INDUSTRY IN THE UNITED STATES MARKET

Since its entrance into the United States automobile market in 1986, the South Korean automobile industry has steadily increased its market share in the U.S. Hyundai had initial success in the U.S. by selling 168,882 units of its Excel in 1986. Kia followed in 1994, selling 12,163 vehicles in the United States, and then Daewoo with 2,400 sales in 1998 (*Ward's Auto World, 2007*). Here we examine several variables to determine factors leading to the increased growth in sales of Korean vehicles in the U.S. Before discussing the statistical analysis, it will be instructive to explore the history of the involvement in the U.S. market of three principal South Korean automakers; Daewoo, Kia, and Hyundai.

DAEWOO IN THE U.S. MARKET

Daewoo's initial entry into the United States market lasted only five years. Daewoo and General Motors (GM) began a joint venture relationship in 1978 when Daewoo obtained Shinjin Motors, which had a joint venture with

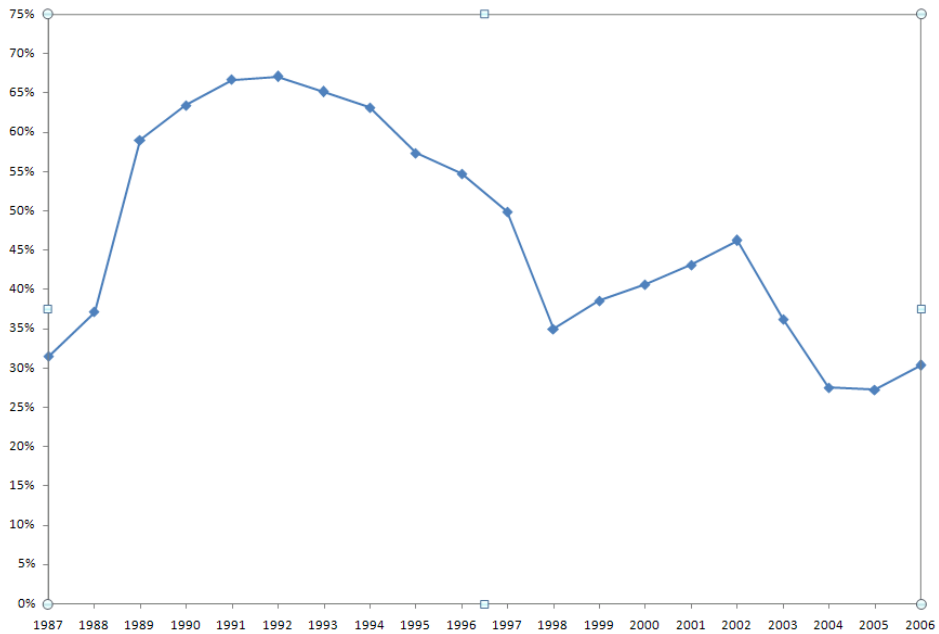

Figure 4. South Korean Domestic Automobile Sales as a Percent of Output

General Motors. GM Did not allow Daewoo to export abroad with its own brand, nor was Daewoo allowed to develop its own technology to design a new car or engine (Kim & Yoonseok, 2001). Therefore Daewoo decided to terminate its relationship with General Motors.

After the Daewoo bankruptcy and GM purchase of Daewoo in 2002, GM renamed the firm GM Daewoo. GM Daewoo began selling the Chevrolet Aveo in the United States in 2003 with 5,677 vehicles osld. By 2005, the Chevrolet Aveo sold 68,085 units (*Ward's Auto World, 2007*).

KIA IN THE U.S. MARKET

Kia's Sales in the United States began with the Festiva, which was produced in conjunction with Frod beginning in 1987. Kia attempted to establish its own dealer network in the US because it was unsatisfied with the marketing decisions of its partner,Ford, and therefore ended the partnership (Ravenhill, 2001). Kia began independent exporting to the United Sates in 1994, with its first export car to the U.S., the Sephia.

Motors Corporation announced plans to build a $1.2 billion assembly and manufacturing plant in West Point, Georgia which will serve as Kia's first manufacturing plant in America. The Kia plant in Georgia is scheduled to open in 2009.

HYUNDAI IN THE U.S. MARKET

Hyundai began to target the North American market by setting up a sales subsidiary in Canada in 1983. Two years later it developed the Hyundai Excel which was a success (Ravenhill, 2001). Hyundai then decided to open up its first R&D center in the U.S. in 1986. In 1988, Hyundai built its first manufacturing subsidiary in Canada for the North American market. In the early 1990's, the North American market for Hyundai contracted and Hyundai had to look for other markets. It closed its plant in Canada (Kim & Yoonseok, 2001).

With sales in the U.S. growing rapidly after the late 1990s, Hyundai once again wanted production facilities in North America. Hyundai opened its first assembly and manufacturing plant in the United States on May 20, 2005, known as Hyundai Motor Manufacturing Alabama. As of 2007 the plant was operating at full capacity producing 300,000 vehicles per year and employing 2,700 persons. The models

Table 1: DETERMINANTS OF DEMAND FOR SOUTH KOREAN DOMESTIC VEHICLE SALES 1987-2005

Dependent Variable: **TOTSALES = Sales of all automobiles and light trucks in the Domestic South Korean Market**

	Coefficient	Std. Error	t-Statistic	p-value
Constant	337345.8			
Real Gross Domestic Product (RGDP)	3.540719	0.373445	9.48	0.00001
Unemployment Rate (UNEMPR)	-126705.1	33838.21	-3.74	0.002
Oil Prices (OILPRR)	-25616.75	6629.48	-3.86	0.0015
Adjusted R-Squared:		0.8397		
Standard Error of the Estimate:		168,183.8		
F Statistic	32.43	(p. value = 0.000001)		
Durbin-Watson Statistic		1.442		

After Kia was sold to Hyundai, Kia sales in the U.S. became strong enough by 2006 that Kia

Table 2: DETERMINANTS OF DEMAND FOR SOUTH KOREAN VEHICLE SALES IN THE UNITED STATES

1987 - 2005

Dependent Variable:		**TSKSUS = Total South Korean Sales in the U.S.**		
	Coefficient	**Std. Error**	***t*-Statistic**	***p*-value**
Constant	68841			
QA (Quality Index)	84053	21722	3.87	0.0015
FC_GUR (Fuel Costs)	2668.98	813	3.28	0.0050
AIRNC (Interest Rates)	-28636	8463	-3.38	0.0041
Adjusted R-Squared:		0.866		
Standard Error of the Estimate: 84,0004.35 (p-value = .0001)				

produced for 2007 in Alabama were the Hyundai Sonata and the Santa Fe (KAMA).

MODEL OF DEMAND FOR SOUTH KOREAN VEHICLES IN THE U.S. MARKET

The analysis of demand examines several variables that are suggested to affect the South Korean vehicle sales in the U.S. market in the 1987 to 2005 period for which consistent data series used in the model were available. The dependent variable in this multiple regression is the Total South Korean Automobile Sales in the United States (TSKSUS). The independent variables and predictions relative to TSKSUS are as follows;

- Real Per capita disposable income (PCDPI) is measured in thousands of dollars. The expectation is that the more disposable income consumers have, the more they will consider buying a vehicle, so an increase in disposable income is expected to lead to an increase in sales of vehicles, therefore yielding positive relationship with the dependent variable (Data from ERP, 2007).

  Fuel costs in Cents per Gallon of unleaded gasoline (FCGUR) is also an important variable. Earlier it was shown in the model of the South Korean automobile market that fuel price changes have a negative effect on vehicle sales. That is, higher fuel prices in South Korea raise the cost of operating a vehicle and depress sales. However in the United States market South Korean vehicles are viewed as relatively fuel efficient compared with other vehicles. Since the mid 1980's, both Kia and Hyundai have consistently exceeded the U.S. Corporate Average Fuel Economy performance of Chrysler, Ford, and General Motors (*Ward's 2006, 84*). With rising gasoline prices, U.S. consumers are more likely to purchase a vehicle that has higher fuel efficiency. Therefore, the expected relationship between U.S. fuel prices and sales of South Korean vehicles in the U.S. is positive.

  -Quality Average or QA; the expectation is that a rise in the Quality Average will in turn raise sales of the South Korean vehicles in the United States, yielding a positive relationship between QA and TSKSUS.

The quality index is taken from annual automotive issues of *Consumer Reports* magazine. It is measured given a quality number of 1-5; one being the worst, and 5 being the best with 3 considered average. The quality ratings for all South Korean cars rated by *Consumer Reports* are averaged for each year. The assumption is made that a higher quality vehicle is more desirable than a low-quality vehicle. The predicted direction of the relationship is positive with increased quality leading to increased sales.

Average Interest Rate per New Car or AIRNC; the expectation is that a rise of interest rates for

new cars will raise the effective price of and have a negative effect on the sales of South Korean Vehicles in the

- United States. Therefore, an inverse relationship between AIRNC and the dependent variable (WMVFF) is expected.
- Because of the existence of multicolinearity between Per Capita Disposable Income (PCDI) and Average Interest Rate per New Car (AIRPNC), (r = -.91), the PCDI variable was dropped from the model.

RESULTS AND EXPLANATIONS

The adjusted R-Square in this equation is .866 indicating that 86.6 percent of the variation in the sales of South Korean vehicles in the United States is associated with independent variables. According to the T statistics in the table, all of the variables are significant at the 5 percent level.

Results of the model showing the statistical association between TSKSUS and the independent variables QA, FCGUR, and AIRNC are given in Table 2. The results confirm the expectations of the hypotheses that a significant statistical association exists between the dependent variable of sales of South Korean automobiles in the U.S. and the independent variables at the 95 percent confidence level. The low *p* values indicate the probability of obtaining the *t* statistic values shown would be very low if there were no statistical significance.

The relatively low Durbin-Watson Statistic does raise at least the possibility of a serial correlation bias in the data which could be due to the small number of observations and which future research might explore. Likewise, while demonstrating significant association between South Korean auto sales in the U.S. and several variables in the past, the predictive value of the model may be weakened due to the relatively large standard error of the estimate.

CONCLUSION

The question raised in this study was; "what are the factors that have lead to the expansion of domestic demand and United States demand for South Korean vehicles?" In answering that question, we find that the South Korean automobile industry underwent significant restructuring in the decade of the 1990's. That restructuring and consolidation has resulted in the Hyundai-Kia combination and a resurgent GM Daewoo combination emerging as dominant producers in Korea that are better able to exploit economies of scale and respond to growing demand in domestic and global markets.

In the domestic South Korean market, consistent with the expectation of the literature on that market, Real Gross Domestic Product was found to have a positive association with the demand for vehicles while the unemployment rate and price of oil per barrel were found to have a negative association with the dependent variable.

In the United States market, the demand for South Korean vehicles in the 1987-2005 period was found to be positively associated with the quality rating of those vehicles and the price per gallon of regular gasoline. The interest rate for new loans was found to have a negative association with the demand for South Korean vehicles in the United States.
The results suggest that demand for vehicles in South Korea will be highly dependent on macro economic variables associated with the development of the South Korean economy. In the United States market, the South Korean manufacturers will be faced with the challenge of having to maintain the momentum of the past decade. There is evidence that will be a major challenge:

In recent years, both Hyundai and Kia sales in the United States have been increasing, but at a decreasing rate. This is evident through the average annual rate of growth in sales between the years of 1995 and 2006. From 1995 to 2000, the average annual rate of growth for Hyundai was 17.878% and 45.37% for Kia. In the following five years, from 2000 to 2005, the rate of sales increase declined for both automakers. Hyundai's average annual rate of growth fell to 13.24% and Kia's average fell to 11.43%. Between 2005 and 2006 the annual rate of growth for these South Korean automakers in the United States Market was 2.594%, brought down primarily due to Hyundai's average growth being less than 1%.

There are several reasons for these variations in growth percentage and low sales growth. For one, saturation of the market may be an issue in the United States. Also, both manufacturers need to maintain (or improve) quality and

customer service. A third suggestion is that the appreciated value of the Won has weakened the profitability of vehicles, resulting in less revenue for the corporations if prices are maintained, or if prices are increased, risking a loss of the low-price niche for South Korean vehicles in the U.S. and possibly a loss of sales.

The South Korean carmakers have a challenge to maintain growth in the U.S. market. At the same time, a weak or stagnant domestic South Korean vehicle market will test the ability of the South Korean vehicle builders to maintain production growth. The macroeconomic independent variables are significant through the years of our study, but may not hold in the future years due to South Korea's changing economy. The progress of the South Korean automobile industry in both the U.S. and domestic Korean markets is likely to provide fertile ground for future research and analysis.

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Appendix:

Table A-1: South Korean Macroeconomic Data and Auto Production and Sales

	Lending Rate	Industrial Share Prices	Wages: Monthly Earnings	Unemployment Rate	Gross National Income (GNI)	GDP Volume (2000=100)	
	(Percent)	(Index 2000=100)	(Index 2000=100)	(Percent)	Billions of won		Unit Sales of Vehicles
	LENDRATE	**SHAREPR**	**WAGES**	**UNEMPR**	**GNI**	**GDPVOL**	**DOMSALES**
1987	10.000	57.034	21.0	3.100	109588.	42.989	249,448
1988	10.125	94.675	25.1	2.500	131061.	47.564	323,561
1989	11.250	125.472	31.4	2.600	147770.	50.772	514,484
1990	10.000	102.035	37.7	2.400	178628.	55.420	626,126
1991	10.000	89.759	44.0	2.300	216303.	60.626	772,548
1992	10.000	80.200	50.9	2.400	245388.	64.188	876,262
1993	8.583	100.215	62.2	2.792	290088.	68.125	1,037,488
1994	8.500	132.192	70.1	2.400	339343.	73.941	1,140,399
1995	9.000	125.794	78.0	2.020	397459.	80.720	1,149,409
1996	8.840	113.586	87.2	2.000	446856.	86.370	1,238,940
1997	11.8767	89.181	93.4	2.590	488457.	90.387	1,151,287
1998	15.279	55.808	91.0	6.840	476245.	84.191	568,063
1999	9.396	109.493	92.1	6.280	523355.	92.178	910,725
2000	8.545	100.000	100.0	4.430	576160.	100.000	1,057,620
2001	7.708	78.270	105.8	4.020	621028.	103.837	1,065,161
2002	6.769	103.471	118.5	3.280	685069.	111.074	1,225,210
2003	6.237	92.884	128.7	3.570	725420.	114.515	1,001,874
2004	5.904	113.869	140.9	3.680	781174.	119.931	857,977
2005	5.593	146.339	152.3	3.700	805886.	124.682	913,550

Source: International Monetary Fund, International Financial Statistics and KAM

Table A-2: South Korean Vehicle Sales in the United States Independent Variable Data

	Total South Korean Vehicle Sales in the U.S.	U.S. Dollars Per Capita Disposable Personal Income	Index number (1-5) Quality Average	Index Number Fuel Cents/Gallon Unleaded Regular	Percent Average Interest Rate per New Car
	TSKSUS	**PCDPI**	**QA**	**FCGUR**	**AIRNC**
1987	263610	14241	3.0	94.8	10.7
1988	264282	15297	3.0	94.6	12.6
1989	183261	16257	1.5	102.1	12.7
1990	137448	17131	1.5	116.4	12.6
1991	117630	17609	1.3	114	12.4
1992	108549	18494	1.0	112.7	9.8
1993	109488	18872	1.0	110.8	9.5
1994	138258	19555	1.0	111.2	9.8
1995	132118	20287	1.0	114.7	11.2
1996	144742	21091	1.0	123.1	9.8
1997	168511	21940	1.0	120	7.1
1998	175510	23161	1.0	105.9	6.3
1999	329571	23968	1.0	116.5	6.7
2000	473357	25472	1.0	138.2	6.6
2001	618258	26236	1.5	146.1	5.7
2002	633861	27165	3.7	135.8	4.3
2003	637692	28065	3.6	159.1	3.4
2004	688670	29475	3.1	188	4.4
2005	730863	30429	3.0	229.5	5.8

Sources: Ward's Motor Vehicle Facts & Figures 2006, 1996, 1992, Economic Report of the President 2006