

Nexus between Financial Fundamentals and Automotive (Car) Industry. ARDL approach

Asep Risman¹, Muhammad Imtiaz Subhani², and Denis Ushakov^{3,*}

¹Universitas Mercu Buana, Jakarta-Indonesia

²ILMA University, Karachi, Pakistan

³Suan Sunandha Rajabhat University, Bangkok, Thailand

Abstract. This paper is an attempt to investigate the nexus between the financial fundamentals and the market share of automotive(car) industry of top 26 automotive producing nations. The time series data of change in stock prices, trading volumes of stocks and market shares of automotive industry of top 26 automotive producing nations were collected from data stream Eikon for the period from 2002 to 2014. ARDL approach was used to investigate the lag length nexus of financial fundamentals with the market shares of automotive(car) industry. Further AR processes were also investigated for the series of automotive market shares. Findings confirmed the significant impact of change in stock prices on the Automobile (car) Market Shares for France, Hungary, Indonesia, Malaysia, Romania, South Africa, South Korea, Turkey and United States of America for lag1, while also the significant impact of change in stock prices on the Automobile (car) Market Shares were also found present for China, France, Hungary, Indonesia, Italy, Malaysia, Pakistan, Romania, South Africa and South Korea for lag 2. Findings further confirmed the impact of trading volumes for lag1 on the Automobile (car) Market Shares for Argentina, Brazil, France, Hungary, India, Italy, Japan, Pakistan, South Africa, South Korea and Taiwan. The impact of trading volumes for lag2 on the Automobile Market(car) Share were also found present for Brazil, Hungary, India, Italy, Romania, South Africa, Ukraine, United Kingdom and United States of America. Moreover, AR processes in market shares of automotive (car) industry for few from the outlined nations were also observed for the stated period.

1 Introduction

Automobile sector acts as a catalyst to empower economic growth in the country with employment opportunities. The automotive industry is one of the leading economic drivers of the World; it holds a great chunk of expansion, strength and cohesion to the micro-economic zone and that is why the automotive industry is acclaimed as one of the elements in building and fostering a nation. Enabling Research, Innovation & Development, accelerating economic growth, bringing governments' revenue, generating employment

* Corresponding author: denis.us@ssru.ac.th

opportunities are some of the positive shifts that come into motion due to the automobile industry operations [1,2].

The primary objective of this paper is to investigate the relationship between the Financial fundamentals (i.e. change in stock prices and trading volume of stocks at equity markets) and the market share of automotive industry of top 26 automotive producing nations through auto regressive distributed lag (ARDL) approach. While Auto regressive process is also planned to interrogate while deploying the same ARDL model.

2 Literature Review

In the automobile industry, market share provides an ample view about the automobile firms' market leader in various market segmentations and in greater detail it identifies the aggregate production, manufacturing cost for firms', which attain a higher market share and indeed in this established industry of existing automobile giants since decades, it is extremely difficult to gain one's market share.

Like any other industry, automobile industry also has to carry out contingency planning and right marketing strategies, strategic program etc to gain the market share. Hence, the business, marketing and development managers usually tap unsatisfactory market position to gain volume profits and profitability [3].

Market share as represented by the sales of a particular industry; studying the US auto sector revealed sales, which was much better in year 2000 than 2011. The reasons behind the sales fall was due to the fall in total demand and long-term decline in the market share [4].

[5,6] analyzed the stock markets of Hong Kong, Singapore, Japan, Australia, and USA and its connections with their automotive markets. The study notes that stock-market inter-linkages became more strengthened as after the Asian financial crisis of 1997. Furthermore, the study identifies significant spillover of US market-volatility into the Asian markets, while spillover from the Japan markets is identified to be comparatively weaker and during all these events automotive markets commoved with the stated equity markets.

[7,8] examined the integration between the markets of Sri Lanka, India, and Pakistan by analyzing data ranging 2003-2010 and its possible connections with automotive industry of these nations.

3 Research Methodology

3.1 Description of selected Variables, Data and Hypotheses

As mentioned earlier that the main focus of this paper is to evaluate and investigate the nexus or the associations between the financial fundamentals and the market share of automotive industry of top 26 automotive producing nations. Where change in stock prices and trading volume of stocks at equity markets are taken as the proxies to represent the financial fundamentals. The time series data of change in stock prices, trading volumes of stocks and market shares of automotive industry of top 26 automotive producing nations are collected from data stream Eikon for the period from 2002 to 2014. The top 26 automotive producing nations taken in this study are mentioned in the following table.

Table 1. Top 26 automotive producing nations.

1: Argentina	8: Germany	15: Mexico	22: Taiwan
2: Australia	9: Hungary	16: Poland	23: Turkey
3: Brazil	10: India	17: Romania	24: Ukraine
4: Canada	11: Indonesia	18: Russia	25: UK
5: China	12: Italy	19: S. Africa	26: USA
6: Czech Republic	13: Japan	20: S. Korea	
7: France	14: Malaysia	21: Spain	

3.2 Hypotheses established

The hypotheses which are established to test the proposition of this study include:

H1: There is an effect of change in stock prices on the automotive total market share of top automotive (cars) manufacturing nations.

H2: There is an effect of trading volume of stocks on the automotive total market share of top automotive (cars) manufacturing nations.

H3: There is an AR process in the total market share of automotive (car) industry of the top automotive producing nations when the panel of variables for equity/ stock markets /independent variables are change in stock prices and trading volume.

The above all three hypotheses are tested for all outlined top 26 automotive producing nations.

3.3 Description of the econometric model deployed to test hypotheses

ARDL approach is used to investigate the lag length effect of financial fundamentals i.e. change in stock prices and trading volume of stocks at equity markets, on the market shares of automotive industry. Further AR processes are also investigated for the series of automotive market shares of all outlined industry/ nations.

4 Findings and Results

Findings in the above table also confirms the impact of change in stock price for previous period (lag1) on the Automobile Market Share for current period (lag0) for France, Hungary, Indonesia, Malaysia, Romania, South Africa, South Korea, Turkey and United States of America while the impact of change in stock price for previous to previous period (lag2) on the Automobile Market Share for current period (lag0) was also found present for China, France, Hungary, Indonesia, Italy, Malaysia, Pakistan, Romania, South Africa and South Korea.

Table 2. Results and findings on lag length effects of change in stock prices on market shares of automotive industry/ nations.

Statement of hypotheses		EMP concl		EMP concl		EMP concl
There is an effect of change in stock prices on the automotive total market share of top automotive (cars) manufacturing nations.	H1-ARG	Failed to reject for lag1 (R)	H10-IND	Failed to reject for lag1 (R)	H18-RUSSIA	Failed to reject for lag1 (R)
		Failed to reject for lag2 (R)		Failed to accept for lag2 (R)		Failed to accept for lag2 (R)
	H2-AUS	Failed to accept for lag1 (R)	H11-INDO	Failed to accept for lag1 (R)	H19-S.AFR	Failed to accept for lag1 (R)
		Failed to accept for lag2 (R)		Failed to accept for lag2 (R)		Failed to accept for lag2 (R)
	H3-BRA	Failed to reject for lag1 (R)	H12-ITALY	Failed to reject for lag1 (NR)	H20-S.KOR	Failed to accept for lag1 (R)
		Failed to reject for lag2 (R)		Failed to reject for lag2 (NR)		Failed to reject for lag2 (R)
	H4-CAN	Failed to reject for lag1 (R)	H13-JAP	Failed to accept for lag1 (R)	H21-SPA	Failed to accept for lag1 (R)
		Failed to reject for lag2 (R)		Failed to accept for lag2 (R)		Failed to reject for lag2 (R)
	H5-CHI	Failed to accept for lag1 (R)	H14-AL	Failed to accept for lag1 (NR)	H22-TAI	Failed to reject for lag1 (R)
		Failed to accept for lag2 (R)		Failed to accept for lag2 (NR)		Failed to accept for lag2 (R)
	H6-CZE	Failed to reject for lag1 (R)	H15-MEXIC	Failed to accept for lag1 (NR)	H23-TUR	Failed to accept for lag1 (NR)
		Failed to accept for lag2 (R)		Failed to accept for lag2 (NR)		Failed to accept for lag2 (NR)
	H7-FRA	Failed to accept for lag1 (R)	H16-POL	Failed to accept for lag1 (NR)	H24-UKR	Failed to accept for lag1 (R)
		Failed to accept for lag2 (R)				Failed to accept for lag2 (R)
	H8-GER	Failed to reject for lag1 (R)		Failed to accept for lag2 (NR)	H25-UK	Failed to reject for lag1 (NR)
		Failed to reject for lag2 (R)				Failed to reject for lag2 (NR)
	H9-HUN	Failed to reject for lag1 (NR)	H17-OM	Failed to accept for lag1 (R)	H26-USA	Failed to accept for lag1 (NR)
		Failed to accept for lag2 (NR)		Failed to accept for lag2 (R)		Failed to accept for lag2 (NR)
Failed to reject at $t > 1.5$ Failed to accept at $t < 1.5$ R= Model is reliable NR= Model is not reliable EMP CONCL = Empirical Conclusion						

Table 3. Results and findings on lag length effects of equity markets' trading volume on market shares of automotive industry/ nations.

Statement of hypotheses		EMP concl		EMP concl		EMP concl
There is an effect of trading volume of stocks on the automotive total market share of top automotive (cars) manufacturing nations.	H1-ARG	Failed to accept for lag1 (R)	H10-IND	Failed to accept for lag1 (R)	H18-RUSSIA	Failed to accept for lag1 (R)
		Failed to accept for lag2 (R)		Failed to reject for lag2 (R)		Failed to accept for lag2 (R)
	H2-AUS	Failed to reject for lag1 (R)	H11-INDO	Failed to accept for lag1 (R)	H19-S.AFR	Failed to accept for lag1 (R)
		Failed to accept for lag2 (R)		Failed to reject for lag2 (R)		Failed to accept for lag2 (R)
	H3-BRA	Failed to reject for lag1 (R)	H12-ITALY	Failed to accept for lag1 (NR)	H20-S.KOR	Failed to reject for lag1 (R)
		Failed to reject for lag2 (R)		Failed to accept for lag2 (NR)		Failed to reject for lag2 (R)
	H4-CAN	Failed to accept for lag1 (R)	H13-JAP	Failed to accept for lag1 (R)	H21-SPA	Failed to accept for lag1 (R)
		Failed to reject for lag2 (R)		Failed to accept for lag2 (R)		Failed to accept for lag2 (R)
	H5-CHI	Failed to accept for lag1 (R)	H14-AL	Failed to accept for lag1 (NR)	H22-TAI	Failed to reject for lag1 (R)
		Failed to accept for lag2 (R)		Failed to accept for lag2 (NR)		Failed to accept for lag2 (R)
	H6-CZE	Failed to reject for lag1 (R)	H15-MEXICO	Failed to accept for lag1 (NR)	H23-TUR	Failed to accept for lag1 (NR)
		Failed to reject for lag2 (R)		Failed to accept for lag2 (NR)		Failed to accept for lag2 (NR)
	H7-FRA	Failed to accept for lag1 (R)	H16-POL	Failed to accept for lag1 (NR)	H24-UKR	Failed to reject for lag1 (R)
		Failed to reject for lag2 (R)				Failed to accept for lag2 (R)
	H8-GER	Failed to accept for lag1 (R)		Failed to accept for lag2 (NR)	H25-UK	Failed to accept for lag1 (NR)
		Failed to reject for lag2 (R)				Failed to accept for lag2 (NR)
	H9-HUN	Failed to accept for lag1 (NR)	H17-OM	Failed to accept for lag1 (R)	H26-USA	Failed to reject for lag1 (NR)
		Failed to accept for lag2 (NR)		Failed to accept for lag2 (R)		Failed to accept for lag2 (NR)
Failed to reject at $t > 1.5$ Failed to accept at $t < 1.5$ R= Model is reliable NR= Model is not reliable EMP CONCL = Empirical Conclusion						

Table 4. Results and findings on AR process in market shares of automotive industry/ nations.

Statement of hypotheses		EMP concl		EMP concl		EMP concl	
There is an AR process in the total market share of automotive (car) industry of the top automotive producing nations when the panel of variables/ stock markets /independent variables are change in stock prices and trading volume.	H1-ARG	Failed to accept for lag1 (R)	H10-IND	Failed to accept for lag1 (R)	H18-RUSSIA	Failed to accept for lag1 (R)	
		Failed to reject for lag2 (R)		Failed to accept for lag2 (R)		Failed to accept for lag2 (R)	
	H2-AUS	Failed to accept for lag1 (R)	H11-INDO	Failed to reject for lag1 (R)	H19-S AFR	Failed to reject for lag1 (R)	
		Failed to accept for lag2 (R)		Failed to reject for lag2 (R)		Failed to reject for lag2 (R)	
	H3-BRA	Failed to reject for lag1 (R)	H12-ITALY	Failed to accept for lag1 (NR)	H20-S. KOR	Failed to reject for lag1 (R)	
		Failed to reject for lag2 (R)		Failed to accept for lag2 (NR)		Failed to accept for lag2 (R)	
	H4-CAN	Failed to reject for lag1 (R)	H13-JAP	Failed to accept for lag1 (R)	H21-SPA	Failed to reject for lag1 (R)	
		Failed to accept for lag2 (R)		Failed to accept for lag2 (R)		Failed to accept for lag2 (R)	
	H5-CHI	Failed to reject for lag1 (R)	H14-AL	Failed to accept for lag1 (NR)	H22-TAI	Failed to reject for lag1 (R)	
		Failed to accept for lag2 (R)		Failed to reject for lag2 (NR)		Failed to accept for lag2 (R)	
	H6-CZE	Failed to accept for lag1 (R)	H15-MEXIC	Failed to accept for lag1 (NR)	H23-TUR	Failed to accept for lag1 (NR)	
		Failed to accept for lag2 (R)		Failed to accept for lag2 (NR)		Failed to accept for lag2 (NR)	
	H7-FRA	Failed to accept for lag1 (R)	H16-POL	Failed to accept for lag1 (NR)	H24-UKR	Failed to accept for lag1 (R)	
		Failed to accept for lag2 (R)				Failed to accept for lag2 (R)	
	H8-GER	Failed to accept for lag1 (R)			H25-UK	Failed to reject for lag2 (NR)	Failed to accept for lag1 (NR)
		Failed to reject for lag2 (R)				Failed to reject for lag2 (NR)	
	H9-HUN	Failed to accept for lag1 (NR)	H17-OM	Failed to accept for lag1 (R)	H26-USA	Failed to accept for lag1 (NR)	
		Failed to accept for lag2 (NR)		Failed to accept for lag2 (R)		Failed to accept for lag2 (NR)	
	Failed to reject at $t > 1.5$ Failed to accept at $t < 1.5$ R= Model is reliable NR= Model is not reliable EMP CONCL = Empirical Conclusion						

The table also confirms the impact of trading volume for previous period (lag1) on the Automobile Market Share for current period (lag0) for Argentina, Brazil, France, Hungary, India, Italy, Japan, Pakistan, South Africa, South Korea and Taiwan while the impact of trading volume for previous to previous period (lag2) on the Automobile Market Share for current period (lag0) was also found present for Brazil, Hungary, India, Italy, Romania, South Africa, Ukraine, United Kingdom and United States of America.

The ARDL model for addressing the explained relations between the Independent Variables and Dependent Variable were found substantially strong for Argentina, Australia, Brazil, Canada, China, France, Germany, Hungary, India, Indonesia, Japan, Malaysia,

Mexico, Pakistan, Romania, South Africa, South Korea, Spain and United States of America nations as $R^2 \geq 0.8$ with $F \geq 3.84$.

Whereas ARDL model were not found substantially strong for explaining the stated relationships for Czech Republic, Italy, Poland, Russia, Taiwan, Turkey, Ukraine and United Kingdom, as $R^2 \leq 0.8$ with $F \leq 3.84$. it should be noted that the ARDL models were investigated via using the Schwarz SC criterion.

The findings confirms the presence of AR1 process (i.e. impact of Automobile Market Share for previous period (lag1) on the automobile Market Share for current period (lag0)) for Brazil, China, South Africa, South Korea and Taiwan, while the presence of AR2 process (i.e. impact of Automobile Market Share for previous to previous period (lag2) on the automobile Market Share for current period (lag0)) for Brazil, Hungary, Indonesia, Malaysia, South Africa and United Kingdom, as the t-statistics is observed more than 1.5 for the mentioned association.

5 Conclusion

This study concludes that there is the significant impact of change in stock prices on the Automobile Market Shares for most of the automotive (car) industry/ automotive (car) producing nations for both of the lags. Further, the impact of trading volumes of equity markets of all outlined nations on their global Automobile(car) Market Shares were also found present for many nations for both lag and lag 2 for the selected period. Moreover, AR processes in market shares of automotive(car) industry for few from the outlined nations were also observed for the stated period.

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