Post-Pandemic Supply Chain Forecasting in the Multinational Automobile Industry

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Abstract

There is intense competition for market share between multinational automobile organizations (MAO) in areas such as innovative technology, branding, and of course total global vehicle sales. To precisely forecast production planning for vehicle production, accurate internal vehicle sales estimates are vital to production planning as both overproduction and underproduction can ruin the bottom line if it doesn't match consumer demand. While increasing the total number of vehicles sold international vehicles internationally is a major goal of any MAO, sheer vehicle sales may not enhance the bottom line of an automobile organization. Accurate sales must match forecasted production schedules, which are created over one year in advance, to achieve the most earnings.

With international supply chains becoming more volatile since the onset of the global pandemic, it is more important than ever that sales correspond to projected production schedules. Since supply chain scheduling is done over a year in advance, the most successful MAOs spend much time and resources on these forecasts so that parts, machining, energy usage, and training can be planned accordingly. This presentation will examine the effects of national tariff rates, exchange rates, and changes in GDP on imported vehicles in order to help MAOs more accurately predict the likelihood of imported vehicle sales in industrialized countries.

This study built models based on economic variables that affect the vehicle sales of imports to better predict the likelihood of sales of imported vehicles in industrialized countries. Automobile imports were modeled as the dependent variable with tariff rate, exchange rate, and GDP as the independent variables using a repeated measures design. Variables included: GDP, Imported vehicles, Tariffs (ad valorem duties), exchange rates, for ten industrialized countries.

From the table below, the fixed effect parameter estimates for the full model are show in the table below. Significant effects for Exchange Rate ($p = 0.0005$) and GDP ($p = 0.026$) were found,

representing 1.37% and 1.95% increases in Exports per 1% change, respectively. Tariff Rate was non-significant (p = 0.7958).

Keywords: automobile supply chains, multinational automobile industry, production planning, tariff rates, vehicle production