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CORRELATING CAR SALES AND CREDIT AVAILABILITY ON THE ROMANIAN MARKET

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Abstract: For the purchase of durable goods such as cars sometimes buyers use credit, sacrificing thereby future income to pay for the present value. Analyzing the link between credit and automobile sales is useful for establishing long and medium term marketing strategy. This paper proposes such an analysis, carried out at a national level and at the eight development regions of Romania for the purchase of new Dacia cars but also for other brands in the year 2009. Data processing reveals a close link between the lending and the volume of cars sold emphasizing high propensity to contract loans for new cars purchases while wages increases.

Keywords: car sales, correlation coefficients, credit, wages

1. Introduction

The cars are durable products incorporating advanced technologies in many areas and have prices ranging from several thousands to tens or hundreds of thousands of dollars. For some buyers purchasing their own vehicle is limited by the shortage of financial resources and therefore they turn to credit.

The period of economic growth recorded by Romania since 2000 has favored the purchase of durable goods and especially automobiles. With the first effects of the financial crisis in Romania car market began to deeply contract. Revenues began to fall and people increasingly turned to less credit - favoring saving and awaiting for better times. To restart lending, policy measures are needed to facilitate access to bank loans in order to stimulate consumption of goods and subsequently car production with all the positive consequences on the economy. For manufacturers and importers of cars is important to know the level of dependence to credit of their buyers in order to make pressures on decisions factors to boost loans and especially car loans that will boost sales and consequently provide employment and budgetary revenues.

Also studying the link between credit and automobiles sales volume is one important element in building a model of consumer behavior. In recent decades several models have been proposed which differ in several aspects, models explaining the mechanism and consumer purchasing behavior.[1]

Dacia produces cars with lower prices than other brands, however access to these products for some buyers is still difficult and therefore they must resort to loans. The legitimate question that arises is to what extent credit influences the level of car sales. This information may be used by the marketing department for the adoption of pricing policies in line with the evolution of car loans offered by the banks. In Romania, the percentage of users of banking products is 56 percent of the total population over 15 years, ranking 13 among European countries. Among the first European countries in this regard are Slovenia and Austria, with a penetration rate of banking services of 100% and respectively 98%, followed by Croatia and the Czech Republic by 90 percent.

2. Income and car sales

To purchase services or goods, a car for example, the buyer needs a certain income,

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[1] BALAURE Virgil (coord), Marketing, Editura Uranus, 2002, p 199

which may come from previously accumulated wealth (property income) or the wages they currently earn. The link between income and consumption at different times is made with budgetary restrictions. Budget constraint can be expressed by the relation:

$$a_t = (1+r)a_{t-1} + y_t - c_t = 91 + r)a_{t-1} + s_t \quad (1)$$

where:

a_t – wealth accumulated until moment t;

r – Interest rate (considered constant);

y_t – disposable income at moment t;

c_t – consumer spending at moment t;

$s_t = y_t - c_t$ saving achieved at moment t.

From equation (1) it results that the individual begins each period with wealth coming from the previous period, receives an income (from wages) equal to y_t, consumes c_t and saves the rest.

With economic development, based on expected future income as stable or increasing, a large number of buyers increased consumption in many cases pledging future revenues and only a small portion of their income was directed to savings. This behavior is very obvious when buying cars.

Starting from this, the analysis may be aimed at the preparation of sales forecasts necessary to establish measures and strategies that the company must take to maintain and develop current business. Other factors affecting sales must not be forgotten. Factors affecting sales can be, on the one hand, company-specific and on the other hand can come from the consumer's behavior.

Sales are however not merely the result of external factors of demand and market conditions but also a result of marketing activities undertaken by firms.

Sales volume will depend on the company's efforts in connection with their products on the market, wide assortment, quality and suitable price, consumer's purchasing power, promoting activity and effective distribution which can bring in the right place and time the required quantities[2].

Analysis can be done with regard to volume of sales by geographical area or types of customers and distributors. Also the analysis can be done at different temporal measures like: weeks, months, quarters or years.

Such analysis is also intended to identify those periods when sales are weak and measures must be taken to stimulate them or peak period when the sales reach a maximum and it is necessary to increase production and distribution infrastructure to match the current demand.

It was found that, as wages have increased, consumer credit for purchasing goods and services increased to.

To test the relationship between wages, bank loans and sales volume a Karl Pearson correlation coefficient was used (commonly named correlation coefficient). He expresses covariance between two metric measured variables and has values between [-1 and 1].

A part of the available financial resources are allocated by potential buyers to car purchasing. When their resources are insufficient, people resort to credit. Between 2007 - 2009 the population borrowed increasingly in relation with their high growing wages. But in late 2009 and continuing with 2010 people turned less and less to credit due to job uncertainty and decreasing revenues. The global economic crisis hit hard the Romanian economy, especially the private sector, which contracted and subsequently consumer's incomes from wages where severely diminished.

Wage increases before 2009 have aided consumers to use credit to fast purchase goods, but the situation turned for the worse since the second part of 2008.

Correlation between wage growth and credit is very strong as indicated by the data presented in Table. 2.1. To determine the correlation coefficient data published by National Bank of Romania (NBR) are used.

[2] DEMETRESCU M.C, *Metode de analiză în marketing*, Editura Teora, Bucureşti 2001, p 87

Table 2.1. Pearson's correlation coefficient for bank loans and wages income

		Bank Loans	Wage income
Bank Loans	Pearson Correlation	1	0,930(**)
	Sig. (2-tailed)		0,002
	N	38	38
Wage Income	Pearson Correlation	0,930(*)	1
	Sig. (2-tailed)	0,002	
	N	38	38

Source: *http://www.drpciv.ro/*
* Correlation is significant at the 0.01 level (2-tailed).

The 0.930 value indicates a very strong connection between credit buying and earning revealing a strong inclination of consumers towards consumption. In Table 2.2 a high-intensity relation between the loans and the purchase of automobiles is presented.

Table 2.2 Pearson's correlation coefficient for car registration and bank loans

		Car Registrations	Bank Loans
CarRegistrations	Pearson Correlation	1	0,541(**)
	Sig. (2-tailed)		0,002
	N	38	38
Bank Loans	Pearson Correlation	0,541(*)	1
	Sig. (2-tailed)	0,002	
	N	38	38

Source: *http://www.drpciv.ro/*; *http://www.bnr.ro/*
* Correlation is significant at the 0.01 level (2-tailed).

Dacia cars were purchased primarily by resorting to credit. Over 80% of buyers have turned to banks for financial sources. The percentage is certainly higher because the above figures do not include loans from non-banking institutions such as leasing companies (which account for an important part of car sales financing) or other personal loans from banks that were also used to purchase new cars that where paid as full.

Consumer Price Index (CPI), accounting for price growth and inflation, had little influence in the acquisition of Dacia cars as shown by the correlations in Table 2.3.

Table 2.3. Pearson's correlation coefficient for Dacia car registrations and CPI

		CPI	Dacia cars Registrations
CPI	Pearson Correlation	1	-0,084
	Sig. (2-tailed)		0,620
	N	37	37
Dacia cars Registrations	Pearson Correlation	-0,084	1
	Sig. (2-tailed)	0,620	
	N	37	38

Source: *http://www.bnr.ro/*

The explanation for this phenomenon can be that the desire to purchase a car for the Romanian consumer is one based largely on subjective considerations.

3. Registrations of new cars by development regions

The development of new car registrations by development regions of Dacia and other brands Dacia in 2009 was analyzed. In Table 3.1 are presented weighted car registrations of Dacia cars to 10,000 inhabitants by development regions.

Table 3.1. Dacia car registrations grouped by development regions

Development Region	Dacia cars registrations to 10,000 inhabitants
Nord-Est	11,4
Sud-Vest	13,4
Sud-Est	14,1
Nord-Vest	15,2
Centru	15,8
Sud	18,5
Vest	20,0
București-Ilfov	64,1
National	20,6

Source: *http://www.drpciv.ro/*

The development region with the lowest registration to 10,000 inhabitants was Nord-Est the opposite being the Bucharest-Ilfov region.

For other brands, the car registrations in the same regions are presented in Table. 3.2. As for Dacia, the region with the least car registrations was Nord-Est

Table 3.2 Car registrations other than Dacia by development regions

Development Region	Cars registrations to 10,000 inhabitants
Nord-Est	15,9
Sud-Vest	18,2
Nord-Vest	19,8
Sud	22,0
Vest	24,2
Sud-Est	24,9
Centru	27,2
Bucureşti-Ilfov	242,4
National	45,7

Source: *http://www.drpciv.ro/*

The development region with the highest number of registrations to 10,000 inhabitants is the Bucharest-Ilfov, which is well above the average of 45.7 cars to10 000 inhabitants.

4. Lending evolution by development regions

Analyzing the evolution of credit by geographical area we see a different distribution for the eight development regions for the loans for buying cars, homes or other durable goods. In Table 4.1 are given the credit statistics at the end of 2009. National credit average is 2060.48 lei per capita over 18 years.

Table 4.1 The level of credit per capita aged 18 years

Development Region	Credits at december 2009	
	% total	lei/inhabitant
Nord-Est	12,10%	1505,51
Nord-Vest	10,46%	1713,80
Sud	13,34%	1785,01
Sud-Est	12,43%	1796,70
Centru	10,03%	1947,56
Vest	8,48%	1948,83
Sud-Vest	10,44%	2021,94
Bucureşti-Ilfov	22,71%	4260,77
Grand Total	100,00%	Average 2060,48

Source: *http://www.drpciv.ro/*

The highest level of lending is in the Bucharest-Ilfov region and the opposite is the Nord Est development region. As previously stated inclination to credit is closely linked to wage increases and wage levels and directly influenced by the level of development of each region.

In Table 4.2 is shown the value of Pearson's correlation coefficient for 2009 in terms of lending and acquisition of Dacia cars.

Table 4.2. Pearson correlation coefficient of bank loans and Dacia cars sales in 2009

		Loans	Dacia cars sales
Loans	Pearson Correlation	1	0,878(**)
	Sig. (2-tailed)		0,002
	N	41	41
Dacia Cars sales	Pearson Correlation	0,878(*)	1
	Sig. (2-tailed)	0,002	
	N	41	41

Source: *http://www.drpciv.ro/*
** Correlation is significant at the 0.01 level (2-tailed).

Pearson's correlation coefficient has a high value indicating extremely high dependence of Dacia car sales to loan financing provided. Its value is greater than the value obtained in 2007-2010.

Pearson correlation coefficient for other brands of cars is presented in Table. 4.3

Table 4.3 Pearson correlation coefficient for car brands other than Dacia and bank loans in 2009

		Bank Loans	Other brands
Bank Loans	Pearson Correlation	1	0,871(**)
	Sig. (2-tailed)		0,002
	N	41	41
Other brands	Pearson Correlation	0,871(*)	1
	Sig. (2-tailed)	0,002	
	N	41	41

Source: *http://www.drpciv.ro/*
* Correlation is significant at the 0.01 level (2-tailed).

Also for the other automotive brands Pearson's correlation coefficient has an extremely high value which shows a strong dependence on bank loans for the car sales. The value of this ratio is less than the value obtained for the Dacia brand. This can be attributed to the fact that some of the expensive brands were purchased with cash by customers with high financial resources.

5. Conclusion

To purchase cars buyers have to, in most cases, contract loans. Dacia cars were purchased on credit more than other brands on the Romanian market. This may be due to the low

prices of Dacia car that makes them more accessible to low and medium income consumers that appealed to credit in order to finance their car purchase. On the other hand these consumers where among the hardest hit by the gloomy economic conditions that Romania faces now and their decision to buy on credit could cost them high. The interests rates have grow and the financial burden of the loans taken to purchase their cars is getting more and more unbearable. The current conditions in the car loans market confirm these trends as more and more banks and leasing firms reposes vehicles from owners who cannot pay their credit installments anymore.

On the other part, luxury cars, sports or SUV's where purchased mainly without resorting to credit for the overwhelming majority of cases but the middle-income consumers who bought this type of vehicles appealed to loans and are also facing problems in paying them back.

At a regional level, Bucharest-Ilfov Development Region has the highest number of cars purchased to 10,000 inhabitants, but these where mostly credit-financed.

The average value of a car loan is around 12.000 Euros for an average price of the car bought of 18,000 Euros with VAT, which means that, on average, 75% of the value of a car purchased by credit was obtained through loans from various banks.

The fact that the Romanian consumer relies heavily on bank loans when buying a car leads to a strong dependence of cars sales on monetary policy and especially on bank interest rates. Thus, the future economic and financial developments both at a national and at an international level will have a decisive impact on the future of the Romanian car market and especially on Dacia, as the most important Romanian auto manufacturer.

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