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CAR PURCHASING POTENTIAL OF FIRST TIME BUYERS IN BRAZIL AND RUSSIA

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ABSTRACT

The emerging countries of Brazil and Russia are becoming increasingly important for the global economy. However, vehicle ownership is rather low in these countries (133 and 218 cars per 1,000 inhabitants in Brazil and Russia, respectively, in 2010). This indicates that many households have limited access to individual motorized transport at present. As many studies expect a positive economic development in Brazil and Russia, the aim of this paper is to forecast the number of cars bought by the first time buyers until 2030.

This paper is based on a system dynamics model, which aims at examining the car purchasing behaviour of first-time buyers in the period from 2000 to 2030. The number of households that are going to buy a car for the first time is simulated and it is furthermore investigated, whether these households will buy a new or used car. Additionally, the model analyses which car segment (basic, small, medium, or luxury) is most popular among the new middle class. The basic assumption is that once a household reaches a certain income level, the household will buy a car. The logit approach is used in order to model segment choice. To verify the prognosis and to build an empirical database, several demographic and economic framework conditions, as well as the Brazilian and Russian car market are analysed in advance.

The prognosis shows the expected development of car sales to first-time buyers in Brazil and Russia. Results indicate that households of the new middle class will buy used cars rather than new ones. Moreover, first-time buyers in both countries who do choose new cars will prefer the basic segment. When buying used cars, Brazilian households of the new middle class tend towards basic cars, while Russian first-time buyers favour small cars.

The car purchase potential of the new middle class will continue to remain rather small, since the income of the new middle class is unlikely to grow significantly. Furthermore, car costs are rather high.

Keywords: car purchase, car sales, car segment, Brazil, Russia, used cars, new cars, new middle class

INTRODUCTION

The demand for mobility and related transportation demand has been growing constantly in the past. This holds not only for the traditional OECD countries, but also for economies like Brazil and Russia, which have started a successful economic catch up process and exhibit a significant economic growth. As mobility demand is deeply related to the demand of new cars, the motorization rate is an important indicator for the stage of mobility in a country.
The development of worldwide car sales in the past decades was dominated by the new registrations in the triad countries. Strong growth of car sales in the USA, Japan and in most European countries caused by a fast increase of income led to a high motorization rate in these countries. Today, in the USA more than 700 cars per 1,000 inhabitants are registered (World Bank, 2011), the values for Japan and European Countries such as Germany are a little lower. As the market in these countries seems to be quite saturated the car manufactures are searching for new growth markets opportunities. Taking a closer look at some of the most important emerging countries: besides China and India, Russia's and Brazil's motorization rates are quite low. Figure 1 shows the development of the motorization rate in Brazil and Russia compared to Germany. Motorization rate in Brazil and Russia rose slightly within the last years. However, the motorization level is still quite low in both countries: in 2010, there were only 133 and 218 cars per 1,000 inhabitants in Brazil and Russia, respectively.

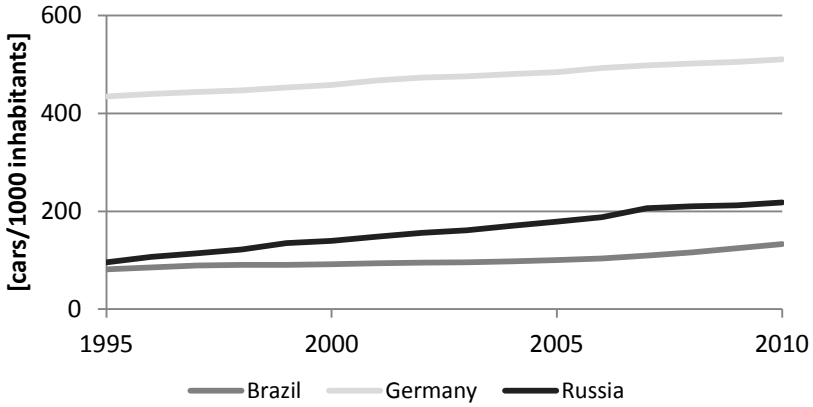

Figure 1 – Motorization rate in Brazil Russia and Germany, 1995-2010 (Source: own calculations, based on Destatis, 2012a; Destatis, 2012b; Drewitz et al., 2010; ITF, 2010; Sindipeças, Abipeças, 2011; World Bank, 2011; World Resources Institute, 2006)

The low rate in Brazil and Russia shows that a huge share of the population in these countries has no access to a car. As a matter of fact income and wealth will grow in the following years and hence the demand for new cars will rise.
We developed a simulation model to predict the car demand of new consumer groups in Brazil and Russia. Socio-demographic and socio-economic framework conditions, which are used as inputs for the simulation, are discussed and the model is described. Additional to the number of cars sold to first time buyers the segments chosen by these people predicted. The major aim is to forecast the market size and composition of segments of cars sales induced by first time buyer as future fleet growth and hence mobility and car availability will be related to this development.

FRAMEWORK CONDITIONS

In the past decades Russia and especially Brazil became powerful economies with huge consumer markets. Economy and wealth of the population grew significantly within the last years. However, both countries differ from one another in many fields, i.e. in their political system. In order to model car purchasing potential, demographic and economic framework conditions as well as the car market need to be analyzed.
Table I compares Brazil and Russia based on different framework conditions. Numeric values refer to the year 2010.

Table I – Demographic, economic and car market framework conditions in Brazil and Russia, year 2010 (source: own compilation)

	Brazil	Russia	Source/Derivations based on
Demographics			
Inhabitants [millions]	195	142	World Bank, 2011
Median age [years]	29.1	37.9	UN, 2010
Household size [persons per household]	3.3**	2.7*	Rose, 2010; Lukiyanova, Oshchepkov, 2011
Economics			
GDP per capita [US$]	10,700	10,400	World Bank, 2011
Average gross wage [US$]	11,900	8,300	Schulze, Marenkov, 2011
Share of households with income < US$ 7.000 [%]	44**	27	DIEESE, 2011; IBGE, 2008; GKS, 2011a; Lukiyanova, Oshchepkov, 2011
Car market			
Car fleet [millions]	26	31	Sindipeças, Abipeças, 2011; Drewitz et al., 2010
New car sales [millions]	2.6	1.9	CEIC Data, 2011; Sindipeças, Abipeças, 2011

* Values of the year 2005
**Values of the year 2008

Brazil and Russia are two of the nine most populous countries worldwide (World Bank, 2011). Brazilian population size (195 million people in 2010) is higher than Russian population size (142 million people). The United Nations (2010) expect the Brazilian population to grow further while Russian population will decrease in future. One reason for the anticipated declining Russian population is that the number of children in Russian households is lower and the household size consequently smaller. The median age of the Russian population is about nine years higher than the medium age in Brazil.
GDP per capita was similar in both countries in 2010 (US$ 10,400 resp. US$ 10,700) and the GDP in both countries is expected to rise within the next years (see PricewaterhouseCoopers, 2011; Drewitz et al., 2010). According to the forecast of PricewaterhouseCoopers (2011), GDP per capita will increase to 20,800 US$ (real values, base year 2010) in Brazil and to 19,800 US$ in Russia in 2030. Average gross wage in Brazil (US$ 11,300 in 2010) is higher than in Russia (US$ 8,300 in 2010). However, the distribution

of household income is more equal in Russia: in 2010, 27% of all households – 17% less than in Brazil - disposed of less than US$ 7,000 per year.
In 2010, the number of car sales in Brazil (2.6 million) was nearly 40% higher than in Russia (1.9 million). Hence, consulting firms and universities (i.e. CAR Universität Essen, Struktur Management Partner, 2011) see a higher growth potential in the Brazilian market. For example, Booz & Company (2011) expects new car sales to rise to 7.8 million in Brazil and to 5.2 million in Russia in 2030. Reasons, according to the authors' opinion, are adverse demographic developments and higher market saturation.

MODEL DESCRIPTION

Passenger car fleet grew significantly in Brazil and Russia within the last years. One reason therefore is the development of new consumer groups: Many households bought their first car within the last years.
To the knowledge of the authors, to date there is no scientific work available, which deals with car demand of new consumer groups in Brazil and Russia. This work aims to close this information gap. However, certain model input and calibration variables, such as historic car sales data to new consumer groups and car maintenance spending are lacking. In order to deal with this matter, we make simplified assumptions and deduce connections from e.g. the German automobile market.
Kunert et al. (2008) investigated the impact of household income and mobility costs on mobility behavior in Germany. They found that car ownership and household income correlate closely: from a certain net household income threshold (€ 2,600 in the year 2003) the broad majority of households possess at least one car.
Hence, the assumption that household income and car ownership correlate closely in Brazil and Russia seems to be reasonable. Within the last ten years the economy in both states developed positively. In consequence, the income of many households rose and the middle class[1] grew in both countries.
In the following it is examined

- how many Brazilian and Russian new middle class households will buy their first car,
- whether they buy a new or used car, and
- which car segments they prefer.

A prognosis model is developed in order to assess the above-mentioned aspects. The structure of the prognosis model is examined and the different modules of the model as well as model assumptions are introduced in the following. The model is implemented and simulated using the system dynamics software VENSIM. The observation period of the model covers the period 2000 until 2030. All monetary calculations are numbered in real terms (US $), base year 2010.

[1] There is no standard definition for the term *middle class* available. The term used in this paper is oriented towards the definition used by the US Middle Class Task Force (2010). Here, the middle class is not primarily defined by their disposable household income but by their hopes and goals. Households who aspire property and car ownership, tertiary education for their children, health and pension insurance as well as occasional vacations are counted among the middle class. Households who belong recently to the middle class due to their economic and social advancement are subsumed under the term *new middle class*.

It has to be noted that the research question is limited to the first car within the household. The purchase of second and third cars is not analyzed in the model.
The structure of the model is illustrated in figure 2.

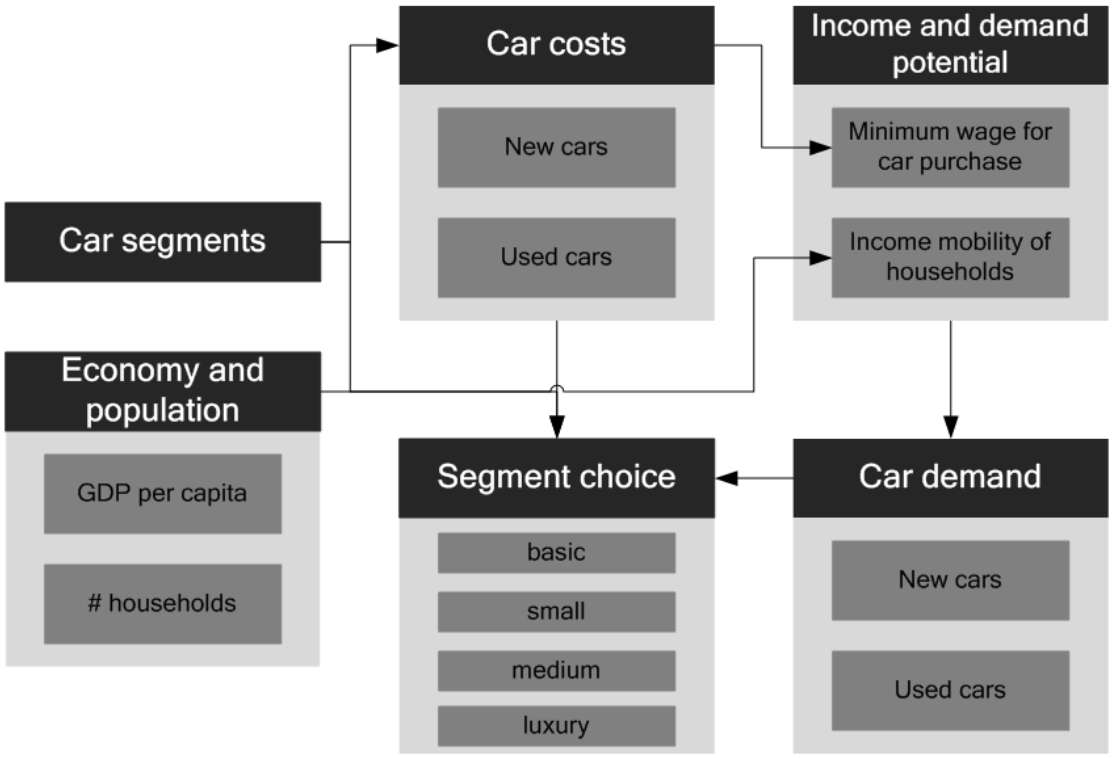

Figure 2 - Structure of the prognosis model (source: own illustration)

The model consists of five modules whereas results of some modules are used as inputs for subsequent modules. Prior to the actual system dynamics modeling car segments have to be defined. Therefore, a database with 50 reference cars is installed. Next, the annually cars costs for new and used cars are computed and the minimum necessary household income for car possession is determined (car cost module). Income development of private households is analyzed based on findings from the economy and population module. Following, the number of households which climb in the observation year above the before determined income threshold for used or new car purchase decisions are determined (income and demand potential module). Using that input, the number of purchased new and used cars by the new middle class is determined (car demand module). Hereafter the segment choice is modeled using the logit approach (segment choice module).
Various exogenous variables and forecasts are used for the model calculations. Table II provides an overview of these variables and shows exemplary values for the years 2010 and 2030.

Table II – Exogenous model variables (source: own compilation)

Variable	Brazil		Russia		Source/ Derivations based on
	2010	2030	2010	2030	
Car cost module					
Petrol [US$/l]	1.42	1.83	0.80	1.04	Agência Nacional do Petróleo, 2010; Fiorello et al., 2009; IEA, 2010
Bio-ethanol [US$/l]	0.82	1.65	-	-	Agência Nacional do Petróleo, 2010; Cavalcanti et al., 2011; Fiorello et al., 2009
Fuel efficiency factor [%]	1	1	1	1	BMVBS, 2002
Annual mileage	7,100	7,400	10,400	11.800	Drewitz et al., 2010
Compulsory insurance [US$/year]	46	46	232	232	Fernando Cirelli & Andrey Klyunchnikow, personal communication, 2011
Complementary insurance [% of the new car price]	5	5	5	5	Fernando Cirelli & Andrey Klyunchnikow, personal communication, 2011
Economy and population module					
GDP per capita [US$]	10,700	20,800	10,400	19,800	PriceWaterhouseCoopers International, 2011; UN, 2010; World Bank, 2011
HH-size [persons/household]	3.2	2.7	2.7	2.5	Rose, 2010; Philippova, 2010
Minimum wage [US$/year]	3,500	7,800	1,600	5,700	GTAI, 2008; DIESSE, 2011
Population [millions]	195	220	142	134	UN, 2010; World Bank, 2011
Income and demand potential module					
Consumption rate [%]	98	98	70	70	Rose, 2010; GKS, 2011b
Car transport expenditure rate [%]	44	44	22	22	GKS, 2010; IBGE, 2009; Zumkeller et al., 2005
Car demand module					
Rate used cars : new cars	2.7	2.3	2.7	2.3	Balt Info, 2010; Fenabrave, 2011; Sindipeças, Abipeças, 2011

* Household income distributions are only available for 2001-2008. Values of the year 2008 are shown here.

Car Segments

The car segments mini, small medium and luxury are determined for the prognosis model. A database with each 25 Brazilian and Russian reference cars was created in order to identify the characteristics of the different car segments. Strongly demanded car brands and drivetrains were particularly considered as reference cars. The classification of reference cars in car segments is oriented towards the segment definitions of Frost & Sullivan (2009). The results of the database analysis, considering the different car segments, are shown in Table III and Table IV: the arithmetic middle as well as the minimum and maximum value for the reference cars are given for purchase price, fuel consumption, motor power and cylinder capacity. The powertrain and two characteristic models are furthermore listed.

Table III – Car segments in Brazil (source: own compilation based on Auto Motor Sport Spezial, 2011; Chevrolet, 2012b; Fiat, 2012; Mitsubishi Motors, 2012; Salao de Carros, 2012; Volkswagen, 2012b)

	Purchase price [US$]	**Powe-rtrain**	**Fuel consump-tion** [L/100 km]	**Motor power** [kW]	**Cylinder ca-pacity** [ccm]	**Model**
Mini	16,060 (14,410-18,440)	Flex-Fuel	7.5* (4.7-8.9)	58 (53-69)	999 (990-1,000)	VW Gol, Fiat Uno
Small	27,140 (23,880-32,320)	Flex-Fuel	8.6* (8.2-9.3)	80 (74-96)	1,790 (1,600-2,000)	VW Polo, Chevrolet Astra
Medium	36,700 (31,980-38,420)	Flex-Fuel	9.7* (7.1-10.4)	98 (87-105)	1,910 (1,750-2,000)	Chevrolet Zafira, Fiat Linea
Luxury	85,940 (51,120-152,650)	Petrol	11.3 (9.1-13.5)	148 (103-179)	3,090 (2,360-3,830)	Mercedes ML, Mitsubishi Pajero

*fuel consumption when using petrol

Table IV – Car segments in Russia (source: own compilation based on Chevrolet, 2012a; Kia, 2012; Lada, 2012; Porsche, 2012; Volkswagen, 2012a)

	Purchase price [US$]	**Power-train**	**Fuel consump-tion** [L/100 km]	**Motor power** [kW]	**Cylinder ca-pacity** [ccm]	**Model**
Mini	11,420 (6,810-16,130)	Petrol	6.4 (4.2-8.5)	56 (50-64)	1,100 (1,000-1,600)	Lada 2107, Kia Picanto
Small	14,730 (12,120-18,770)	Petrol	6.5 (5.5-7.8)	69 (60-80)	1,390 (1,210-1,600)	Lada Priora, Chevrolet Aveo
Medium	24,020 (16,670-35,890)	Petrol	7.7 (7.4-7.9)	93 (80-110)	1,800 (1,600-2,000)	Kia Certano, VW Passat
Luxury	83,370 (32,920-122,020)	Petrol	9.9 (7.8-11.7)	181 (130-220)	3,180 (2,360-3,600)	Mercedes ML, VW Phaeton

Purchase price and fuel consumption of Brazilian cars is higher compared to Russian cars of the same segment. The flex-fuel cars, which are mostly available in the lower and medium segments, can be refueled with petrol, bioethanol or gasohol (Busch, 2010). Most luxury cars in the Brazilian market have gasoline engines. All Russian reference cars are equipped with gasoline engines. Cars with diesel engines are not included in the database as they play only a minor role in the car market of both countries (Frost & Sullivan 2009; Frost & Sullivan 2011b). Engine power and cylinder capacity of same car segments are similar in both countries.

Car cost module

The basic assumption of the model is that once a household reaches a certain income threshold the household will buy a car. This income level depends on the costs of a car. In order to determine the number of households that are able to afford their first car within the observation year, the annual car costs for new and used cars are calculated. It is assumed that car buyers distinct car costs according to their accruing. Consequently, the costs are distinguished between regularly accruing costs – fuel costs, car insurance costs, maintenance and taxation – and non-recurring costs – acquisition costs. These calculations

are done for different car segments for new and used cars (assumed age of used cars: 10 years).

It is known from transport psychology that persons or households do not act purely rational in their car purchase decision (de Haan et al., 2007). They rather only consider costs, i.e. fuel costs which occur within the first three years of car possession (National Research Council of the United States of America, 2002). Taking these findings into consideration, it is assumed in the model that only car costs of the first three possession years are relevant for the car purchase decision.

Fuel cost calculations depend on fuel consumption of different cars, fuel costs and annual mileage. It is furthermore assumed that fuel efficiency of new cars enhances due to improvements in vehicle engineering (see Table II). Furthermore, the model considers that Brazilian mini, small and medium cars will be refueled with bioethanol, if the bioethanol price per liter is at least 30% cheaper than the petroleum price per liter (see Cavalcanti et. al., 2011).

In order to determine annual car insurance costs, the compulsory insurance premium is added to the product from complementary insurance and share of car owners with complementary insurance.

Car maintenance costs are estimated using German car maintenance cost data. Deutsche Automobil Treuhand GmbH (2011) publishes the amount of money German car owners pay annually for car reparation and maintenance, depending on the age of their car. A typical car repair – oil change with filter – is chosen in order to determine costs of Brazilian and Russian cars. Car garage prices for oil change in Brazil, Russia and Germany are compared in order to derive annual maintenance costs.

Tax rates on car ownership and car acquisition are taken from ACEA 2011. It is furthermore assumed that car owner depreciates the acquisition taxes over three years. It is noticeable that acquisition taxes in Brazil are a multiple higher than in Russia.

In contrast to previously discussed car cost components acquisition costs do not accrue annually but the car owner pays the whole amount when purchasing the car. Similar to other literature (see Zumkeller et al., 2005; Kunert et al., 2008; ADAC, 2011a) car purchase price at the first year of car possession is calculated on the basis of car value depreciation. A depreciation period of three years is assumed. It is suspected that the price development of used cars in Brazil and Russia is similar to the German used car market. The link between car age and car market price in Germany is derived from ADAC 2011b. An equal relation is assumed for the Brazilian and Russian car market.

Economy and population module

The economy and population module provides information of the demographic and economic situation. These data are needed as inputs in subsequent modules. Results from this module are the number of households, the number of persons per household, annual GDP alteration rate and minimum wage per country and year. Input data are historical values for population size, GDP, average household size and minimum wage (see Table II). External prognoses are used to detect future population size and GDP of both countries (PriceWaterhouseCoopers International, 2011; UN, 2010). Other data are extrapolated into the future on the basis of average annual alteration rates.

Income and demand potential module

The income situations of private households in Brazil and Russia are analyzed and the minimum needed household income level to purchase a car is assessed in the income and demand potential module. Furthermore, the numbers of households which can initially afford a new or used car in the observation year are determined.
The disposable income of a private household is not constant but it is variable over time. In order to investigate the income situation in Brazil and Russia, all households are allocated to one of the following five income groups: (1) households with low disposable income (≤ US$ 7,000 per year), (2) households with low-medium disposable income (US$ 7,001-14,000 per year), (3) households with medium disposable income (US$ 14,001-21,000 per year), (4) households with medium-high disposable income (US$ 21,001-28,000 per year), (5) households with high disposable income (> US$ 28,000 per year).
Households do not remain in the same income group during the whole observation period as their disposable household income can change. Income mobility depends on different factors. Within this work, the correlation between different demographic and economic variables and average household income was tested (own calculations based on DIEESE, 2011; GKS, 2011a; Lukiyanova, Oshchepkov, 2011; Philippova, 2011; Rose, 2010; Schulze, Marenkov, 2011; World Bank, 2011). A causal link was empirically validated for three variables: (1) GDP per capita: the schematic of GDP calculation on the basis of income breakdown calculations (StLa RLP, 2007) shows that the disposable income of private households depends on a countries' GDP. Thus, GDP per capita and household incomes correlate positively. (2) Minimum wage: development of minimum wage stands as proxy for development of wage share in both countries. As wage is the main income source of private households (Destatis, 2012c), a wage increase affects household income positively. (3) Household size: a vast number of household members implicates a high number of children in this household. If this is the case, the probability that both parents work full time will be lower. Consequently, household size and disposable household income correlate negatively.
On the basis of the previous calculated car costs the minimum needed household income level for car purchase is investigated in this module. This value is calculated on the basis of a household's average annual consumption and car spending (see Zumkeller et al., 2005).
In the next step, the number of households that could afford a car within the observation year for the first time is calculated. The model assumes that the income of every single household changes, when factors which influence income mobility decrease or increase. Equal distribution of households within every income group (see Krail, 2008) is furthermore presumed. A household can initially afford a used or a new car if household income is initially higher than the calculated income level for purchasing a used respectively a new car.
In order to simulate the development of household income in both countries as close to reality a possible, the model is calibrated using the VENSIM internal calibration tool. Therefore, the endogenous variables which reflect the share of households per income group are replaced by exogenous variables filled with statistical data for the calibration period of 2001 until 2008 for Brazil respectively 2002 until 2010 for Russia (figure 3 and figure 4). Model parameters are calibrated in order to simulate income mobility on the basis of alterations of GDP per capita, minimum wage and household size during the calibration period.

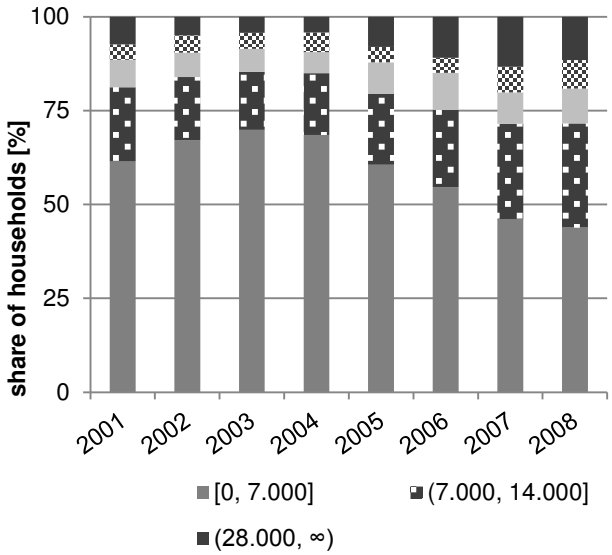

Figure 3 – Brazil: distribution of households according to their annual household income (source: own calculations based on DIESSE, 2011; IBGE, 2008)

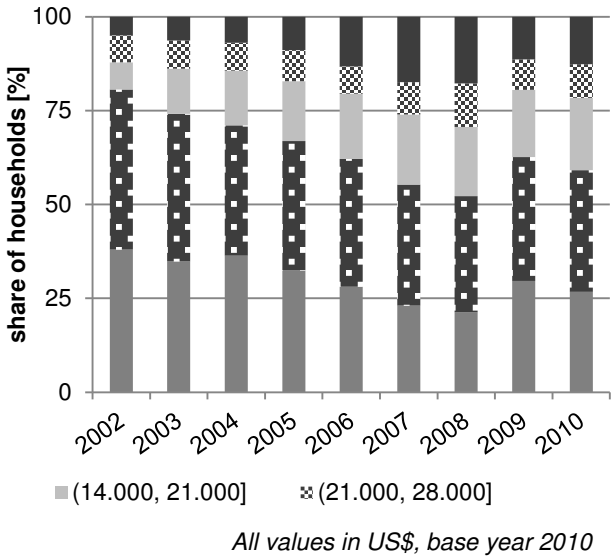

Figure 4 – Russia: distribution of households according to their annual household income (source: own calculations based on GKS, 2011a; Lukiyanova, Oshschepkov, 2011)

Car demand module

Using the input of the income and demand potential module, the number of purchased new and used cars by the new middle class is determined in the car demand module.
The number of households who can initially afford a used car and the number of households that can initially afford a new car in the observation year was determined before. It is assumed that a certain share of households who can afford a used car within the observation year will buy one. The remaining households prefer new cars and will wait for their car purchase decision until their household income suffices to afford a new car. This assumption indicates that all household that can afford a new car in the observation year will own a car: A part of these households has bought a used car before and the remaining households buy a new car in the observation year.
It is assumed that the share of new and used cars of the total Russian and Brazilian car sales (own derivation based on Balt Info, 2010; Fenabrave, 2011, Sindipeças, Abipeças, 2011) corresponds to the new and uses car shares of first time car buyers.
The car demand module calculates the number of used and new cars bought by the new middle class in Brazil and Russia.

Segment choice module

Furthermore, the model analyses which car segment (basic, small, medium, or luxury) is most popular among first time car buyers. Segment choice is modeled using the logit approach. This approach is used frequently in scientific literature in order to solve car segment choice problems (for instance Berkovec, Rust, 1985; Choo, Mokhtarian, 2003; Hocherman et al., 1983).

Each car buyer chooses a car of a certain segment out of different discrete alternatives – he can opt for a basic, small, medium or luxury car. The basic assumption of the logit model is that the car buyer wants to maximize the benefit he derives from car purchase (Train 1993). Scientific studies indicate that this benefit depends on different observable vehicle properties and household characteristics (Choo, Mokhtarian, 2003).

The factors car purchase price, regularly accruing car costs, car engine power and household size are considered in the model. The impacts of these factors on car purchase are described hereafter. (1) Car purchase price: scientists indicate that the probability of a positive car purchase decision decreases the more expensive the car is (Choo, Mokhtarian, 2003). The significant variable for this causal relationship is the purchase price of a car. (2) Regularly accruing car costs: fuel costs, insurance, tax and maintenance costs are car costs which accrue when using a car. Increasing regularly accruing car costs induce decreasing benefit of a certain car segment. (3) Car engine power: a car is not only a usage object but is also often seen as a status symbol – as an object which demonstrates the wealth and the social status of its owner. The term car engine displacement is used in the model in order to quantify the status symbol character of a car. Consequently, high car engine power positively affects the attractiveness of a certain car segment. (4) Household size: A car with many seats is more desirable for households with many household members than for small households.

The benefit V(t) a household derives from purchasing a car of a certain segment is quantified as the following linear combination.

$$V_{i,seg,a}(t) = \alpha * HHgröße_i(t) * \sqrt{pkwSI_{seg}} + \beta * pkw\Pr_{i,seg,a} + \gamma_i * \frac{regKO_{i,seg,a}(t)}{pkwL_i(t)} + \delta_{i,a} * pkwML_{i,seg}$$

For year t, HHgröße(t) denotes the average household size in year t. pkwSI is the number of passenger seats per car. pkwPr represents the car purchase price and regKO(t) are the regularly accruing car costs in year t. pkwL(t) denotes the yearly mileage in year t. pkwML stands for car engine power in horsepower. The index for car age is a (a: new, used). The index seg denoted the observed car segments (seg: basic, small, medium, luxury). α, β, γ and δ are model parameters. Parameter values are derived from the logit parameter estimations of Berkovec (1985), Berkovec & Rust (1985) and Hocherman et al. (1983).

The probability P that the decision maker who buys a car of age a in country i choses alternative seg in year t is calculated as follows:

$$P_{i,seg,a}(t) = \frac{\exp(V_{i,seg,a}(t))}{\sum_{seg \in SEG} \exp(V_{i,seg,a}(t))}$$

The major outputs of the segment choice module are segment shares of Russian and Brazilian car sales to the new middle class.

MODEL RESULTS

Results of the simulation are presented and discussed in the following chapter. The number of Russian and Brazilian households buying a new or used car within the observation period is shown. It is furthermore analyzed which car segments these households prefer.

The car sales to the new middle class in Brazil and Russia from the year 2000 to 2030 are shown in figure 5 and figure 6.

An increasing number of households buy their first car in Brazil within the last years. Only during the international economic crisis 2009 car sales decrease. Most cars – about 830,000 units - are bought by first time buyers in 2010. Hereafter, car sales to the new middle class decrease constantly. Only about 310,000 cars are sold in 2030. The reason for this development is that a large number of households that dispose already enough income to own a car and the number of households who will not own a car will be quite little until 2030. Between 2000 and 2030 first time buyers in Brazil will buy 12.8 million cars – 3.7 million new cars and 9.1 million used cars.

The car demand of the new middle class affects motorization in Brazil positively. If the growth of the Brazilian car fleet until 2015 was only caused by first time car buyers, car density would rise from 133 cars per 1,000 inhabitants in 2010 (see figure 1) to 144 cars per 1,000 inhabitants in 2015.

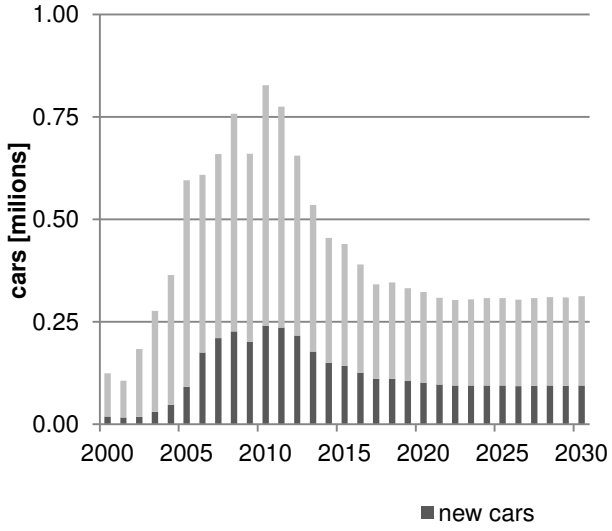

Figure 5 – Brazil: car sales to the new middle class (source: model calculations)

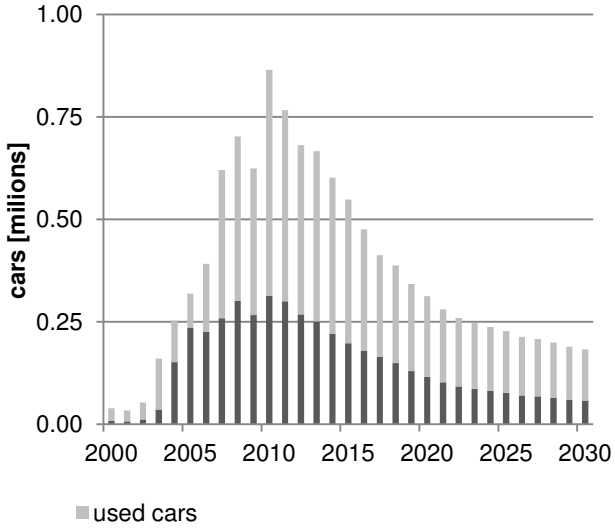

Figure 6 – Russia: car sales to the new middle class (source: model calculations)

Car sales to the new middle class increase in Russia within the last years, too. The car demand of the new middles class attains its maximum in 2010: first time buyers purchased 870,000 cars. Hereafter, car sales to the new middle class decrease continuously until 2030. There, only 180,000 cars are bought. The new Russian middle class will buy 11.5 million cars – 4.6 million new cars and 6.9 million used cars – in total.

Again, if car density in Russia was only induced by first time car buyers, the number of cars by 1,000 inhabitants would rise from 218 in 2010 (see figure 1) to 240 in 2015.

A comparison of total new car sales in Brazil and Russia in 2010 (Sindipeças, Abipeças, 2011; Ernest & Young, 2010) with model results shows that 9.1% of all new car sales in Brazil and 16.4% in Russia are purchased by first time buyers.

The model also analyzes which segments first time car buyers prefer. Model results are shown in figure 7 and figure 8.

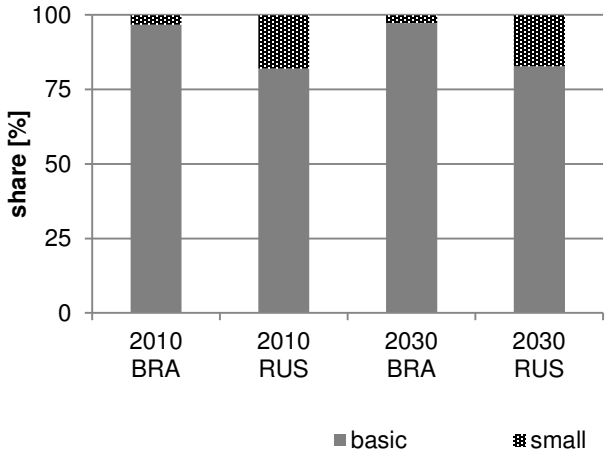

Figure 7 – New car segment choice in Brazil and Russia (source: model calculations)

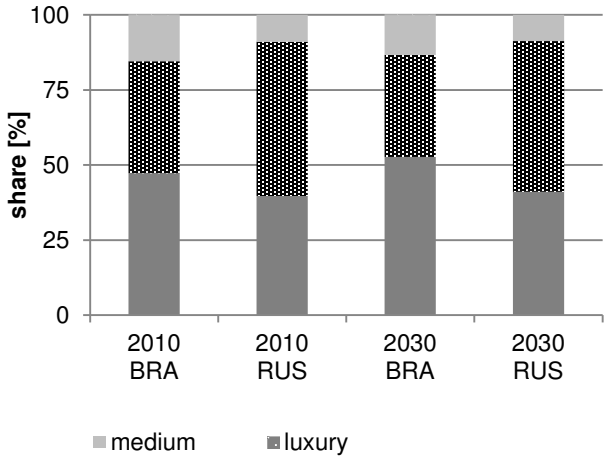

Figure 8 – Used car segment choice in Brazil and Russia (source: model calculations)

About 97% of new car buyers in Brazil turn to small cars in 2010 and in 2030. In Russia, about 82% of first time buyers of new cars purchase a basic car, 18% a small car in 2010. In 2030, about 83% Russian new car buyers prefer basic cars. The share of medium and luxury new car sales to the new middle class is negligible. Reasons for increasing basic car shares in both countries are rising regularly accruing car costs and decreasing household sizes.
In Brazil, 47% used car buyers prefer basic cars in 2010. Further 37% buy small and 15% purchase medium cars. In 2030, the share of basic cars on used car sales to the new Brazilian middle class rises to 53%; 34% prefer small cars and 13% medium cars then. In 2010, 51% of Russian used car buyers of the new middle class buy small cars, followed by basic (40%) and medium cars (9%). Compared to 2010, in 2030 segment shares of used car sales of the Russian new middle class remain the same.

CONCLUSION

Both countries, Brazil and Russia, will be important players on a future market of globalization. The dynamic growth, especially in Brazil, will make this market to an important opportunity for car manufactures to increase sales. This paper shows that first time car purchasers buy more cars in Brazil (12.8 million) than in Russia (11.5 million) within the observation period. This result indicates that the Brazilian car market would become more important for automotive companies in future than the Russian market.
However, the car purchase potential of the new middle class will continue to remain rather small. Furthermore, first time buyers in both countries prefer used over new cars and chose rather small than big cars. Reasons therefore are that household income of the new middle class is unlikely to grow significantly in the future. Furthermore, car costs such as purchase price or fuel costs are rather high. The development of cheap mobility concepts that enable households of the new middle class in emerging countries, such as Brazil or Russia, to participate in the use of cars could be worthwhile.

A comparison of the total new car sales in Brazil and Russia in 2010 with model results shows that only a small number of all new car sales (9.1% in Brazil, 16.4% in Russia respectively) are purchased by first time buyers. This finding indicates that other consumer groups, e.g. households which buy a second or third car or replace their old car with a new one, are also important when analyzing the car market. The described model could be extended in future in order to assess the purchase behavior of these consumer groups.

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