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**REGULATORY DETERMINANTS OF US AUTOMOTIVE
MARKET STRUCTURE – AN OVERVIEW**

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INTRODUCTION

Governments have various measures at their disposal to influence the car market and thus achieve particular goals. Indirect interventionism, due to, for example, environmental regulation, should include social welfare. Moreover, economic aspects can force governments to take direct action on the market. The occurrence of particular circumstances can be a reason to nationalise a company. All these processes have already happened in the history of the American car industry. Indirect and direct interventionism has influenced both market structure and foreign competitors. The main reasons for this action were the need to save thousands of jobs in the car industry and increase environmental standards.

The aim of this article is to identify the regulatory determinants of changes in car sale structures and other consequences of government intervention in the car market. These findings could be very useful in further research concerning the Polish automotive market. The American passenger car market has a long history; therefore, as much should be learnt as possible from its successes and failures. Firstly, we need to clarify and analyse the prospects of government influence on strategic sectors, which the automotive branch definitely is for the US economy. The research also analyzes the concentration ratio (CR4) and Herfindahl–Hirschman Index (HHI) that were used to highlight the level of changes in market structure.

**NON-REGULATORY AND REGULATORY DETERMINANTS
OF PASSENGER CAR OWNERSHIP**

The determinants of passenger car ownership can be divided into two groups: regulatory and non-regulatory. The second group has been widely described by V. Van Acker and F. Witlox, who maintain that the two main factors that influence car ownership are



daily lifestyle and travel habits. Therefore, the following determinants can be distinguished [Van Acker and Witlox 2010]:

- population density;
- opportunity to reach daily destinations;
- gender;
- level of education, employment, and personal income.

Berri has found that there is a connection between the level of a society's income and car density. Changes in car ownership can be acknowledged as a convincing indicator of a country's development. Research in seven different countries (France, Italy, the Netherlands, the United Kingdom, Poland and the United States) highlights this relationship. Although Berri focuses on non-regulatory determinants, such as the history of a car market in a particular country, economic development, and population density, her findings are also worth mentioning here for the valuable background they provide. The higher the level of social welfare, the lower the number of car purchases will be. Such a relationship can also be seen in the US car market [Berri 2009].

Distortions that negatively influence market mechanisms are called market failures. Regulation is one of the methods used to achieve higher market efficiency [Asch 1988]. If interventionism is not based on a purposeful and integrated formula, it might have a tendency to cause random measures including:

- government reaction to incidental market changes;
- solutions that solve the problem in one area, but can also cause distortions in others;
- reasons for further differentiation of the position of entities on the market.

The state may intervene to:

- restructure the economy;
- redistribute incomes and expenses;
- eliminate market instability;
- change social policy.

Interventionism developed due to the inability of the free market to solve a crisis without assistance [Wrzosek 2002]. The 2008 financial crises destabilized the market. As a result, the US government decided to intervene directly, also in the automotive market. This was a sign of direct interventionism from the main regulator. In normal circumstances, a government has a range of indirect tools to steer a market in the desired direction, one of which is fiscal policy. Fiscal instruments are some of the most popular and effective regulatory determinants of automotive market share. U. Kunert and H. Kuhfeld [2007] divided them into three groups:

- a one-time payment linked with purchase and registration (i.e. turnover tax, registration tax, registration fees);
- periodically charged taxes (i.e. vehicle tax, insurance tax);
- charges that depend on vehicle usage (i.e. petroleum tax).

Specific taxes can also vary. For example, there are at least 10 different bases for estimating registration taxes in Europe. Moreover, there are eight different bases in European countries for vehicle taxes levied on passenger cars [Kunert and Kuhfeld 2007]. Parry has pointed out that the optimal petroleum tax in the US should be twice as much as the current base. In comparison, it should be half as much in the UK. One of the major reasons for this discrepancy is the political background. Firstly, decentralisation and

ethical diversity help to preserve the low tax rate in the US and federal authorities prefer governance to direct steering. Secondly, lower density and public transport availability have a greater impact on road transportation. Finally the US has vast and diverse oil supplies, so the, oil giants and the entire car industry play a significant role in the economy [Parry and Small 2005].

THE BIRTH OF THE BIG THREE

General Motors (GM), Ford and Chrysler make up what is known as the Big Three of the American automotive industry. They strengthened their leading position after the crisis in 1930. Smaller car producers were not able to compete with the effects of scale and the shrinking economy, which let only the strongest car producers survive. There were 88 competitors in 1928, but the number had been slashed to 5 by 1958. The remaining other significant players were American Motors and Studebaker. This oligopoly in combination with the trade union monopoly (UAW – United Automobile Workers) seemed to be unbeatable. Moreover, the post-WWII boom helped the Big Three to develop rapidly. This is because they managed to fulfill consumers' expectations and preferences. For example, the moral revolution associated with contraception was a great time for the new Ford Mustang. Millions of Americans admired the 1960s muscle cars and their own escapades in the automobiles of their youth. The new invention of television was also helpful in spreading the popularity of cars as a symbol of status and power in the US. Ford booked advertising on all three television networks and ran advertisement campaign in newspapers nationwide [Ingrassia 2011].

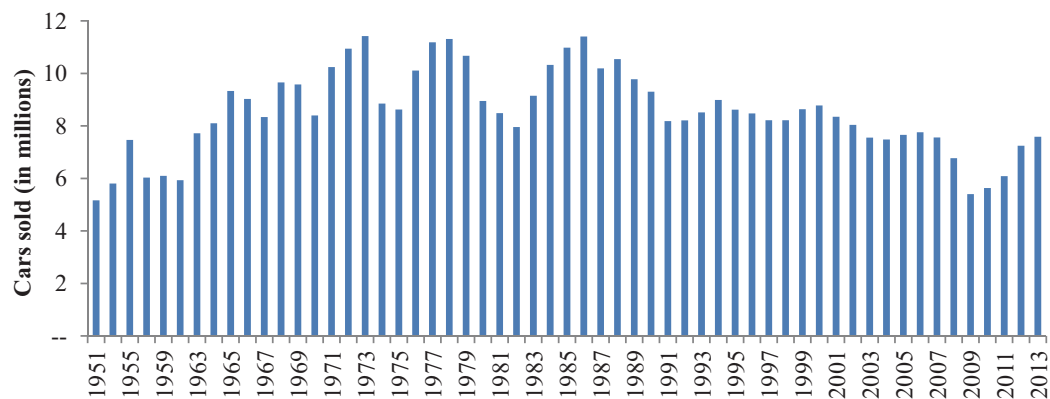


FIG. 1. Sales volume of new passenger cars in the US, 1951–2013

Source: the author's own elaboration based on Ward's Auto database, available at wardsauto.com/data-browse-us-sales-inventory [accessed: 03.12.2014].

As Figure 1 shows, the yearly number of car sales has been stable since 1990, with a slightly falling trend. Overall, the market has diminished significantly compared to the highs of 1985 or 1977. The 1973 oil crisis 1973 and the 2008 financial crisis precipitated steep declines.

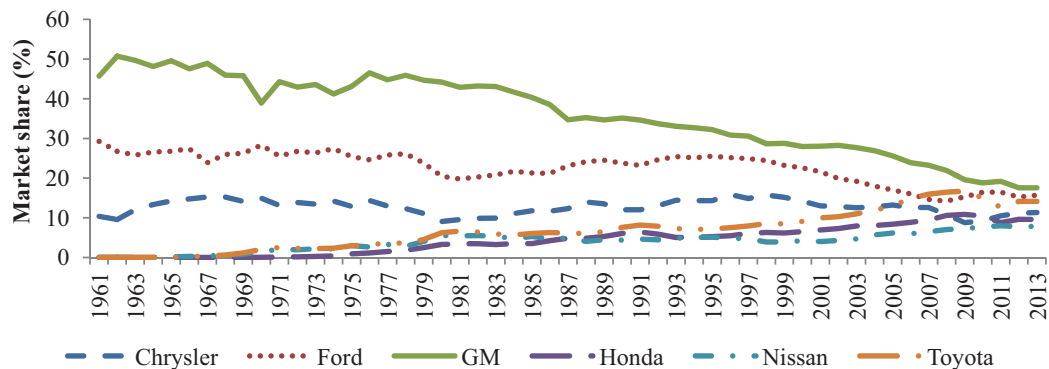


FIG. 2. The top six and their shares in the automotive market in the US, 1961–2013

Source: the author's own elaboration based on Ward's Auto database, available at wardsauto.com/data-browse-us-sales-inventory [accessed: 03.12.2014].

As Figure 2 shows, the structure of the car market has changed over the last 50 years. The Big Three's total 90% stake in the market in 1960 became a 10–20% market share for each of the main six market participants. The automotive sector was influenced by different determinants leading to the final stage today. The situation could have been far graver if the American government had let the dying giants from Detroit fail after the 2008 crisis.

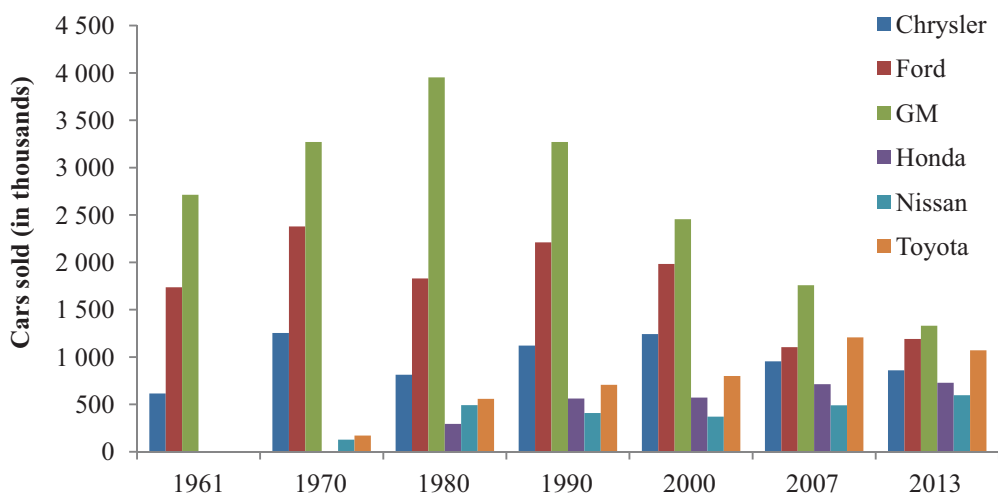


FIG. 3. The top six carmakers and their sales volume in 1961, 1970, 1980, 1990, 2000, 2007, and 2013

Source: the author's own elaboration based on Ward's Auto database, available at wardsauto.com/data-browse-us-sales-inventory [accessed: 03.12.2014].

A comparison of passenger car sales among the top competitors in the last 50 years reveals an increasingly oblate structure. Figure 3 displays the falling sales volume, especially of GM, and the rising volumes of Japanese brands Honda, Nissan, and Toyota. In the early years (1960–1990), limited access to the American market for foreign competi-

tors was one reason the Big Three dominated to the extent they did, perhaps inflating the truth of the well-known notion “America will buy everything that Detroit builds”. Detroit was the centre of the automobile industry, with the main GM, Ford and Chrysler factories headquartered there.

Changes in market structure are confirmed by an analysis based on market concentration indicators: CR (concentration ratio) and HHI (Herfindahl–Hirschman index). In this article, CR is focused on total market share of the four largest car sellers. It illustrates their level of market control and, all in all, the tendency towards an oligopolistic model. This indicator varies from 0% (extremely competitive market) to 100% (monopoly). Different methodologies clarify the levels between these two extremes:

- low concentration (0–50%). As value grows, the market structure changes from monopolistic competition to oligopoly;
- medium competition (50–80%). This kind of market structure is usually strictly oligopoly, or has a lot in common with it;
- high concentration (80–100%). Oligopoly structure that often requires government regulation.

The second indicator, HHI, is calculated on the basis of the top 10 car sellers. The US Department of Justice uses the following levels in estimating concentration:

- unconcentrated market (0–10%);
- moderately concentrated market (10–18%);
- highly concentrated market (above 18%).

Changes in both indicators for automotive market concentration in particular years are shown in Figure 4.

Concentration ratio fell from 91% in 1961 to 59% in 2013, meaning that the market share of the top four car sellers dropped by more than 30% in 50 years. This trend is also

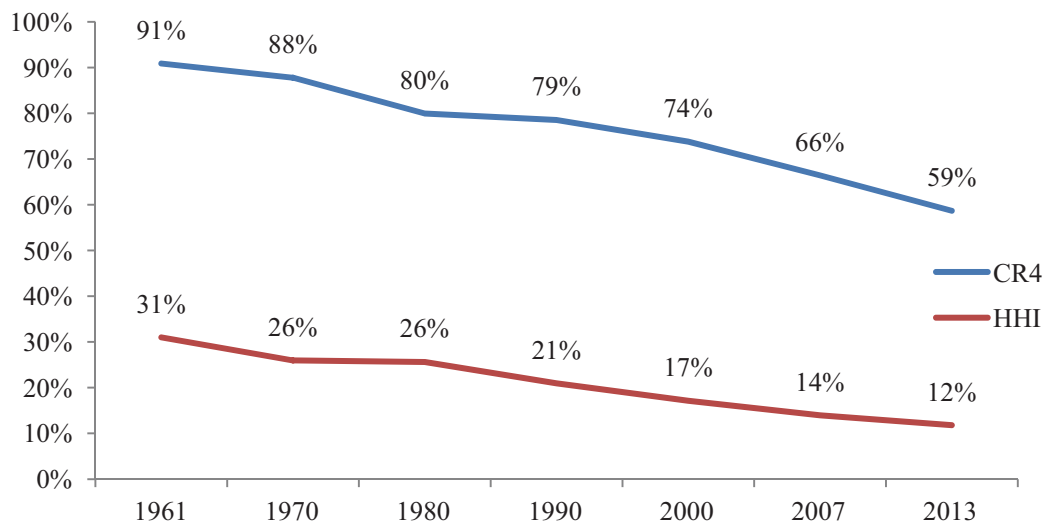


FIG. 4. Concentration ratio (CR4) and Herfindahl–Hirschman index (HHI) for the automotive market in the USA in selected years

Source: the author’s own elaboration based on Ward’s Auto database, available at wardsauto.com/data-browse-us-sales-inventory [accessed: 03.12.2014].

confirmed by HHI as its value declined by 19% in the same period. As a result, the market structure changed from highly concentrated (far above 18%, which is said to be the moderate limit) to almost unconcentrated (near 10%). If the government had not decided to help GM and Chrysler avoid shut down after bankruptcy, these indicators would have fallen even more significantly.

INTRODUCTION OF ENVIRONMENTAL STANDARDS

The rising awareness of environmental issues and the resulting regulations did not bypass the car industry. A new amendment, called the Clear Air Pact, was implemented on 22 April 1970. Car producers had to change their emissions standards and make a greater effort to enhance engine efficiency; therefore, environmental regulations have played an increasingly important role in the automotive market since 1970. In their research, V.J. Karplus et al. [2013] presented the influence in the US on the greenhouse effect of regulation regarding CO₂ emissions in the car industry and road transportation. The econometric model estimated that fuel-saving standards are 6 to 14 times more efficient than traditional fiscal instruments, such as increasing the fuel tax. The aim of this estimation was to lower the amount of fuel used at any cost. The number of vehicles in the US has risen 2.3% annually since 1970, but the distance travelled has only gone up by 0.4% year on year. Cars were also responsible for 45% of fossil fuel usage in 2010. Due to this trend, the US government decided to amend CAFE (The Corporate Average Fuel Economy). As a result, CAT standards (Cap and Trade) were planned. Although this regulation was somehow rejected, it shows the direction environmental restrictions in the car industry and transportation are going to take [Karplus et al. 2013]. New emissions standards relating to distance travelled were set thanks to the new Clear Air Act (2010), which was subsequently amended and sharpened by the EPA (Environmental Protection Agency). We cannot forget about the power of the well-known car industry lobby. There are many obstacles to implementing new regulations in this area, because car producers and the transport sector contribute significantly to the US economy. Therefore, fuel taxes in the US are lower than, for example, in Europe. Sterner emphasised the importance of fuel tax in the context of climate politics. This fiscal instrument influences the demand for fossil fuels and the resulting CO₂ emissions. According to Sterner's estimation, if Europe implemented a tax model similar to that in the US, the demand for fuel would be twice as high as it currently is. On the other hand, if the US implemented European tax rates, the usage of fossil fuels would decrease by 57%. Overall, the fuel tax is one of the most effective ways of reducing CO₂ emissions [Sterner 2007].

AMERICAN CAR PRODUCERS WERE CHALLENGED ON DIFFERENT NICHES

New environmental regulations were not the only obstacle for the Big Three from Detroit. The demand for higher wages and other employee benefits forced car producers in the US to renegotiate work conditions. The power of the UAW was very effective

and, as a result, GM and others agreed to a new deal with workers. This move negatively influenced car production costs. Moreover, Israel invaded Egypt in October 1973 and oil exporters from the Persian Gulf imposed an embargo on US. Oil prices, which had been stable for 25 years, but went on to increase rapidly (by 60%) in a few months (Fig. 5). Shrinking oil reserves forced the US government to limit fossil fuel usage and decrease the speed limit to 55 miles per hour. This was also the reason for the subsequent tougher emission standards in car production. Other events including the Vietnam War and Water-gate scandal also took its toll on the car industry.

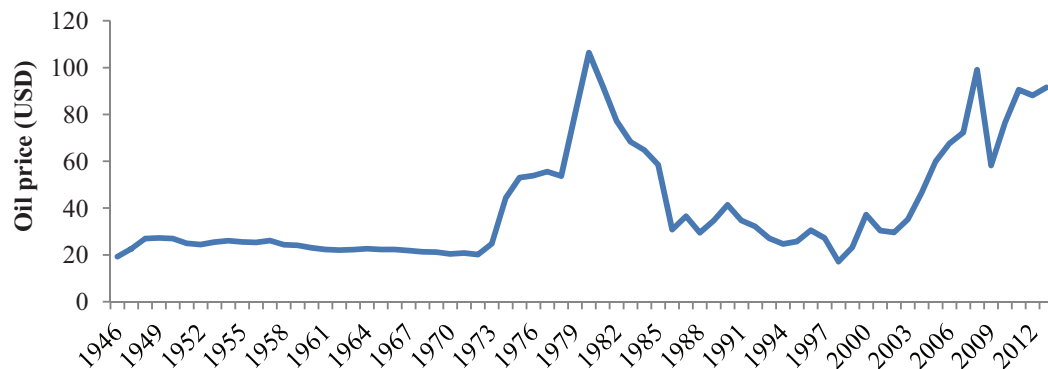


FIG. 5. Oil price corrected by inflation rate in 1946–2012

Source: own elaboration based on inflationdata.com [accessed: 03.12.2014].

Due to these problems, foreign competitors found their opportunity to break the domination of The Big Three and enter the American car market. Car producers from abroad, mainly from Japan, offered smaller vehicles with low fuel usage. This was a perfect match with market expectations. Since then, the Japanese market share in the US has grown at a constant clip ever since. The US government tried to protect home car producers by imposing limitations on the number of cars that could be imported. Initially, in 1980, it was 1.7 million annually, but rose to 2 million by the middle of 1980. This regulation did not deter the Japanese companies, which opened production plants in the US and car sales grew year on year.

THE FINANCIAL CRISIS AND INTERVENTIONISM

The Big Three from Detroit already had their own doubts about the future (i.e. high labor costs and ineffective car brand policies) just prior the financial crisis in 2008. Ford suffered an 8.7 billion USD loss and GM a 15.5 billion USD loss in the second quarter of 2008. General Motors shares were worth less than 12 USD, the lowest price for 26 years, and Merrill Lynch bank forecasted a scenario in which GM went bankrupt “as not impossible”. The peak of the financial crisis came in September 2008. Merrill Lynch was merged with Bank of America, insurance giant AIG needed to ask for a bailout, and investment bank Lehman Brothers declared bankruptcy. As a result, the Dow Jones index

fell to 500 and two weeks later the government introduced a rescue plan worth 700 billion USD. These events had an enormous impact on passenger car sales in the US and the volume of new vehicles purchased fell by 30%. A cash injection was not enough to help the American car giants. For this reason, in 2009 the government implemented a special rescue plan designed for the car industry. Official estimations were that bankruptcy of the car industry would mean 3 million lost jobs, 150 billion USD in lost personal incomes, and another 156 billion USD in lost tax revenues. The rescue plan obliged participating companies to make significant production cost cuts, abandon less profitable brands and sectors, to name a few changes. On these conditions, car producers were partly nationalized with the intention to re-sell acquired shares in the future.

Unfortunately, GM did not survive on its own. Previously one of the most powerful corporations in the world, GM went bankrupt on 1 June 2009. Debt reached 172 billion USD while assets were estimated at 82 billion USD. The recovery plan set up the following division of new shareholders: the American government 60%, bondholders 10%, trade union healthcare fund 17.5%, and the Canadian government 12.5%. Nationalisation was reversed in 2013. Overall, the government recouped 39 of the 49.5 billion USD it invested in saving the Detroit car giants. Chrysler was also forced to declare bankruptcy and reshape Chrysler Group LLC. Finally, Fiat (an Italian car producer) took over Chrysler in 2014.

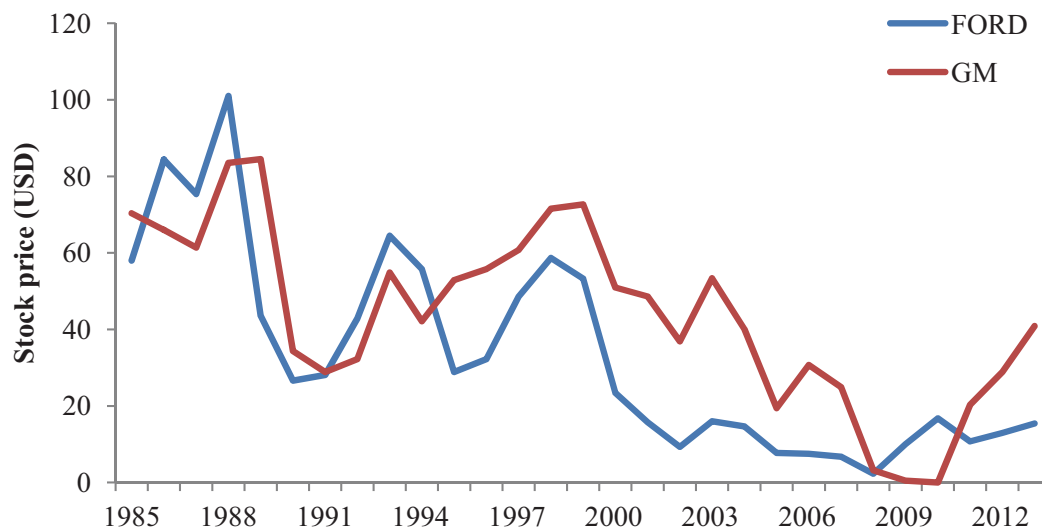


FIG. 6. Ford Motor Company and General Motors stock prices in 1985–2013

Source: own elaboration based on <http://www.stockoptionschannel.com>, <http://www.1stock1.com>, <http://finance.yahoo.com> [accessed: 03.12.2014].

As can be seen in Figure 6, the value of American car producers has fallen constantly since 1987, hitting the lowest point after the crisis in 2008. Chrysler is excluded from our comparison due to changes in ownership. Share prices do not include dividends and are given as year-end values. As a result of bankruptcy, GM also issued a new series of shares in 2010.

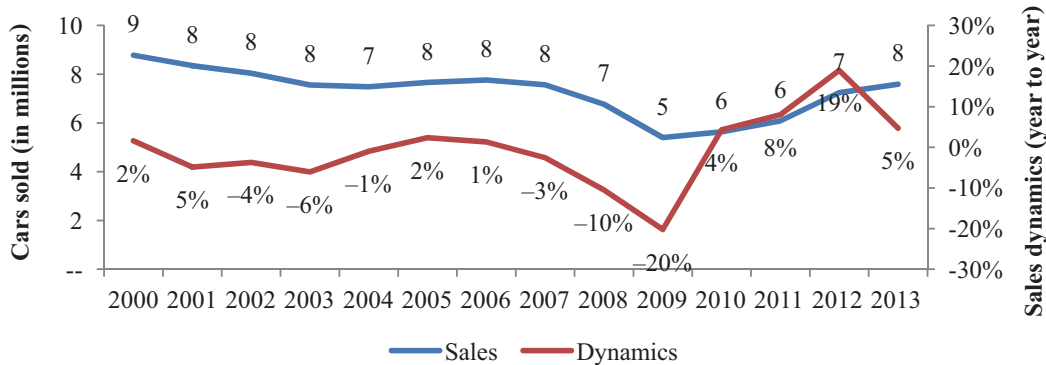


FIG. 7. Sales volume and dynamics of new passenger cars (year to year) in the US in 2000–2013

Source: own elaboration based on Ward's Auto database, available at wardsauto.com/data-browse-us-sales-inventory [accessed: 03.12.2014].

There are several doubts about government intervention and the rescue of two of the Big Three from Detroit. As we know, some economic paradigms indicate that the state has no right to steer and lead private companies to bankruptcy, because individual investors and equities holders would have no chance to get their money back. This is the cost of saving social benefits for employees and jobs. According to the American Automotive Research Center, the total cost of the recovery plan for GM and Chrysler was 13.7 billion USD. On the other hand, 1.2 million jobs were saved in 2009 and there was no need for an estimated 39.4 billion USD of social expenses in 2009 and 2010. P. Ingrassia stated that the total bailout for GM and Chrysler reached over 100 billion USD. This estimation includes direct financial injection for companies, as well as help for subcontractors, suppliers, and vendors in the form of discounts and other initiatives for buying new cars, and so on [Ingrassia 2011].

Ford Motor Company also faced financial crisis in 2008, but was the only one of the Big Three to survive without declaring bankruptcy or receiving state help, though they asked for it. An agreement with trade unions let production costs decrease so significantly that there was no danger of losing financial liquidity. Another fact worth mentioning was that they were able to finance their own development with less risk, and therefore use its financial reserves in the crisis. GM and Chrysler had not followed such a sensible financial policy and therefore lacked the cash to pay their debts.

CONCLUSIONS

Different approaches to interventionism influence ongoing perceptions of market regulation theory. This also applies to the automotive market. Measures against market failure (i.e. unfair competition and monopoly, road transportation safety or environment care) should be taken when the need arises. The government played the role of guardian angel not only for the US automobile market, but also for some private companies as it directly intervened to rescue them.

As P. Ingrassia [2011] observed, the entire cost of the financial sector bailout and the saving of American banks was seven to eight times higher than the recovery plan for Detroit. In addition, the United States suffered a number of emotional losses, with political costs and dented pride among them. One of the reasons for the collapse of the Big Three was foreign competition, mainly car producers from Japan. Since the 1973 oil crisis, more and more American consumers have purchased Nissan or Toyota vehicles. This prompts the question: Why did the government rescue the automotive giants and not let them go bankrupt? The first answer contradicts Schumpeter's "creative destruction" or even the basics of Smith's theory. If GM and Chrysler had been left to their own devices, they would also probably have gone bankrupt and disappeared like Lehman Brothers. There is no empty space in the market; maybe saving them, however, prevented the opportunity to create new companies that would be more effective and better managed than the dying giants? The answer to this question may be found in political economy. The Detroit region is one of the most important sectors of American industry and plays a prominent role in US history, akin in many ways to Silicon Valley. There's a good deal of truth in Charles Erwin Wilson's admission: "because for years I thought what was good for our country was good for General Motors, and vice versa" [Simmons and Macklin 2014].

In summary, the American automotive market has been influenced by different forms of direct and indirect interventionism. Environmental or safety regulation caused all of the Big Three to change. The financial crisis of 2008 clearly showed that market mechanisms are not sufficient. Possible further losses associated with the collapsing car industry forced the government to take control of the bankruptcy of GM and Chrysler. Since then, the Big Three has become the Big Six, in which each of the competitors has around 10–20% market share.

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Summary. Governments have different measures at their disposal to influence the car market and thus achieve particular goals. Indirect interventionism, thanks to i.e. environmental regulation, should include social welfare. The American automotive market is more than 100 years old and has been the subject of various regulations that have shaped its structure. The Big Three of the US car industry (General Motors, Ford Motor Company, Chrysler) has changed over the last 50 years into The Big Six, which now includes Nissan, Honda, and Toyota. Analysis shows how fiscal and environmental policies influence particular sectors. This should be a revealing lesson for Polish automotive market regulators, especially when we need to deal with our own problems, such as the high average age of vehicles. The article also describes government activity in rescuing a key national economic sector. The financial crisis of 2008 showed that market mechanisms are not sufficient. Possible further losses related to the collapsing car industry forced the government to take control of the bankruptcy of GM and Chrysler.

Key words: American automotive market, interventionism, General Motors, Ford, Chrysler

JEL: O18, O38, O51

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