Cash for Clunkers: Does it Stimulate Car Markets?

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ABSTRACT

Automotive industry in several developed countries has been the back bone of their economies employing a large number of workers and contributing significantly to the overall industrial output. Sudden decline in demand for new cars caused by reduced finance accessibility and by bleak consumer outlook led many governments to the introduction of special car scrapping schemes – special programs designed to stimulate new car purchases in search for lower emissions and increased road safety. The question of that time as well as today remains the same: do car scrapping schemes unlock the demand for new cars, alleviate consumer fears and contribute to the long term prospect of car markets or did they simply bring the demand forward, exhaust the market capacity, and immediate gains would be offset later on by lower car sales?

Keywords: Automotive Industry, Market, Strategy, Cash for clunkers, Car scrappage schemes, Demand shift, Crisis

1. INTRODUCTION

At the time of economic downturn, governments typically incentivize frozen financial markets, consumer spending and become more active players in deterring threat of bankruptcies – from direct subventions to certain companies, through government-backed loans to direct privatization or direct stimuli to consumers of goods, producers of which have been affected the most. The recent economic recession has been marked in a number of countries by car scrapping schemes. Consumers, initially stimulated through ever increasing fuel prices, turned their back on new cars in the fear of job security, decreased personal wealth and limited finance options. On the other hand, governments have been seeing prospects of lower tax collection, higher unemployment and more aged vehicles on the road yet pursuant to meet obligations of global anti-warming initiatives.

Car scrapping schemes offered owners of well used cars an opportunity to receive a special bonus if they dispose of their old vehicle indefinitely losing the opportunity to trade-in. Suddenly incentivized demand for new cars through scrapping schemes offers market opportunity for many producers and dealers. However, the opportunity goes hand in hand with uncertainty: would the sudden consumer interest be followed by even harder landing on the tarmac of economic crisis, would the market capacity be simply exhausted more rapidly, would there be a slump in demand after governmental money runs out?

2. SCRAPPING SCHEMES

Car scrapping schemes have been introduced in most top-10 car producing countries around the world with the exception of Brazil and India [19]. Car scrapping programs were perhaps first introduced in Europe throughout 1970s. Countries such as Spain or Greece tried to reduce the age of passenger cars on roads, more in line with other European countries. Since 1970s, scrappage schemed have also been run by other countries such as Sweden, Norway and Iceland, although they targeted environmental aspects concerning end-of-life vehicles with no further obligation to buy a new car [8]. Schemes introduced during the recent economic crisis should be labeled as cash-for-replacement schemes [5] as they offered a financial bonus to everyone who brought an old junk to a scrap yard and purchased a brand new vehicle. Those kinds of accelerated replacement schemes came into existence in 1990s. In 1990, California's Unocal oil company implemented the SCRAP – South Coast Recycled Auto Programme. 700 US dollars were given to retire pre-1971 vehicles and some local dealers as well as Ford Motor Company threw in some additional funds to allure buyers [5]. Greece is believed the first European country to launch a replacement scheme as we know it today in January 1991. Cars older than 10 years in Athens area could be replaced with more modern catalysator-equipped vehicles while being exempted from 40 to 60 % exercise duty and some registration charges. Similar although lower reduction in registration and road charges was applied to all new car purchases (with catalytic device) across Greece[5]. First European scheme driven primarily by economic objectives could be the Spanish Plan Renove program implemented in 1994 [9]. The scheme provided less than 500 euro to any new car buyer if they scrapped at least 10 year old car. Economic objectives resurfaced just recently. The collapse of financial markets introduced the scrapping scheme idea to many other countries, including those with relatively young car fleets such as Germany or United Kingdom (see Table 2).

Magnitude, technology and determinants of scrappage schemes were clearly different (see Table 1). Usually, the bonus was given directly to the individual consumer, payee of value-added (sales) tax, who owned an old vehicle for a certain period of time (commonly 18 to 24 months). Their old car had to meet certain age criteria and/or score badly on environmental performance in terms of fuel consumption or air pollution. Most countries running scrapping schemes required junks to be between 10 and 13 years of age, with the exception of Germany with its relatively young fleet enabling scrappage of 9 years old vehicles.

Table 1 Scrapping Bonus

Country	Minimum Age of Cars	Scrapping Bonus (EUR)
Austria	13	1,500
Denmark	10	234
France	10 (emission based)	2,000
Germany	9	2,500
Great Britain	10	2,300
Greece	10	3,400
Italy	15	1,500
Japan	13	1,800
Netherlands	17	1,000
Portugal	15	1,250
Romania	15	790
Slovakia	10	2,000
USA	(15.8 mpg or lower)	3,150

Adapted and updated from [11]

The average scrapping incentive (in some countries there was a direct governmental incentive plus compulsory dealer participation) across the European Union fluctuated around 1.500 euros per vehicle. Extraordinarily high subsidies hawked buyers in Greece (3,400 Euros), Germany (2,500 Euros) and the Great Britain (2,300 Euros). In most countries, drivers had to take their four-wheelers to a junk yard with registration plates and in a drivable condition. Disposal of old cars was free. Owners were issued a confirmation which then could be exchanged with local transport authorities or directly used at dealers. The incentive was paid to dealers once they delivered the new car – a couple of weeks after order in Europe, almost immediately in the United States where cars have been sold directly off the lot. Vouchers issued for a junk had usually a limited acceptance not much beyond a few months or within the particular fiscal year. In most countries, a few vouchers remained unused.

Scrapping scheme does not affect only auto manufacturers, their suppliers across the value chain and dealers. It provides subsequent stimuli for other sectors such as the car finance companies or even local garages. For instance, the Slovakian scrapping scheme temporarily increased demand for repair workshops [12]. Many junks were growing rust in gardens and bringing them to shape in which they could be driven to a yard required some mechanical ingenuity. Similarly, second hand parts retailers were circling around queues in front of car yards dismounting some resalable components, price of which were decreasing [17].

Table 2 Average Age of Passenger Cars

Country	Scrapping Bonus (EUR)	Average Age (2001)*	Share of Cars Older Than 10 yrs (2004)**
Austria	1,500	7.4	33.5
Denmark	234	8.2	31.9
France	2,000	7.5	32.2
Germany	2,500	6.8	30.6
Great Britain	2,300	5.9	20.4
Italy	1,500	8.1	38.9
Japan***	1,800	5.8	29.9
Netherlands	1,000	7.0	31.1
Portugal	1,250	11.4	-
Romania	790	11.5	-
Slovakia	2,000	14.8	55.8
USA^	3,150	9.0	34.8

Source: *European Environment Agency (2009), **Eurostat (2009), *** JAMA (2010) – 2009 figures, „-“ data unavailable, ^ 11 years and older, median 2009, share 2005

Governmental incentives programs were limited also in the absolute monetary allocation which could be transferred through the scheme. This measure indirectly abridged the number of incentivized new vehicles. Limited programs allocation forced consumers to act rather swiftly and created sudden demand. Scrapping schemes were exhausted within a month or two or even in weeks in countries such Austria, Slovakia, and Germany. Some schemes limited the maximum price of the new vehicle under the umbrella of avoiding luxury or large car purchases, others such as France or Netherlands set levels of environmental acceptability in terms of CO_2 emissions per kilometer. Last but not least, some programs did not allow consumers to lease new cars or take other consumer finance options in the effort to shelter buyers from irresponsible purchasing decisions.

Media referred to the U.S. Car Allowance Rebate System (CARS) as cash-for-clunkers. The program came to implementation in July 2009 under the assumption that 3 billion dollar allocation would last until November. However, the program was saturated by 24 August 2009. Clunkers had to be younger than 25 years and their fuel economy had to be below 15.8 mpg (over 13 l/100 km). Most junkies returned with dealers were pick-up trucks (such as Ford F150) or large SUVs (Ford Explorer, Jeep Grand Cherokee). Maximum rebate of 4,500 US dollars received only buyers of cars with fuel economy exceeding 10 l/100 km. Others were eligible for 3,500 dollars only. 700,000 new vehicles purchased under CARS were mostly smaller sedans and hatchbacks with badges such as Toyota, Honda, and Ford. Winning brands had enough stock at the time of the scheme while other traditional Detroit automakers (General Motors and Chrysler) did not have enough inventories or the right product mix.

Japan, another well developed and mature car market, launched their incentive scheme in June 2009 for cars above 13 years of age. The incentive of 250,000 yen (about 1,800 Euros) should increase the demand for new vehicles by 20 % and put new 900,000 vehicles on the road [13].

In 2009, China has become the largest car market in the world. Recognizing the potential and impact of the automotive industry, Chinese government has decided to fuel car market growth. For 2009 and 2009, the luxury tax was lowered from 10 to 5 % on cars with engines smaller than 1,600 ccm as there was a relatively small amount of old vehicles. Outside large agglomerations, three-wheelers could be scrapped and traded for an automobile or a minivan with engines up to 1,300 ccm. Only between January and June 2009, the demand for cars between 1,000 and 1,600 ccm grew by 40 % [22]. South Korea took a similar tax-break approach – from May til December 2009, owners of cars registered in 1999 and earlier were given a 70% cut in taxes when buying a replacement.

It was not until March 2010 when Russia adopted an incentive policy of its own kind. Buyers interested in disposing of their vehicles aged 10 years and more could opt only for vehicles assembled or manufactured in Russia if they intended to claim the governmental subsidy of 1,300 Euros (50,000 rubles). 66 models of Lada, UAZ, Gaz, Chevrolet, Fiat, Ford, Renault, Volkswagen, and Skoda brands were manufactured in the country. However, 70 % of all recycling certificates were used in favor of local Lada. 10 billion rubles allotment (200,000 vehicles) ran out shortly and government decided to put additional 10 billion rubles on the table in June 2010.

3. ISSUES WITH SCRAPPING SCHEMES

Scrappage schemes are distortive by nature and target one particular sector and only a portion of the market, just like most other economic measures introduced by political representations through parliaments or governments. Controversial informed as well as popularly shallow or politically colored discussions have accompanied car scrappage schemes since their inception. All economic measures ever implemented by states – grant schemes, direct subsidies or tax breaks – always assist or suppress selective sectors or segments, sometimes for limited periods only. A stimulus such as the scrapping program would immanently have only a short kick-in effect (if designed wisely; although its magnitude and duration may clearly differ). Guardians of budgetary discipline voiced doubts over income neutrality and feared a scrapping bonus could be yet another net public expense. However, most countries concluded the scheme was really expense neutral or even income positive [9]. Sales tax collection from stimulated car sales offset the stimuli.

Scrapping incentives such as tax breaks, reductions, direct (to consumers) or indirect (through dealers) bonuses were based on car's age, its fuel economy, air pollution, length of ownership and on price and specs of the new car. Programs effectively discriminated those who bought their (aged) cars just recently (short ownership) and supported primarily lower income brackets who might recipients of other social welfare. In some countries (such as Great Britain), most of the passenger car market recruits from business side and businesses were ineligible to take piece of the scrappage pie.

Car scrapping schemes have been fundamentally discarded for supporting the least environmentally-cautious mean of transportation, although the green argument was present in all programs [19]. New cars emit fewer pollutants and consume less fuel, even might be safer for passengers and pedestrians being loaded with numerous safety features, electronic and restraint systems, and undergoing more crash approvals. Older cars become gradually less rigid and do not shelter passengers from impact as well as new cars do.

In spite of scrapping schemes being implemented primarily in car producing countries (governments might have been concerned with local employment at the time of crisis), except for Russia mainly imported vehicles and foreign-based manufacturers gained the most new market presence. In Germany, local makes such as Mercedes, BMW or Audi were not flying from dealerships as scrapping schemes stimulate consumers to purchase generally smaller and less expensive cars. The scrapping bonus is relatively the highest for small/cheapest cars, which provides greater motivation to buyers. Even in countries, in which smaller cars have been produced (such as Slovakia), the model which were sought after came from abroad (e.g. Renault Thalia or Dacia Logan small sedans – [16]).

The demand for new cars increases at the time of scrapping scheme and not all brands gain. In Europe, the demand for certain makes and models increased disproportionately (Dacia, Hyundai, Kia, Skoda, Volkswagen). In Germany, most successful models included VW Golf and Polo, Opel Astra, Skoda Fabia, Opel Corsa, and Ford Fiesta ([14]. Austrian buyers chose Seat Ibiza, VW Golf, Opel Corsa or Peugeot 207 [20]. In the United States, Toyota Corolla, Honda Civic, Ford Focus, Toyota Camry and Hyundai Elantra were popular 0. All models mentioned above (perhaps besides Camry) belong to what can be considered a small car for a given market. In Europe, where about half of all passenger cars had diesel powered engines (commonly purchased by companies), scrappage stimulated disproportionate demand for gasoline powered cars.

Owners of older vehicles usually do not belong to most affluent buyers. Stimulating generally poorer consumers to make long-term purchasing decisions at the time of economic uncertainty was another concern raised by scrapping scheme opponents. Buyers might have been thrown even deeper into financial troubles and more mildly used cars might have appeared on the market later on. Or some consumers may have preferred a new vehicle before buying a second hand. Buyers of new cars might have spent their money elsewhere; hence crisis might have just been shifted away from automotive industry to other parts of national economies which are traditionally reliant on discretionary spending (such as restaurants or entertainment establishments), offering other durables (such as furniture), or even away from retail sector in general [7]. In Slovakia and Austria, scrappage schemes assisted to second hand car dealers in spite of not providing that many mildly used cars which were purchased with a bonus. Throughout 2010 a different trend prevailed: all Europe have suffered lack of mildly used cars (jahreswagen) as private ownership takes usually longer than corporate cycle of fleet renewal.

A question mark appeared after some countries (such as Great Britain) required compulsory dealer participation in the bonus. Cash bonus offered in the program was evenly split between government and dealers. However, dealers' discounts have been obvious ever since car salesmen became a symbol of elaborate selling techniques (e.g. [23]) and any participation beyond slimmer margins was a wishful thinking of policy makers. There is no evidence that dealers' or manufacturer's profits would be sacrificed: in the contrary, dealers and manufacturers, who were scrappage scheme winners, reported strong financial results (e.g. [21]; [18]). In France, Netherlands or the United States, the actual bonus varied based on attributes of the old scrapped and the brand new car. The average U.S. bonus reached 2,877 US dollars per car [10].

It would be misleading to believe that scrapping bonuses anyhow hinder competition between brands. Similarly, it must be noted that vehicles exchanged for a bonus are not worthless and would have been normally traded-in with dealerships. Therefore, it is not just the bonus but the resale value which impact on consumer decision making process. Market literacy of some buyers might be questioned though, as scrapped vehicles included more than 5,000 Mercedes cars, more than 1,000 Jaguars and even 11 Porsches, 6 Maseratis and 1 Aston Martin in the United States for instance [15]. Resale value is perhaps to blame for much older and much less fuel efficient cars than required were disposed of. Large bonuses in combination with a younger fleet and weak administrative controls could be blamed for recorded exports of 50,000 presumably scrapped junks to third countries out of Germany [3].

On the other hand, capacity of junk yards was not unlimited and some collection points in Slovakia stopped accepting vehicles after utilizing all available space. In the United States, it was even believed that the program might cause significant future expenses related to indefinite environmentally considerate disposal [4]. The price of scrap metal had been decreasing throughout 2009 [2] possibly due to sudden influx of used cars.

Proponents of scrapping schemes remarked that the automotive industry is labor intensive and provide lot of job opportunities. Only in Germany, one in seven jobs, i.e. 5.3 million jobs depend on the automotive sector [6]. A car has been one of the most complex products consumed and purchased on a regular basis. Supporting the auto industry may, therefore, help several other sectors from suppliers, dealers to local communities, in which these companies operate. Scrappage schemes were in line with official environmental policies, even on the international scale (Kyoto Protocol). Whereas oil resources have been scarce and most auto nations rely on imports, potentially lower fuel consumption might contribute to environmental as well as national security issues

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The major issue with scrapping scheme design and acceptability has been the potential overutilization of market capacity: cars purchased now will not be sold later and scrapping scheme may just pre-sell what would materialize later anyhow. A car is driven, has to be maintained and the maintenance costs mounts the older the vehicle gets and the more miles it features on the odometer. It is certainly possible to extend vehicle life but through time it may become more costly to run an oldie than to purchase a new car. The discussion was tense but evidence was lacking and it is not until about a year at least until scrapping schemes might be assessed for mid-term impact.

4. STIMULATION OR SUPPRESSION

Both manufacturers and car dealers raised concerns about sales sustainability. Do scrapping schemes stimulate or suppress car markets in the mid-term? A stimulus program means that the demand would ease up instantly once the scheme runs out (if now phased out gradually which was more or less the case in France). However, if the stimulus package was designed wisely, the new demand levels should exceed those before the program had been launched. Looking one year in the program, there might be a more accurate answer to the problem.

Formula 1 Future Loss Index (FLI)

$$FLI = \frac{Vehicleson\ Bonus + \frac{Bonusin\ Euro}{1{,}000}}{PassengerCar\ Sales 2008} \qquad (1)$$

The scheme distorts the market the more cars it includes (as a portion of the market) and the higher is the bonus. To address the issue, we have constructed a future loss index as a measure of scrapping scheme appropriateness. Future loss index (see Formula 1) multiplies the number of vehicles purchased on bonus by multiples of thousands of euro under the assumption that the stimulus increases with dollar amount. As discussed previously, typically purchased vehicles were smaller cars for which the rebate was relatively more substantial. Future loss index is then divided by a number of passenger cars sold in a given market in 2008 (a year before the scrapping scheme). Broadly speaking, the index might be perceived as a percentage of 2008 market affected by the scheme. The higher the index is the more it should impact on future sales after the subsidy runs out. A number of counter-arguments might be voiced against such measure: it does not consider specifically the average age of registered cars (the effect on future sales might be smaller if the current fleet is aged), usual portion of the market belonging to fleet sales (the future loss would be smaller if most usual sales were fleet) or local variations in car pricing and taxes. Furthermore, consumer's appetite measured by consumer confidence, GDP per capita, unemployment rate, savings rate or availability of consumer finance might play their part in future loss assessment.

Table 3 Future Loss Index: One Year in Scrapping Scheme

Country	Bonus (EUR max.)	Scheme Introduced	Vehicles on Bonus	FLI	y/y Growth Rate (year in bonus)	y/y Growth Rate (two years in bonus)
Austria	1,500	4/2009	30,000	15.3	25.7	5.0
Portugal	1,250	1/2009	32,500	19.0	61.9	-9.2
Spain	1,000	6/2009	240,000	20.7	25.6	-9,6
UK	2,300	5/2009	200,000	21.6	13.5	-1.7
France	2,000	1/2009	600,000	58.5	14.3	8.2
Italy	1,500	2/2009	856,000	59.0	20.6	-20.5
Japan	1,800	6/2009	900,000	23.5	20.6	-21,6
Slovakia	2,000	3/2009	40,000	114.2	-16.8	20.1
Germany	2,500	1/2009	2,000,000	161.8	-29.8	16.5
USA	3,150	7/2009	670,000	22.1	5.0	10,5

Source: ACEA, www.inautonews.com, The Wall Street Journal

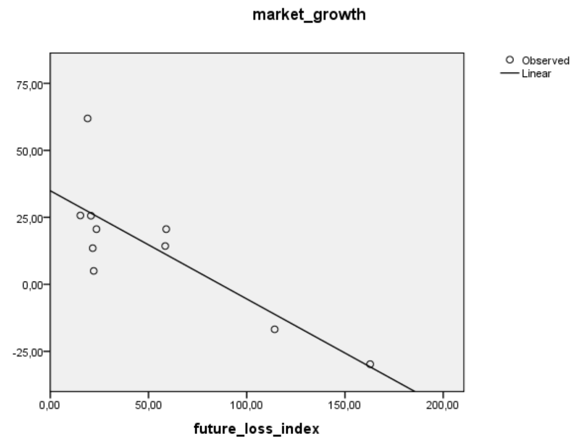
Having those limitations in mind, the future loss index seems to be a solid indicator whether scrapping schemes were designed appropriately and whether they succeeded in jump starting local markets. Looking at the market annual growth rate 12 months after the scheme was introduced, it is apparent that only Slovakia and Germany, schemes of which offered substantial incentives and affected a big chunk of the market pie, recorded a decline. Even with limited number of observations, Spearman's correlation between the future loss index and the market growth rate a year in the scheme is – 0.784 (p-value = 0.01, 2-tailed) implying that higher future loss index leads to lower market growth: with high future loss index the schemes were outselling car market future. Beta coefficient of the estimated linear regression (see Formula 2) is estimated with 95 % significance and the model R Square was calculated at 0.649.

Formula 2 Future Loss Index (FLI)

$$Market\ Growt\ Rate = 34.925 - 0.404 \times FLI \qquad (2)$$

It remains a question whether the relatively optimistic outcomes would persist in year two and beyond. It appears that linear regression (as documented in Figure 1) would be able to explain a significant portion of market growth rate variation (p-value = 0.05). Would the demand have been substantially brought forward due to scrapping schemes, there would have been at least anecdotal evidence of junk owners waiting for the incentive plan introduction in various countries. Long term effects might be difficult to capture as many other external and internal factors affecting national economies would come to play.

Figure 1 Linear Regression: Market Growth vis-à-vis Future Loss Index



We have also attempted to run similar analyses with growth rates two years in the scheme (Table 3 – last column). However, there seem to be no relationships among variables. It may well be that effects of car scrapping schemes were covered by fiscal and macroeconomic issues in multiple countries of the European Union in 2011, which implemented auto-industry support in 2009.

5. CONCLUSION

Scrapping schemes have been special measures implemented by governments at the time of economic downturn not only to support car markets but to contribute to environmental sustainability of individual motoring or to reduce dependency on imported oil. Scrapping schemes are not systemic by definition and skew usual patterns of car markets. Demand shifts towards smaller cars. Early post-scrappage evidence suggests there could be the right way to introduce scrapping schemes if they should vitalize car markets and not just outsell the future. The future loss index might be a good proxy in making initial judgments and assisting to policy development.

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