

## THE NOSTALGIC EFFECT AND COMPOUNDED ANNUAL GROWTH RATE USED TO DETERMINE CLASSIC CAR SURVIVAL RATES

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### ABSTRACT

The surging interest in classic cars in the US brought on by the Baby Boomer generation and their interest in cars from the 1950's, 1960s and early 1970's has also brought with it the curiosity to determine how many of these classics are actually left on the planet. The establishment of the rarity of the collectible item is critically important for both valuation and the allocation of resources for preservation purposes. Existing auto survival estimation methods range from insurance actuary models to researching the state auto registration records. None of these methods is sufficient for the classic car markets due to such factors as appreciating values and barn finds (sudden discoveries of collectable automobiles stored or forgotten and not registered for many years). This research proposes a new method using components of several distinct disciplines including Americana or American popular culture, Econometrics and Consumer Research to determine how many of these classic cars still exist. These multiple disciplines are operationalized using cross-reference data on classic car pricing and theories on why cars become classics including generational interest in specific classic car years. The method also examines some of the factors leading to vintage cars increasing in interest and value over time. Using this methodology will lead to more accurate classic car valuations and would be welcomed by classic car collectors and consumer-oriented economists alike. It also sheds much light on classic car culture in America and why this is so important to the study of American culture in general.

**Keywords:** Classic, Vintage, Cars, Automobiles, Collectors, Muscle, Antique, Branding, Scrapage

### INTRODUCTION

Auto historians, economists and actuaries have always been interested in the survival rates of cars. From an auto historian standpoint, it would be good to know how many cars they are studying are still around and the process of how these cars go extinct. For the economist it is important to understand the demand for new cars in relation to those which have been scrapped. It would also be interesting to study cars and their survival rates as it pertains to sustainability. For the insurance actuary it's important to know when these cars reach maximum depreciation based on their expected life. All of these separate interests in the survival rates of automobiles are not much help to the auto enthusiast who is looking for a more accurate number for his/her specific vehicle not only for curiosity sake and the ability to boast that there are only X left but also to be able to assign a proper valuation to the vehicle in combination with demand. We therefore approach this research from the

perspective of several disciplines including Americana or American popular culture, Econometrics and Consumer Research.

Limited research has been done on the survival rates of motor vehicles. The first documented attempt was from an auto historian Marshall Naul who wrote scholarly article in *Special Interest Automobiles* magazine (now known as *Hemmings Classic Car*). In this article Naul analyzed the data for all American cars initially registered between 1946 and 1968. His key findings were that a 1% survival rate came at 18.5 years after the production year. He then extrapolated the curve downward and estimated that the 0.1% survival rate would come around 23.2 years. Data was sparse after two decades so he interpolated the line to the bottom of the graph (Naul, 159). However, it should be pointed out that no make actually ever reaches zero. This is reinforced by classic car insurance which restricts the use of cars in order to lower rates.

Naul's predictions were supported by Parks who examined the scrapping rates of postwar vintage vehicles to support and advance economic research related to investment and depreciation behavior. Park's discovered that the key variables related to a car being scrapped included the car's age, the relative cost of repairs and variables that capture the built-in durability characteristics (2000-2001). Some of these same factors were also confirmed by Walker (504) along with Greenspan and Cohen (382). There is further evidence of Naul's model from insurance companies like GEICO who are recommending customers discontinue full comprehensive and collision coverage when a car becomes more than 15 years old. Essentially, they are sending any car without collision to an eventual death by scrapping given a large enough accident which deems the car totaled.

However, critics have always commented on Naul's 23.2 year estimate coming with the conjecture that the 0.1% survival rate should be much later in a car's life and may never even come. They argue that somewhere in the lifecycle of a vehicle ~25 years, the curve has to turn and become almost horizontal, approaching zero asymptotically.

The 18.5-year datum is probably pretty good as Naul really only had data out to about 15-16 years. However, some critics commented that Naul really should not have extrapolated it all the way to the bottom of the plot (it's on a logarithmic scale, so it never reaches zero). Naul himself acknowledged that sometime following the 18 year mark, the curve would make a hard left.

Naul's plot is really a combination of two intersecting lines: a very slow straight-line decline from ~99% at year 1 to about 92% at year 6, followed by a fairly steep decline to 5% at year 15. According to Naul around year 6 in the life of a typical vehicle, the cost of annual maintenance begins to exceed resale value, causing the car to be passed along to its second owner, who may not take very good care of it. We all know today's cars can be trouble-free for much longer than 6 years.

In addition to the above challenges there are additional concerns with the existing methods. One additional concern is that a lot of things have changed a lot since the 1968 models that Naul studied and the early 1970's cars that Park's studied. Cars don't deteriorate and rust like they used to, and both icy road treatments, metallurgy (including composites) and lubricants have improved significantly -- so cars should last longer. This increased longevity of automobiles was confirmed by Hamilton & Macauley (255). In addition, Williams (23) identified several reasons for longer lasting

cars today than in the 1960's and 1970s. The first is the fact that global competition has raised the standard for how vehicles perform and endure. This is in partial thanks to the efforts of quality gurus Dr. Deming and William Juran who coached the Japanese in how to raise the quality standards of their products Post WWII. The Japanese subsequently began to develop quality (as perceived by the customer) products in the areas of consumer electronics and automobiles. US auto manufacturers only began to realize the need to compete with the Japanese in the 1980's and began to utilize the same teachings from Deming and Juran along with those from Phil Crosby to raise the quality standards of their vehicles which in turn created a competitive landscape of higher vehicle quality levels across the globe. A phrase in popular culture for auto enthusiasts is 100,000 miles is the new 50,000 miles. The second is global emissions standards which prevent the release of hydrocarbons from burning oil and therefore require engines to perform more efficiently. While there are exceptions (including Audi known to burn oil and yet maintain highly reliable engines and maintain emission requirements) engines that burn a lot of oil which is associated with low lifespans will simply not pass state emissions tests. However, it should be mentioned that some have made the claim that current methods are still pretty valid for cars built before the 1980s which would certainly hold true for some of the above improvement criteria especially metallurgy.

Newer methods of calculating survival rates utilize electronic records of auto registrations. These types of websites are particularly popular in the United Kingdom where there is only a single motor vehicle registration system represented by Driver Vehicle Licensing Agency (DVLA) resulting in the estimation being significantly more accurate than the United States where auto registration is handled by individual states and therefore websites must consolidate statistic from over 50 individual Department of Motor Vehicle (DMV) databases. One problem with these government databases are errors. This is especially true in later models where all of the records are based on hardcopy exhibits. To improve accuracy it has been suggested that these websites also incorporate data from car club registries and also voluntary registries. However further problems with these databases are that many owners have multiple vehicles of the same type for parts and end up registering only a single vehicle. Moreover, collectors can be on an international assignment and choose to keep their cars unregistered and in storage for a time. There are also the "barn finds" where collectors with mechanical abilities bring cars back to life and may not register them while in the process of being restored. Moreover some of these "barn finds" which may run the gamut from garden-variety stuff to the most rare and desirable models remain put away somewhere and long forgotten. These "barn finds" have been popularized recently through reality TV programming including such shows as "Gas Monkey Garage", "Fast N' Loud" "Chasing Classic Cars" and "Classic Car Rescue" although the probability of finding the "diamond in the rough" diminishes more as the value of the vehicles increase and the word gets out that these cars have value. However, this does not mean that collectors will not be motivated to storing away their vehicles (unregistered to keep operating costs low) in anticipation of their vehicles increasing in value in the years to come.

In terms of the self-reported databases club membership is not 100% and older members of the hobby including older baby boomers and war babies may have lower adoption rates to the websites which request information from the members about their cars. This is likely due to having less of a familiarity with online activities although this is tending to become less of an issue over time. Another skepticism of existing is around the type of car. Although Naul reported quite a bit of

variation among makes it was much less than what would be expected. His lowest groupings were at the division level of an auto company. Therefore, all brands were aggregated together, so such collectible cars as GTOs and Firebirds were simply labeled as Pontiacs. Similarly, Barracudas and Roadrunners labeled as Plymouths. This was also confirmed by Walker (504) when in his study he noticed automobile scrappage increasing with age and apparently level off at advanced ages. He explained this by greatly curtailed use of very old cars, approximate random ordering in age of major component parts, so that breakdowns occur piecemeal, and perhaps a “tendency by owners to preserve them as antiques”.

The last explanation is interesting and if this hypothesis proves to be correct then one immediate way to improve the model is to build separate models for collectible and for non-collectible cars. Presumably, the collectible cars would bottom out in terms of scrapping rate earlier than non-collectible cars. Evidence of this can be found by searching the little scholarly research done on classic or collector cars. Many of the studies have been those involving gender specifics. For example Belk (274) examined the phenomenon of attachment by males to their vehicles. In a study of 40 males Belk noted that “those who are most involved in their vehicles include restorers of old automobiles, automobile collectors, members of car clubs, and those who show their vehicles at special auto shows and concours'd'elegance”. In this research Belk (276) uncovered several common themes related to the perception of men and vehicles including the auto as a prosthetic extension of self. An example of this has been observed when people restore or collect automobiles which they were involved in when they were younger. The Baby Boomer interest in muscle cars in the United States is one example of this. As Williams (23) put it “A growing number of baby boomers are finally able to afford the cars of their dreams, made possible by a boost in disposable income that comes from getting their kids educated and out of the house. In many cases, their dreams are from their teenage and twenty something years when most had to make do on a Ford Pinto budget”. Williams (24) further points out that the collector-car hobby has really taken off in the past few years, with boomers flush with cash and a desire to recapture some part of their youth. The most popular thing right now is the muscle cars," he said, such as the Dodge Challenger and Charger, Chevrolet Camaro, Ford Mustang and Pontiac GTO, among others. "People are really wanting those cars, trying to relive the days when horsepower was king. But trucks play a role, too. It really depends on what your flavor is: “some people seek out specific cars, such as one their father or grandfather drove, or a vehicle they had to sell when they got married and settled down for a few decades”. Now that they have some disposable income they want to relive their glory days.

Another theme identified by Belk (274) is treating an auto as an intelligent being. This has also been popularized in the popular television series “Knight Rider” the favorite children’s movie “Chitty Chitty Bang Bang”, the animated Cars with Lightning McQueen and the voice overs of Owen Wilson and Paul Newman and of course in the popular 1970’s movie series “Herbie “The Love Bug”. Another example is when names are assigned to cars like Eleanor the Shelby Mustang in the popular movie “Gone in 60 Seconds” or the General Lee is the 1980s TV show the “Dukes of Hazard”. Another theme is cars as sacred objects. In this theme Belk (274) discussed the amount of time people put into detailing their cars. Some enthusiasts subscribe to car related magazines such as Car and Driver. Sometimes rituals associated with autos are cultural in nature such as low-riders in the Hispanic community, pickup trucks in rural communities, modified Japanese cars in the Asian communities and Cadillacs in the African American community. Another related theme observed

was salvage and sacrifice where there is a perception among enthusiasts who restore vehicles or collect survivor cars aimed to keeping them in their original state that the car is being rescued and/or restored to its former glory. This is not unlike the psychology of taking in a rescue dog from a shelter or adopting a child from a foreign country. Some of the popular TV reality shows like “Gas Monkey” or “Full Throttle” demonstrate this behavior often. The focus on polishing a car especially with car enthusiasts who are polishing their cars at shows is another example of this behavior. Auto detailing services also cater to this type of behavior. Pilgrimage was another theme observed where men would take their cars to car shows and even a recurring annual car show at the national level. The Greenwich Concours d Elegance in Greenwich, Connecticut is one show which comes to mind. The sponsor of the program Bruce Wennestrom builds the case above by explaining the appeal of car collecting where he that "the true collector gets the same aesthetic thrill from owning and looking at a classic car as other people get from owning and looking at a beautiful painting or piece of sculpture". Belk (274) concludes by pointing out that the link between men and machines has both positive and negative aspects including antisocial and self-indulgent behavior, addictive and compulsive behavior and finding justifications for auto activities which can be ridiculous in nature.

In another study Lezotte (85) examined the cultural aspects of classic cars and the empowerment of women via their ownership of these vehicles. This was emphasized in popular culture in the Quentin Tarantino Grindhouse series movie called Death Proof where three girls were empowered after acquiring a 1970 Dodge Challenger in order to take care of the bad guy which was a local stuntman in a 1969 Charger. You also see the empowerment of women driving modified cars in the Fast and Furious movie series and the actresses Marian Busia (1974 version) and Angelina Jolie (2000 version) in Gone in 60 Seconds. I also think this applies to Bernadette Peters in the 1989 movie she starred in with Clint Eastwood called Pink Cadillac.

Another popular depiction of the classic automobile has been in rock and roll music. Lezotte (87) links the automobile directly with rock and roll music also examining such trends as the automobile as a symbol of independence and the automobile as a symbol of liberation and empowerment and finally the automobile as a container of memories. Rock and roll music even took on the theme of classic cars in the 60's with popular acts such as Jan and Dean with Deadman's Curve and Ronnie and the Daytona's with Little GTO and of course Fun 409 and Little Deuce Coup by the Beach Boys and finally, Hey Little Cobra by the Rip Cords. The following is a quote from a Beach Boys fan. Note the reference to classic cars and overall Americana “The Beach Boys embodied the whole West Coast, and California Dreaming, with Hot Weather, Surfing, Girls, the beach, Hot rods, Malt shops, Drag racing, cruising up and down the coast in corvettes, 55,56,57 Chevys, Super Sports, Nova's, GTO's, coupes, and it had to of been the greatest time in American History, never to be repeated again. I lived it, and if you remember, you know what I am talking about”.

The classic car songs actually pre-dated surfing music and are considered by some music historians as being the forerunner of surfing music. Some refer to it as hot rod music. Both hot rod music and surfing music emerged from Southern California. In later years classic car music had its own loyal following. For example, searching the web one can come across a list of the 25 greatest classic car songs of all time. Songs like “Mustang Sally” from Wilson Pickett or “Boss Barracuda” from the Surfaris. More recent songs include references to Cadillac's (Coupe de Ville) in Meatloaf's Bat out



of Hell and Billy Joel's Moving Out. The song Red Barchetta by Rush is another song about classic cars. Bruce Springsteen also referenced cars for other than pure utility in his songs "Born to Run" and "Thunder Road". The late Natalie Cole also covered the Bruce Springsteen song "Pink Cadillac". Many collectors with 70's era cars include 8-track tape players to enhance the nostalgic feeling they get when driving cars of a bygone era. Later generations also favored the cassette tape. Many collectors will have additional nostalgia revolving around mix tapes created by their boyfriends or girlfriends for playing in their cars. Today, the cassette tape has given away to virtual music mixes created from downloaded iTunes. This is a far cry from cassette tapes which would wear out or worse get tangled in the player after heavy repeated use. However, there was something about having that art on the plastic cover of the tape (the record cover) that was a core part of the music experience.

All of these studies and the example quote above demonstrate the deep psychological and social motivations enthusiasts have when thinking about their classic cars. Some of these motivations are even embedded deeply in the subconscious and to the person responsible for the above quote it's obvious that this has become a part of the cultural fabric. However, it's useful to note that some of this enthusiasm may have eroded in the present day due to restrictions on young drivers and the popularity of sustainability of the environment. Younger drivers have to have an adult present their first year of driving and prefer hybrids to nitrous-injected hot rods like the experiences of past generations on youths. Past generations couldn't wait to receive their licenses. This was the right of passage and their entry into adulthood. They would have sweet sixteen parties and go on their first dates. It was a sign of freedom and the lure of the open road. I got my license no more than 6 months since my 16th birthday.

Some of the enthusiasm around classic cars can be explained by the well-known concept of nostalgic branding. Lefi and Gharbi (189) studied the effects of nostalgic branding and determined that age has a positive effect on nostalgic brand loyalty and gender does not have any effect on the ability to be influenced by nostalgic branding. In other words females and males are just as likely to be influenced. Muehling et al., (83) examined empirically the differential influence of past brand associations (specifically, in-home childhood brand exposure and past personal attachment) on consumers' reactions to nostalgia-themed advertisements. The results suggest that brand-focused outcomes (purchase intentions and brand attitude) are more pronounced for those who have had some past personal association with the advertised brand. However, this effect was not observed for ad-focused responses (ad involvement and attitude toward the ad); as hypothesized, the nostalgic ad produced more favorable responses than the non-nostalgic ad, irrespective of participants' past association with the brand. Brown et al, (33) provided case studies of retro branding introductions including the New Volkswagen Beetle and the later generations of Star Wars. Based on some of the studies cited above one can hypothesize that the enthusiasm for collector cars can be partially attributed to nostalgic branding. This has been validated by Holbrook and Schindler (119, 412, 27) who have developed a "nostalgia proneness scale" and have tested it in various memory-rich domains including classic cars.

## **DISCUSSION**

Given the literature above it would seem to suggest that a new model for auto survival rates would need to be developed with an adjustment for classic/collector cars. The first question to be addressed

in the development of this new model is to determine what base model to use. The second question to be answered is how to determine the nostalgic effect of the collector car in question. The term nostalgic effect is one coined specifically for this research and indicates the effect of nostalgic branding on the ability to increase the desirability and ultimately the value of the classic car. In this case we would want to know both the incidence and the level of the nostalgic effect. The third question to be addressed once we have the models is when to apply them both together. In other words, when does a car become a classic which will then alter its traditional survival curve? We will be addressing each of these questions separately in the next section.

The base model chosen for this research is an adjustment to Naul's survival curve with a 30 year average curve when then approaches zero asymptotically after the 30 years. The reason behind the increase over Naul's original 23.2 year estimate comes from the literature in previous sections which provides reasons why today's cars will last longer. The consensus a few years back was that 25 years was a better estimate for the point of inflection. Given the data and improvements in cars over the previous decade it is calculated that 30 years should be sufficient to begin the point of inflection.

Now that we have established the base model we now need to adjust for the nostalgic effect in order to do this we need to look the generational effect and its impact on cars. Muscle cars for example became popular in the 1990s as baby-boomers reached their peak purchasing power. Nostalgic branding aside we should explore what makes any car collectible. Let's take the 1957 Chevrolet Bel Air for example. In the mid-1950's this was the commonest of commonest of cars. Everybody seemed to own one. Some say it was the fins which resembled jet aircraft or a spaceship. This is not exactly it for the 1957 Plymouth also shared in common with the Chevy the big tail fins. Moreover, some critics claim that the '57 Plymouth had better styling, and so did the '57 Dodge with its fin-over-fin tail treatment. And when it comes to automotive design some critics point to the fact that the '58 and '59 Chevys were much more interesting, and definitely more exotic looking than the '57. Therefore, there was nothing special mechanically or related to features with the '57. Was it the era? One thing we know about this era was that the post-war boom was in full swing and many middle class were buying their first brand new cars. The fact that Chevrolet's were very popular and a symbol of American industrial might after WWII may just have etched the nostalgic brand image onto future collector's mind. Later, this was reinforced in the movies. For example Tony Danza drove one in the popular movie Hollywood Nights and the black 57 in the 80's movies "Dirty Dancing".and "Eddie and the Cruisers". And yet, half a century later, it's the Chevy that has become iconic. It's the Chevy that collectors want. I see the reason for their popularity is the simplicity of their design. Some say they look upscale, even when converted to a drag car. Others report it was the front end styling which included twin rockets in the hood that tailed back into the hood. The car also had a mystique with the 283 V8 with lots of power options. Some collectors say one reason the 57 Chevy was so special (as well as the 56 and the 55) is that all the GM cars were making giant strides in quality and drive-ability. Furthermore some say it's the robust and powerful engineering, especially the small block, plus color schemes that cry the best of 1950s style, but most of all it captured the fin style of the era without being over the top when viewed one, two or three decades later as we formed our passions in the era of more conservative styling. It's the sort of car that if your family owned one you were a fan forever, but if you didn't then it was the universal 50s car so many people remembered. Others have more practical recommendations for why the icon status such as the '57 Fords and MoPars rusted out like crazy. The Chevy's dealt with water and salt much better. Some

say it was the price. One story is that a big reason the '57 Chevy's gained such a groundswell of popularity was because a lot of new car shoppers then hated those fins and passed on them. The effects followed into the used car market and the '57s flooded the lots. They were being sold at lower prices to get them out, making it easier for a common guy to buy one. Just think today if a Mustang GT was priced like a Subaru Outback! Other point to the contribution of the Baby Boomers in making this car a classic One Boomer reported that as a high school student in 66 – 69, the 55-57s were cheap and available and made a great first car. With a little work and investment, he said you could drop in a small block Chevrolet engine 327/350 c.i. and make them run in a more reliable manner.

In interviews (Comerro and Lentinello, 24) where owners collectors were asked about what makes the car so special the following responses were received:

“I love the look of the fins: not too much, but enough to give it style. And I love the ride it gives, and how easy it is to enter and exit with the four doors”.

“I love the look of the fins: not too much, but enough to give it style. And I love the ride it gives, and how easy it is to enter and exit with the four doors. It has fewer than 46,000 original miles on it, and I hope to be enjoying it for a long time”.

“It is interesting to drive an old car that is like new. The steering wheel is large and the ratio is slow, the drum brakes feel self-energizing and the body structure is soft and shaky compared to new cars. But what was then a fast car is slow now, yet it still looks wonderful and gets lots of stares”.

“The 1957 Bel Air convertible represents the best of the '50s autos. Love the long, sleek, well thought-out chrome and the slightest touch of fins. It has a solid ride, is very dependable, and has good performance and handling. When I drive this car, I forget about current stresses and I'm back in a simpler time, enjoying an easier way of life”?

“Chevrolet managed to create a beautiful fin without altering the car's almost-level bodyline. Notice how the fin stays level while extending beyond the trunk lid to create the illusion of a much larger fin...genius! Its 283 Power-Pak delivers more than enough power to glide us down the road on its cloud-like suspension”.

“I like the style of the long, not-too-high fins and the chrome front end with the two hood rockets, and its green color. The ride is sweet and smooth, like riding on a cloud. The engine has plenty of power, and the four doors make it easy to get in and out of. My favorite is that the high-beam indicator on the dash is a bowtie?”

“The massive steering wheel and the traffic-light viewer make me smile every time I get behind the wheel. The wraparound front windows and the lack of a B-pillar give an unmatched panoramic view. It has amazing details such as the Wonder bar radio that finds my favorite AM stations by just touching the ends of the bar”.

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and its green color. The ride is sweet and smooth, like riding on a cloud. The engine has plenty of power, and the four doors make it easy to get in and out of. My favorite is that the high-beam indicator on the dash is a bowtie”.

“It's a Chevrolet...traditionally, although not in 1957, America's favorite car. That puts it on first base right away”.

“The 1957 Bel Air showcases all the major 1950s styling cues without going overboard: "Dagmars" up front, headlamps below heavy eyebrows, distinctive hood ornaments, swoopy stainless-steel side moldings, anodized-aluminum quarter-panel trim, Harley Earl's sexy dip below the quarter windows, a hint of fins, a "betcha can't find it" gas cap location, and dual exhaust outlets (albeit fake) in the rear bumper. Simply, it includes every major styling element from a decade characterized by the outlandish”.

“It could have the 283-cu.in. V-8. Debuting in 1957, this engine ultimately defined V-8s in the low-price field. Chevrolets so equipped are nimble, with generally crisp response and good handling. The 283 V-8 responded to cheap, easy hopping up when it was introduced, and still does. Even so, the Blue Flame Six remained well-respected. "Stovebolt" power being an acceptable alternative renders every 1957 Chevrolet collectible”.

“There's factory fuel injection. While each of the low-price three had its own V-8 by 1955, factory hot-rodding hit its stride in 1957 with Ram-Jet fuel-injected Chevrolets, supercharged F-code Fords and Studebaker Golden Hawks, dual-quad Plymouths, and 327 Rambler Rebels. Fuel injection kept '57 Chevys either up front or out front in that competitive market”.

“The 1957 Bel Air models included the original Nomad, arguably the most attractive entry in the important 1950s station wagon market. Its uniqueness and glamour indirectly enhances all other 1957 Chevrolets”.

“For 1957, Chevrolet's Fisher Body quality proved better than its primary competitors. This made sure that '57 Chevys were well-liked when new, and also later, as late-model used cars. With around 1,500,000 units built, many of today's collectors rode in them as youngsters. These positives helped ensure that they'd be sought after and available decades later”.

“The 1957 Chevrolets were good cars mechanically. They took abuse fairly well, and when they did break, they were often cheaper to repair than their contemporaries. Thus, a higher percentage of them survived to become hobby/collector cars”.

“Operable 1957 Chevrolets were still available after a higher percentage of their competitors had been scrapped due to mechanical issues or body integrity. More potential hobbyists could thus afford a used '57 Chevy as their first car, and they were easy and cheap to work on. Those experiences often initiated a lifetime passion for that make and model”.

“Nothing succeeds like success. As soon as all the above factors buoyed 1957 Chevrolets early on, increased demand for reproduction parts made them readily available at competitive prices. This, in

turn, created a demand for both unrestored cars and more parts to restore them”.

“Finally, model year 1957: the end of an era. The industry's 1958 "downer" is not as fondly remembered, and 1959 saw compact cars become permanent contenders. When the Big Three compacts arrived for 1960, the industry mix changed forever. The new-car market would never return to the simple innocence of 1957”.

Based on the responses above one can see that the 1957 Chevy holds a special place in the heart of all those who own one. Moreover, it's more than just hard assets or vehicle attributes. There is evidence of a relationship or fondness of the car. Notice that ever person has a personal favorite about the car even though it's hard to believe that Chevrolet got everything right on the car. Even people of a different generation altogether who would not have had firsthand experience exposure to the 1957 Chevrolet comment on how it's such a cool car.

Comerro and Lentinello (21) asked whether the management at GM's Chevrolet division could have anticipated and engineered on purpose every one of these elements to create the icon known as the 1957 Chevrolet. The answer they came up with was no but somehow they admit that the “stars” aligned behind the 1957 Chevy, and, specifically with the Bel Air model. Comerro and Lentinello (23) went on to comment that with something to offer everyone, its no wonder why Americans chose the '57 Chevy to represent the fabulous 1950's.

Dinah Shore the movie actress and singer who hosted a variety show sponsored by Chevrolet from 1956 to 1963 could be partially responsible must be smiling at the other end of the rainbow. I viewed one of her 1957 shows and was really impressed on how she called out the 1957 Chevy and the discussion was around how one could explore America in the car. It was a real patriotic ad that reminded one of Americana in itself. The word Americana is an interesting one to describe a car as muscle cars and classis cars like the 1957 Chevy are described as objects of Americana. The Greenwich Councours a famous car show has a show known as Americana for domestic only cars. Even the Smithsonian Institution has a car collection with exhibits from the 1950's and 1960's. One of the most notable classics include the 1965 Mustang. Surely this is straight out of American history. I think the reason why classic cars are associated with Americana are that they are objects that Americans have a love affair with due to that independent spirit and the open road. They mark a time in our history. I heard the founder of the popular show “searching classic cars” describing finding a classic car in a garage like finding a historical object in a battlefield. The only difference here is that it is a historical consumer good that marks a time in history. The car basically sits in a “cocoon” in the form of a garage while the world changes around it.

However, it's not only the United States where people have an affinity for Americana. China has a deep affinity for the historic American Brand the Buick. China is now the world's largest auto market and one where having a large, foreign car is a status symbol. The Buick Excelle was the number one passenger car in China for several years in a row. The current Excelle, the Verano, and the Opel Astra are all siblings under the same chassis for those not yet familiar with the Excelle (and I was used to the Regal and the LeSabre). Buicks are not only popular as daily drivers in China but they also cater to the upscale market where there are drivers employed. The upscale cars in China are known under the name of Buick LaCrosse. Interestingly, the Buick in the US is known as an

aging brand associated with an older generation. However, in China the target age for the Buick is mid-30s. This is a much younger profile than in the US and one necessary for the key survival of the brand moving forward. GM is doing a big branding campaign in the US with the theme of people not even recognizing the current vehicles as Buicks. The first commercial in this series is titled "The Garcias bought a new Buick, but it sure doesn't look like one". Critics of the commercial cite that it's sad that the Buick has to not be itself in order to sell the brand but instead mimic a German or Japanese luxury car. This is a long way from at one time being one of America's great luxury brands. The commercial is targeted at both a Millennial and a Baby Boomer population at the same time. When I view these commercials I often reflect on how far we have really come since the Grand Sports or Classic Riviera's were in full production mode. Buick is now having to compare itself with these newcomers in luxury brands in order to gain market share. However, China is another matter altogether as the Chinese love nostalgia and everything Americana. In fact, the last drive-in theatre I have seen was on Orange County, California and before that in the Oakley section of Cincinnati, Ohio in close proximity to Red Bank Road off of Interstate 71. This drive-in had those really old cameras, like the big blue ones where you put reels of film on the top and bottom. I heard this drive-in is closed now and is replaced by commercial space although I left Cincinnati in 1996 and I believe it was closed then. Amazingly I heard it was still standing as of June 2007. However, there are other drive-ins in the Cincinnati-Dayton area including one which is fully operational in Hamilton, Ohio which is about 45 miles north of Cincinnati. This drive-in has certain rules based in part on the car size and/or tailgate size. They also encourage everyone in groups to arrive together as places cannot be held. There snack bar is right out of the 1950's with popcorn, hot dogs and hamburgers all lined up in a row under the heat lamps. Of course the old style receivers which clipped onto the window of the car are mostly gone. Now viewers can tune into a radio station instead to get the sound. The old clip-on receivers are popular with car collectors who often display them along with their cars at shows. I saw once recently on a 1957 Chevy long with a drive-in tray with artificial foods one would find at the old drive-in fast food restaurants. And for those who still to enjoy the drive in experience & not happy with the Hamilton drive-in known as the Holiday Auto Theatre, there is still the Starlite drive-in on Rt. 125 in Bethel, OH (east of Amelia).

There is a seasonal drive-in theatre in Northfield, Massachusetts. This is an area above the Snowbelt so not much demand for any activity in the winter. Maybe they can become creative like enclosing the whole facility in a giant bubble similar to the training camp for the Tennessee Titans in Nashville, TN.

There were several drive-ins in the Connecticut area where I live including the Center Drive-in Ansonia, CT. The drive-in I can remember best growing up was the Milford, CT drive-in. Ironically this was eventually converted into a Showcase cinema which is also shuttered. The Milford Drive-in was where I first saw Diana Ross's "Lady Sings the Blues" with my parents and later "Nightmare on Elm Street" when I was dating in high school. The Milford drive-in eventually became a flea market or swap meet on Sundays and then finally closed. This used to be a great place to peruse for antiques especially old records and radios or high fidelity equipment with vacuum tubes which were then fading out due to the growing popularity of solid state electronics. There are only two operating drive-ins in Connecticut which are the Southington Drive-in and the Mansfield Drive-in. These of course are operated only in good weather since Connecticut has fairly brutal winters but they serve to keep the nostalgia going and are a great representation of Americana in the Nutmeg State. With

Mansfield, Connecticut being very close to the University of Connecticut's main campus in Storrs, Connecticut. I am sure this drive-in is popular with the college students especially Millennials getting the drive-in experience for the first time. They probably heard stories about these from their parents or more likely from their grandparents or even great grandparents. With my oldest daughter who is a Millennial her parents can explain a drive-in but it was really the sweet spot for her grandparents who spent a good portion of their teenage years at the Milford Drive-in and the Candlelight Pix on River Street in Bridgeport, Connecticut. The Candlelight Pix which once housed two screens and handled over 1100 cars has now been converted to a construction business office and storage area for construction equipment. This area along the Pequonock River can be seen by exiting from Route 25 North at the Barnum Avenue exit. Before it was a drive-in Theatre it was actually a baseball stadium and then a motor speedway. In 1947 the Bridgeport Bees who were in the Colonial League hosted home games at Candlelite Stadium. Carl Brunetto, a local restaurateur, and Fairfield resident Bob Sherwood were the Bees' co-owners; Interestingly, Sherwood also played center field and batted .310 in the Bees' inaugural season. Home games were played at the Candlelite Stadium. The team – and the league – lasted total of 3½ seasons. The team was affiliated with the National League team in Boston and served as a farm club. After WWII they linked up with the Washington Senators. The Candlelite Restaurant, located at 246 River Street, opened in 1946. The restaurant featured a large terrace overlooking Candlelite Stadium located in the back. The restaurant was also noted for its large banquet facilities with seating for up to 1,200 people. Many weddings, Bar-Mitzvah's etc. were held there. In 1971, the business was sold, and the name was DeNitto's Villa. The building was torn down in the 1980s. The Candlelite Stadium hosted a host of other sporting events over the years including basketball, boxing, rodeo, automobile races, wrestling, thrill shows and special events. This facility had a maximum capacity for 20,000. Midget automobile racing was very popular here with many accidents occurring, some resulting in fatalities. The track was referred to as Bridgeport Speedway aka Candlelight Stadium. The specs for this racetrack are recorded as following: 1/5 mile paved oval (6/30/1947 - 1955) 1/10 mile dirt oval (6/03/1951) < TQ Midgets. Midget cars as their name implies are very small with a very high power-to-weight ratio despite only having 4 cylinders. These Midget cars originated in the US in the 1930s and are raced on most continents today. This motorsport which started on the West Coast in Los Angeles has most recently been organized around a worldwide tour and national tours in the US, Australia and New Zealand. In Australia instead of Midget racing cars they are referred to simply as "Speedcars".

The 4-cylinder engine in these cars typically have 300 to 400 horsepower and weigh approximately 100 pound or 450 kilograms. Because of the high power-to-weight ratio and the relative size of these cars they have proved to be quite dangerous with several people actually being killed over the years including some deaths unfortunately in Bridgeport itself. A pair of fatalities in the midgets whose names were Jeep Colkitt and Mid Marozzi, took place on October 6, 1947 and May 10, 1948 respectively. Hopefully, technology today which comes in the form of better safety features (similar to those commercially available on Volvos or Subarus) can help the sport to mitigate this problem. And who knows whether innovations in safety for Midget racing will bleed over to other Motorsports and even someday into passenger cars.

Candlelite Stadium was sold by the Bridgeport Sportsman's Club in 1955 to E.M. Loew's Theaters, Inc. of Boston for the sum of \$110,000 with the aim of constructing the first drive-in theatre in Bridgeport, CT. It's interesting that AMC Loew's Theatres are still in operation today with an

establishment still in operation in nearby Danbury. What's more is that Loew's Theatres was operated the largest theatre ever in Bridgeport, Connecticut. The final plan was for Loew's to operate one theatre using the right field bleachers to seat 2000 people and the field for another 650-700 cars. It was to be a hybrid drive-in theatre so to speak. Seymour Levine of Stratford, Arthur Lockwood and Louis Gordon of Boston and Samuel Rosen of Marathon, FL were the operations of the Pix Drive-In. The theatre was eventually demolished in 1955 to make way for the Drive-in Theatre. In Ansonia, Connecticut there was also a drive-in known as the Center Drive-in. This drive-in was built on the former flood plain of the Naugatuck River before it was controlled by the US Army Corps of Engineers after the great flood of 1955. The drive-in was exact opposite the McDonald's and is now the sight of a BJ's Wholesale Club. Prior to the construction of the BJs and after the drive-in was closed the land was utilized once a year for a Midway Carnival sight which had many rides and games. Today in addition to the BJs it is a greenway suitable for walking, jogging and biking. I often go by this spot in the morning and see many retirees and stay-at home moms socializing and drinking coffee around the track. Many make a pit-stop at the McDonald's before returning to their daily exercise routine. Some are walking dogs and/or babies across the path taking in the views of the river and surrounding valley. The river used to be very polluted during the industrial era due to all the factories which dumped their effluent directly into it. However, due to environmental regulations enacted in the 1970's it became extremely difficult for these companies to simply dump their chemical by-products in the rivers. Most of the factories moved to China or some other developing countries to escape the brutal regulations which were being imposed. One of the most famous cases is the BF Goodrich Sponge Rubber plant in Shelton, CT. In the case he owners actually burned the building in order to collect insurance payments. They even went so far as to tie up the guards before setting the factory ablaze. Charles Moeller, president of parent company Grand Sheet Metal Products, was acquitted on arson charges, but in a civil lawsuit, a jury in 1988 ruled the insurer did not have to pay claims on the fire because a preponderance of evidence showed the company's top officials arranged the fire to claim insurance money. This was a fitting bit of justice for an otherwise perfect crime. Eight others were convicted or pleaded guilty to the crime especially those directly responsible for holding the guards against their will. This fire also served as a catalyst for the decline of other industries along the banks of the Housatonic River in Shelton, Connecticut. Of course this also had extreme repercussions on other industrial towns in the Housatonic and Naugatuck River Valleys such as Derby, Ansonia, Seymour and Naugatuck. Waterbury and Torrington were also casualties of this trend. This good news today is that the rivers are clean and one can fish and see wildlife returning including top predators like coyowolves, bobcats and black bears. In my opinion it is the cleanup of the rivers that enabled this by bringing back the entire ecosystem including fish and aquatic birds. When I was growing up in the area in the 1970s none of these animals were even remotely present. The highest predators were probably badgers or wolverines although there were rumors of foxes being in the area although I never saw a single one directly even though today there are frequent sightings so their numbers must have increased over the years due to the cleanup of the environment. Fogarty (238) reported that the movement of industry to developing countries has caused an economic decline in industrial jobs but has resulted in an improved natural environment necessary to fuel knowledge worker growth. It seems that knowledge workers especially Millenials demand a clean environment from which to live and raise their children. A post-industrial environment with clean rivers and old factories converted to living lofts can help to facilitate this environment. These knowledge workers with high wages will then be able to buy manufactured goods which are not made in China and used to be made where the



Millenials now live. Fogarty (236) demonstrated this by profiling mill towns in Connecticut whose manufacturing base included sponge rubber and brass. Some of these towns were undergoing a renaissance of sorts converting retired mills to luxury condos, gentrifying the pre-war commercial space in their downtown areas and tearing down tenements to make way for greenways and nature trails. One place in Derby Connecticut actually razed its entire dilapidated downtown area. A greenway was built along the confluence of two rivers one of which during most of the 1900's was ranked among the most polluted in North America. This began to change when modern sewage treatment plants reduced the amount of nitrogen in the rivers and regulations hampered the ability of factories to pollute. I can remember a time when I saw pipes coming directly from one of the factories spewing chemically contaminated water. Throughout the Industrial Revolution it was just assumed that the rivers were a resource to be polluted. The destruction of the environment was the cost of progress. Linden, Woodbridge and Bayonne, New Jersey or Marcus Hook, Pennsylvania are both examples of this.

California has a few of these drive-ins left because of the nice weather. Recently, I passed by one of them on the I-5 on the way to Disneyland traveling from Los Angeles. In the Northeast as discussed previously these are mostly all now gone. However, China have now even revamped and revised the drive-in theatre although now the sound comes through your Ipad or phone and the giant screen is LCD.

Getting back to the '57 Chevy is it just that classic car buyers are a fickle bunch, or is there some other reason why the '57 Chevy has become such a cherished collectible? And the 1957 Chevy has crossed the generational threshold with three generations including War Babies, Boomers and even Gen Xers interested in collecting the vehicles. Some have speculated that as the generations die off so will the interest in certain motor vehicles. This is definitely not the case for the 1957 Chevy which has held its value across generations.

## **ANALYSIS**

Based on the above review it stands to reason that the identification of a classic or collectible car is not an easy one. There are many opinions which make sense to those individuals but are not based on any solid data analysis. However, we propose a slightly more quantitative approach which still relies on the qualitative aspects of what has already been developed. The proposal is that the point when an automobile value starts to climb from its fully depreciated value by a certain amount then the owner or collectors will want to keep the vehicle. Interestingly, the car may not actually be considered a classic by collector opinion or other qualitative measures but the hypothesis is that a vehicle with a rising value will create the incentive for investors/collectors to preserve the vehicle rather than send it to the scrap heap. Information on this cannot readily be found since sources like the Kelly Blue Book which purportedly has information on car values dating back all the way until 1946 did not really digitize their information until several decades ago. Therefore, without the information we propose an innovative heuristic where we will assume a regular compound interest growth of the car and find out at what year the value of the car is double the original purchase price. At this point we believe based on investor motivation that extremely few of these vehicles will be sent to the scrap heap. Why would someone do this to a car that has doubled its purchase value? Economics aside the person would more likely be attracted to the intrinsic qualities of the car in the first place and would make the choice to either sell it or keep it as a collectible.

To give an example we take a 1957 Chevy Bel Air convertible which we established earlier as a classic and costs around \$1,900 new. Today, that same car in concours condition (as defined by Haggerty Insurance) has an average value of about \$100,000. If we compare the original price of the Bel Air with the average price today we get an ROI of 50 times. When we look at this from a compound interest standpoint from 1957 through 2016 it is 59 years. Therefore, the 1957 Chevrolet Bel-Air Convertible has appreciated at around a 7% compounded annual growth rate CAGR). If we take this same 7% annual appreciation rate and apply it the original \$1900 purchase price of the Chevrolet Bel Air we get to \$3800 in little over ten years which is 1966 early 1967. This is approximately when enthusiasts stopped sending 1957 Bel Airs to the junk yard. Interestingly, this is right around the time younger baby boomers (yet old enough to remember) were going to high school and therefore remembered the 1957 Chevy and would start to treat the car as somewhat of a classic. The cars would be relatively cheap in the early 60s and the first generation of boomers would be turning them into hot rods. The later boomers going to high school later in the decade would begin to hold these cars in a high esteem. Some would start collecting for nostalgia sake and given the rarity from earlier instances of sending the cars to the scrap heap the prices would rise. Now that we have our point of inflection we can now incorporate determine how many cars were scrapped beforehand. By using Naul's model to determine approximately and more accurately how many Bel Airs Convertible Coupes are left we would assume a fairly steady survival rate came around 10 years after the production year. Extrapolating the Naul curve downward in a straight line which reached 1% after 18.2 years we estimate a 47% survival rate by 1966 which is 22,000 vehicles. Therefore, using an original production figure of 47,562 vehicles and deploying his algorithm we come up with a survival rate for the 1957 Bel Air Convertible Coupe of around 22,000 vehicles. This is more realistic than the 475 vehicles after 18.5 years as predicted by Naul's original model. Assuming a steady .01 annual attrition (TV shows, accidents, natural disasters etc.) thereafter over the last 54 years we lost an estimated 119 additional vehicles. Therefore the estimated total survival rate for the 1967 Bel Air Convertible is 21,881.

## CONCLUSION

Thus we have a viable alternative model to the one created by Naul decades ago when we didn't have such good pricing data to be able to construct this model. This new model should help with collector car valuations, will be of interest to car societies and even for aftermarket collector car performance parts suppliers trying to assess the market when they are creating a new part to manufacture. Car designers may even want to use it to model the next retro car using the surviving rates models as an indicator of the type people would like to buy in a modified form today. The limitations of the study include the assumptions of straight line CAGR (Compounded Annual Growth Rate) which may not hold true in many cases. However, it should not be very far off from reality after a certain age of the collector vehicle. Evidence of this can be found in mature collectibles which seem to increase at a fairly steady rate with the exception of during recessionary or growth cycles as indicated in Haggerty Insurance Auto valuations. Suggestions for further research include evaluating the new revised survival rates according to a number of factors including price, appreciation, time to sell, production numbers, engine popularity, etc. Overall this represents a unique initial deposit in a largely unexplored area of research on the classic car and its relationship with American culture, nostalgic branding and consumer behavior. In particular, it gives a nice view of generational preferences and outlook and serves as a reminder of how important certain industries

emerging out of the industrial revolution like the auto industry have shaped our culture. This will have implication on the study of other industries over time including the computer industry. Further research on this interesting an important topic is most certainly warranted and will represent a significant and unique contribution to knowledge in the above disciplines.

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