

A STUDY OF THE VIABILITY OF AUTOMOTIVE INVESTMENT

by

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## ABSTRACT

This paper is a holistic examination of the viability of automotive investment as a tool within wealth management. I wanted to combine the available qualitative information on the space with a returns analysis of my own making – using data from various auctions and online sources – to form an idea of how repeatable positive returns from automotive investments are. I approached the problem from the perspective of a business – could you charge a management fee on portfolios of varying size and still generate outperforming returns? The resulting analysis showed that generating positive returns is difficult with smaller portfolios, and that returns grow progressively with the size of the portfolio, indicating that the more expensive, “blue-chip” vehicles are more likely to appreciate in value.

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## Introduction

Markets for buying and selling collectible items are not a new phenomenon. For as long as there have been collectible goods there have been people who will buy and sell them, some with the goal of making a profit off of that sale. What is somewhat new is research on certain collectibles. There are troves of academic papers and financial analyses on the art market, by far the largest market for collectibles goods. However, research on items such as collectible cars is somewhat lacking. The majority of research to date can largely be categorized as fragmented and qualitative. For example, in a periodical about charitable giving there was an article detailing how to avoid taxes on the sale of classic cars (Fox, 2013). In the New York Times, there was an article detailing the social world of concours level car showing, which entails going to events such as the Pebble Beach Councours D'Elegance and showing your car for judging. It went on to detail some aspects of collectible car returns such as the effect of insurance, and how that can change if you drive or don't drive your car, however it too fell short of a comprehensive returns analysis (Sullivan, 2012). There are many other examples of literature, specifically pertaining to taxes and insurance, that comprise certain aspects of a returns analysis, but fall short of a complete evaluation.

Thusly, the gap in the topic is a quantitative returns analysis over a period of time, relative to a benchmark, coupled with a write-up of the various factors affecting the assumptions in the model, with the end result being a definitive answer to the question whether or not net positive returns on the buying and selling of collectible vehicles is possible and can be turned into a business opportunity. The way to do this is to identify certain characteristics of appreciating collectible cars, and to apply those characteristics to the selection of various

portfolios of cars, and to compare those returns against a benchmark over that time period.

Some of the characteristics of collectible cars that have appreciated include being the first, one of, or last of their kind, racing heritage, and various other factors. Once the cars are selected, the effects of certain expenses such as restorations, repairs, insurance and management fees will be applied to the returns, and from there the ending result is the net gain or loss on the portfolio.

The question is whether it is possible to do this as a business, therefore it makes sense to have differing sizes of portfolios as there are differing levels of client wealth. A representative range of potential client investable assets which will be used in this analysis is:

- \$50,000
- \$500,000
- \$1 Million
- \$5 Million
- \$20 Million

From there, a comparison versus certain benchmarks, such as the results of various art indices over the same time frame, or the returns of certain equities yields the answer of whether it is possible to engage in automotive investment as a business opportunity. It is important to note that the effects of certain intangible benefits from car ownership should and will be taken into account in the model, in the form of selectable sensitivities, to determine the effects of one's enjoyment on the viability of the project.

## Literature Review

Automotive investment is an area of collectibles investing that has only recently received research attention. Many of the articles written on the topic are qualitative in nature (Sullivan, 2012; Andrews, 2010). Other articles and studies examine very specific aspects of automotive investment, such as taxes (Andersen Tax, 2015), ways to avoid transaction fees (Borden, 2012), and insurance premiums on collectible cars (Rousseau, 2012). With that said, there have been some studies that have used data to support their findings (Dimson and Spaenjers, 2014; Burton and Jacobsen, 2013; Hagerty Insurance, 2015). However, none of these studies compile all of the data and qualitative information together, and make a comprehensive argument for the long term viability of automotive investment.

For many years there have been collectors such as Ken Lingenfelter, the Sultan of Brunei and Jay Leno who have amassed car collections, which if sold today would result in massive profits. This is a specific example of a much larger phenomenon that many people are starting to buy in to – collectible car investment on many different scales. This inflow of money marks a need for a compilation of research and data to examine whether this type of investment is sustainable. A comparable benchmark for this would be any other collectible item, such as art, stamps, sports memorabilia etc. The returns of cars should also be compared to more traditional equity and bond indices, as their investment represents money the owner could be using to generate return from another source. There is a significant amount of research on the broader market portfolio, ranging from items such as stamps to art, which is the most highly researched asset class in the market portfolio. The purpose of this paper is to perform a thorough analysis of every factor affecting the repeatability of automotive investment, and to create sample

portfolios of various values in order to provide real life context to the data and theory which will be presented.

### **Market Tracking Indices**

Hagerty Insurance is one of the largest insurers of classical and collectible cars, and as a result they have to value these vehicles. They recognized the value in the data they were collecting, and made that information available on their website (Hagerty, 2015). On this site they have synthesized their own indices which they believe are representative of various types of automotive sub-segments. While I support the majority of their index segments, I don't necessarily believe that their choices of cars to form the indices are the most representative, and believe that there are other segments to consider. Nevertheless this is a very valuable tool, and will serve as my starting point for tracking several of the cars in my portfolio.

Hagerty is one of few companies in the automotive collectibles space to consistently keep and update indices for cars (Bloomberg had an index briefly, and there are smaller companies like K500 with indices) (K500, 2015). There are many companies in the art space, however, that keep and update indices for a variety of periods of art, and some track individual artists (Moi Moses, 2015; Artnet, 2015). One index in particular, the Blouin Art Sales Index, allows you to see every estimate and every auction record for millions of paintings. This is an excellent example of what will develop within collectible cars, and indeed already is with some companies. The art indices serve as a useful comparison for the returns of the car portfolio.

### **Tax Considerations**

The sale of an asset in which you have a taxable base less than that of the sales price results in capital gains tax. In the case of collectible cars there has been some research regarding



how to minimize a tax bill upon the sale of a car. Bradley Borden wrote an extremely thorough research paper on the sale of art and other collectibles, and how the use of the collectible in a business or any setting that is for work, and not personal investment, drastically reduces the tax burden upon sale (2012). Andersen Tax released a newsletter regarding the sale of collectibles as well, and they further support the points of Mr. Bradley, and go further to break down the deductibility of expenses and sales tax and capital gains tax whether you are a personal investor, a long term investor or a dealer of some kind (2015).

## **Insurance**

Insurance is another area of collectible car investment that projects to be a sizable expense working against capital gains in the model. Bryant Rousseau did a write up in the National Underwriter regarding the lower premiums of collectible. Mr. Rousseau posits that due to the relatively low miles travelled of these vehicles and their infrequent use they generally have lower premiums than daily driven cars.

The specific car insurance class for classic cars, amongst others, is called the inland marine insurance industry (Insurance Advocate, 2012). Marine doesn't pertain to water, rather, the title in totality covers anything that moves, IE cars, silverware, jewelry, baseball cards etc. The industry as a whole is worth approximately \$14 Billion, most of which is commercial, which would include businesses like that of the popular History Channel show *American Pickers*. Several articles covering this space have mentioned the importance of insuring collectibles with a specific policy, not just with homeowners insurance (Bookman, 2011; Murdock, 2012). The majority of homeowners policies cover collections up to \$2,500, which when considered in relation to a potentially \$5 Million or more portfolio of cars (or other collectibles) makes one

realize why there are so many options for collectible auto insurance. There are three main players: Hagerty, Chubb and Ace, all of whom provide collectible auto insurance.

In addition, the body of research regarding collectible cars seems focused on classic collectible cars (Rousseau, 2012; Reyburn, 2015; Henry, 2002). In my portfolios I will have several contemporary cars, as they are just as likely to appreciate as a classic car. Insurance in general projects to have a significant impact on the viability of returns on all of the portfolios, and will be carefully calculated for the cars.

## **Maintenance**

This is an area of the valuation that is perhaps the least researched, but maybe the most important. To illustrate what that means, consider that the cost for the replacement of brake pads on the Ferrari Testarossa, a car in one of the portfolios, is between \$1,000 and \$1,395, whereas to do the same thing on a contemporary car today, like a Ford Mustang for example, would be maybe \$200. If one needed a rotisserie restoration on any type of classic collectible, the cost would assuredly eclipse \$100,000 with no upward bound on that price tag (Pollock Auto Restoration, 2016). As such the majority of information on this topic is put out by restoration shops and from internet articles for certain high profile car restorations. Firsthand conversations will prove valuable in order to receive quotes on what restoration and repair could cost.

## **Factors Affecting Future Value**

This is a speculative area of collectibles that so far very little research has explored. A study by Jessica Anderson and Susannah Snider examines the factors that affect the collectibles market in general, but in general is far too broad to use as a main source for my work (2014). A video interview with Mike Spinelli, Rob Sass and Zac Moseley, all of whom are respected automotive pundits in either business or media, does the best job of discussing certain criteria that in the past have resulted in capital appreciation (Drive, 2015). However, it is largely in the context of what car should be bought, which is narrow in focus. These factors represent the cornerstone of the selection process for the cars in the portfolios, and perhaps is the main reason why automotive investment hasn't become as mainstream as art collecting.

## Like Assets in the Market Portfolio

The collectible car market falls into an asset class called the market portfolio, which is a series of alternative asset classes. These asset classes vary in terms of size of the market, valuations, types of valuation techniques and volatility. Some examples include cars, guitars, art, stamps, and even gold. Some of the assets such as collectible guitars are less covered and researched than things like collectible art. One alternative asset manager called Anchorage Capital Investment has a guitar fund, which owns 25 “blue chip” guitars (Byrne, 2014). This is one of the few funds of its kind that values and holds guitars as asset classes. It is perhaps most similar to the portfolio that I propose for the collectible car fund, in that it fully supports the frequent use of the guitars, as it is commonly thought that playing them improves their quality. Other similarities include the need for separate insurance, and potential high maintenance and restoration costs.

The collectible art market is far more widely covered by academics, and there are several papers with discussions of their valuations (Cifuentes, 2014; Renneborg & Spaenjers, 2013). These asset classes provide parallels in valuations techniques and market tracking, and are important to consider as they are key competitors for alternative investment capital for an investor with an inclination to diversify across asset classes. In addition to discussions on valuation, there are several websites and databases that were mentioned above which serve as tools for perspective investors.

Another asset in the market portfolio that has been the topic of considerable research is gold. Gold is one of the biggest destinations for alternative asset capital due to the fact that it tracks independent of the market. Research in the past has centered on the best ways to invest in

gold, whether it be through stocks, or directly buying gold (Jaffe, 1989). The paper covers the benefits of diversification, and is an examination of the best way to buy that diversification in gold. It is similar in theory to buying a car fund (hypothetical at this point) or buying a car – which will provide the best return and diversification for your risk?

Ultimately, the car portfolio has to compete for assets and attract buyers away from other market portfolio assets, such as art, guitars, gold etc. However, there are a certain subset of car enthusiasts that are going to buy the cars regardless, and they represent the other half of the demanders for the collectible cars.

### **Valuation Techniques**

Several articles in regards to the art market discuss various valuation methodologies (Charlin & Cifuentes, 2014; Higgs & Worthington, 2004). Of particular note and import to this paper is the discussion of the hedonic pricing model (HPM), as it involves breaking down an item into the individual components that have value, and aggregating those values to find the true value of the item (Charlin & Cifuentes, 2014). That is directly applicable to the collectible car market, in particular muscle cars. For example, the values of a 1972 Plymouth Barracuda can range from \$10,000 to over \$2 million, depending on hedonic factors such as the option packages ticked. In the case of the Barracuda, if you ordered an automatic base model V6 example, the individual values of those options aggregates to the aforementioned ~\$10,000. However, if you ordered a convertible 440 6 pack Barracuda with a 4 speed you'd have a car with hedonic factors in total valuing almost \$1 million. As a result, this valuation metric is very useful.

## **Intangible Value**

One of the areas of the model that is particularly hard to quantify is the concept of intangible value, IE the “returns” one receives from the cars that are not monetary. These can come from the feeling of driving the car, how sitting in it in traffic makes you feel, etc. A paper that quantifies the exact same phenomenon, and how it affects the returns of the asset in the art market is written by Benjamin Mandel (2009). He asks the question, if high profile art in the broader environment underperforms equities, why do people buy it? From there rises the concept of the utility dividend, which presupposes that as the price of a luxury good (such as art or a collectible car) rises, you receive more satisfaction from owning it, which represents your utility dividend. This concept is a significant aspect of the non-monetary returns one receives when owning a collectible, appreciating car.

Other aspects of intangible worth would be how one values feelings such as driver enjoyment. These are topics that are less researched and are extremely subjective. They, when combined with the “dividend” one receives from increasing values, represent the intangible value of an asset.

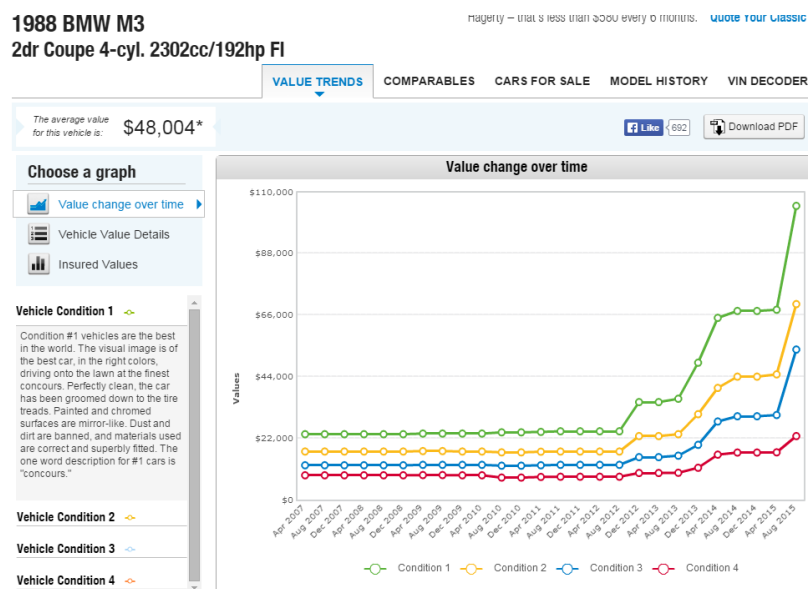
## **Methodology**

This thesis will take the form of a primarily conceptual paper with case study analysis and some database analysis. From the beginning I've set out to combine the relatively plentiful qualitative information regarding collectible car investing with the data that is starting to become more and more available. I am studying the viability of automotive investment on a repeatable scale, and to do that I will generate several portfolios of varying value, and analyze their historical performance, in addition to looking forward.

## Factors Affecting Future Value

These are the criteria that will be applied to any car added to the portfolios. They represent characteristics of cars that both in the past have resulted in appreciation, and characteristics of cars that perhaps have not yet begun their appreciation. On the surface, it is essentially automotive speculation, which many would immediately associate with high risk. While this is not entirely without merit, one must also consider the returns possible by being the first to predict a trend. A glance at the returns of any successful hedge fund manager will support that. To predict future collectibles it is useful to examine the characteristics of collectible cars that have increased in value by multiples over the last several years, and determine whether it is possible to identify the individual characteristics that caused said cars to increase in value. With that information one can predict future value.

An example to highlight several of the characteristics that appreciating vehicles have is the BMW E30 M3. The BMW E30 M3 has increased in value by approximately five times over the last three years (Hagerty, 2015).



The E30 M3 was sold as a homologation special in order for BMW to race in various touring car series. A homologation special refers to a quota of vehicles that racing bodies required manufacturers to sell to the public in order to field the racing version of that vehicle in a particular race series, and will be examined in greater detail in the discussion of how heritage affects value. The M3 is now on its fifth generation, and has essentially created an entire automotive segment: the sports sedan. But what about the original M3 spawned such admiration? There were several things that could contribute to its collectability, but I posit that the following factors, which can be applied to many potentially collectible vehicles, are what has made this vehicle so popular and has caused its increase in value:

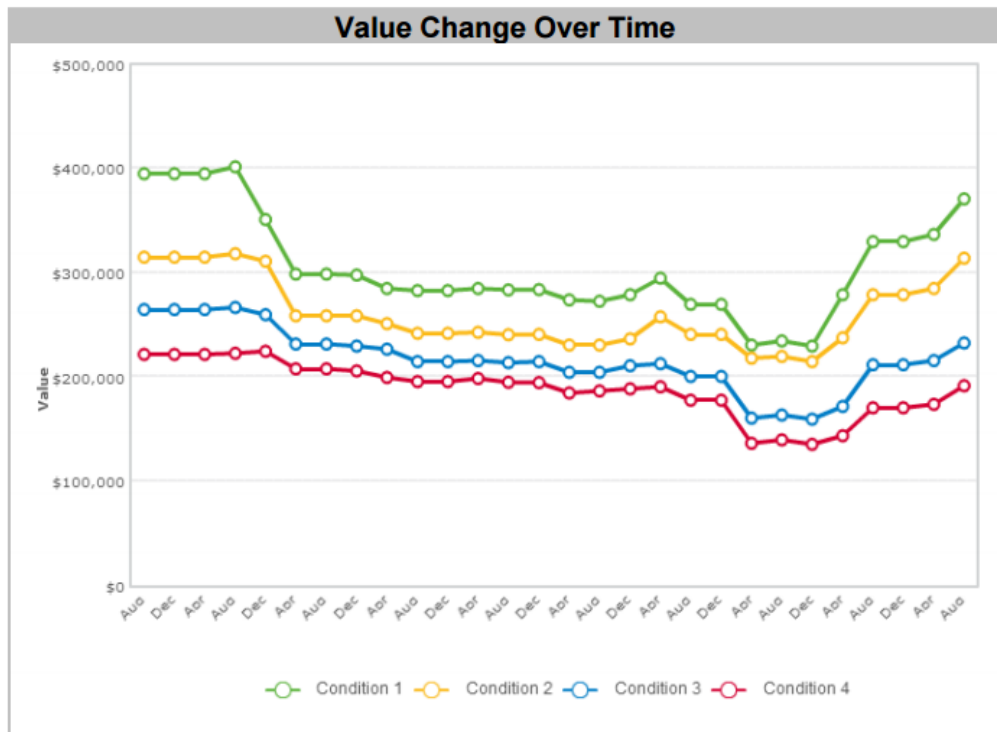
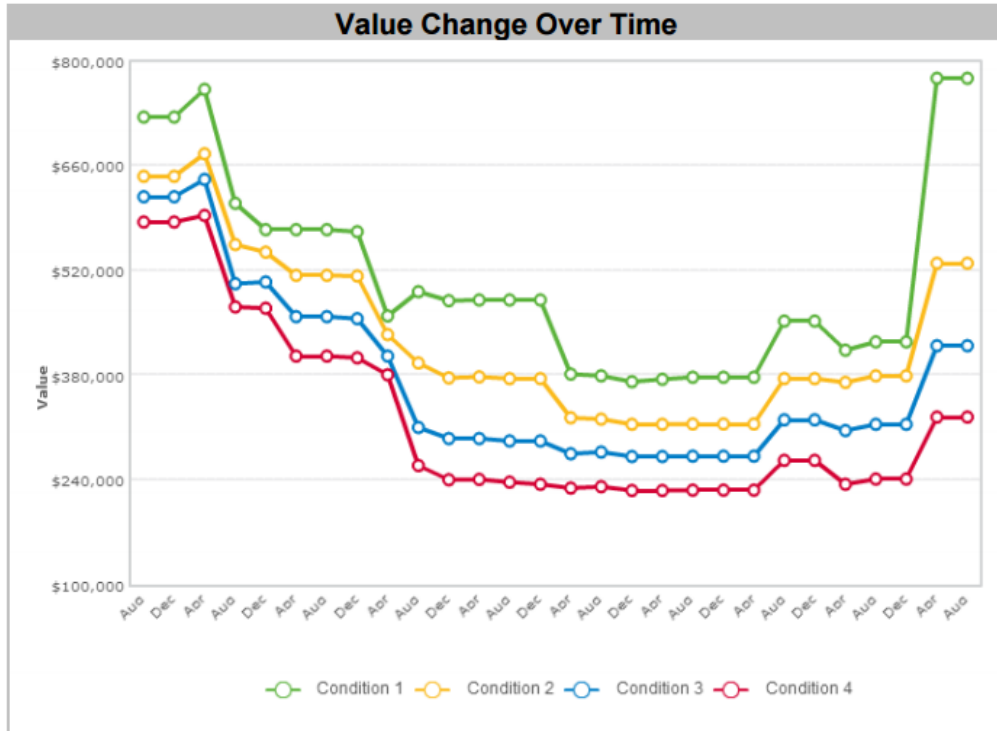
- First of its kind
  - o As mentioned, the E30 M3 was the first sports sedan, and has gone on to create and define the segment 30 years later
- Its performance
  - o Given the era, the S14 engine which the M3 was sold with was immensely powerful, with the highest specific output per liter of any car available. It was (and is) a rewarding engine to drive quickly, and as a result has made this car desirable to collectors and drivers alike
- Its heritage
  - o There are many examples of homologation specials increasing in value including
    - Dodge Charger Daytona
    - Plymouth Roadrunner
    - Buick Grand National
    - Lancia Delta Integrale



- Ferrari 250 GTO
  - Lancia Stratos
  - Lancia 037
- These are all examples of vehicles that had to be homologated in order for their race car counterparts to be contested in various racing series. This is perhaps one of the most identifiable characteristics of future value that one can target in a future collectible
  - Its appearance
    - While subjective, many agree that the classic lines of the M3, coupled with its wide body box flares give it an aggressive and timeless stance

The general characteristics of the BMW that show up most often in appreciating cars are being the first/last of their kind and their heritage. Heritage is an interesting characteristic of a car to examine, and can be broken down into two different segments: cars inspired by race cars, and the race cars themselves.

Road cars inspired by race cars tend to appreciate in value when the race car iteration itself performed well. An excellent example of this is the Dodge Charger Daytona/Plymouth Superbird. The Charger Daytona went racing in the 1969 NASCAR season with great success, and was succeeded by the almost identical Plymouth Superbird. The Dodge/Plymouth was so fast and won so many races in these two seasons that NASCAR changed its regulations to make the unique aerodynamics of these two cars illegal. That story combined with the fact that there were only 503 Daytonas produced, and some 1,935 Roadrunners (the production version of the racing Superbird) produced has resulted in the following value graphs (Redgap, 2006; Moriarty, 1995).



The following graphs show in descending order the value of the Charger Daytona and the Plymouth Superbird over the last ten years.

The graphs bring up two important points, the first being the obvious drop in prices from around 2005-2009. Collectible American cars were hit particularly hard by the financial crisis of 2008, and that drop in value serves as a reminder of what can happen when you speculate on appreciable assets. The second thing to note is the approximately 100% and 50% appreciation in value since 2010, which further details the risk-reward trade-off.

The second type of car with heritage is the actual race cars themselves. While you cannot drive the race cars on the street, many people will still buy them for their collections, or to race at specific vintage racing events. This particular sub-segment of cars is where values tend to get particularly astronomical. Take for example the Ferrari 250 GTO. The Ferrari was designed in 1960 and 1961 for competition in FIA's Group 3 Grand Touring series (Buckley and Rees, 1998). There were 39 versions produced, and when sold currently they consistently set the record for most expensive car in the world. Bloomberg reported in 2013 the private sale of a Ferrari 250 GTO for \$52 million, which stands as the most expensive unconfirmed sale of a vehicle ever (Bloomberg, 2013). The highest confirmed price at auction is also for a GTO at a price of \$35 million in 2012 (Bloomberg, 2012). This Ferrari was created for Stirling Moss to campaign in the 24 Hours of LeMans, which is the most famous endurance race in the world and is one of the key determinants of value for this Ferrari. The story for a race car is perhaps the most important differentiator among seemingly identical vehicles. For example, that particular GTO sold for \$35 million, while another GTO sold in 2012 for \$24 million (Hagerty, 2015). The only difference between the cars is the story, and that's what makes race cars unique as an investable asset, and what can drive value so much in the collectible market.

The last major factor which I believe has played a key role in the value of collectible cars in the past is being the last of its kind. I mentioned before the Porsche 997 GT3 RS – the 4.0 engined version (the most expensive, and the one to buy) had an MSRP of almost \$190,000 in 2012 - not long ago at all (Car and Driver, 2012). A recent search on Autotrader.com showed prices of GT3 RSs ranging from \$450,000 - \$520,000. What could cause such explosive value in just three years? I would argue that the biggest reason for its increase in value is because it is the last Porsche RS car to come with a manual transmission. While there are rumors of the now twice removed future generation of 911 RS receiving a manual transmission, that is both unsubstantiated and has not affected 997 values. This seemingly tiny detail, superficially, should not result in an increase in value by more than double, however, the omission of the manual from the next generation (991) 911 RS cars serves as a turning point, marking the end of an era for RS cars. It is the last of its kind, and as a result it is intensely desirable for many people, with values for 4.0 RS cars not showing any sign of slowing.

You can see this investment thesis play out in a number of other cars, an excellent example being the 2005-2006 Ford GT. The Ford GT hearkened back to the LeMans racing Ford GT40s of the 1960s which won the aforementioned race four consecutive times from 1966-1969. Almost identical in appearance to its forefather, demand for the Ford far outstripped supply, even at the Ford's MSRP of \$139,000. It was sold in limited numbers and for only three years, and then it was gone from production. It was the first and only American supercar mass produced, making it both the first (an equally valuable trait) and last of its kind. As a result, the entry point for a Ford GT now is approximately \$250,000 for a well driven example. GTs that were garaged and have less than 1,000 miles on them are approaching \$500,000.

The reason it is important to determine the factors responsible for the increase in value of certain cars is to be able to identify undervalued cars with those characteristics, and place them into the investment portfolios. I believe that being the first and last of the breed, having heritage either from the racetrack or from a homologated race car, being a beautiful machine, or any combination of the above is an excellent indicator of value – and that belief will be reflected in the cars in the portfolios.

### **The Hedonic Pricing Model in Action**

As mentioned in the literature review, there is a valuation method applied to various different pieces of art which relies upon valuing the various components that result in the artwork. For example: the period in which it was painted, how the work relates to the artist's most famous work or most common work, and various other factors. A conversation with Dennis Kohr of Kohr's Kustoms in Pennsylvania, a restoration and maintenance shop which specializes in Chryslers, Dodges and Plymouths from the 60's and 70's, put into detail the market conditions which muscle car enthusiasts have operated with for decades. The value of a classic muscle car is largely driven by the individual features which the car was optioned with from factory. When asked about what trends he sees in the muscle car collectible market, Kohr noted that the "blue chip" cars such as the 1970 Plymouth Hemi Cuda convertible with the 426 (cubic inches of displacement) engine, Super Track package, Hurst Pistol Grip Shifter, and drag gears have consistently appreciated and stayed relatively stable in value. In contrast, the value of superficially the same car, a 1970 Plymouth Cuda, however this time only optioned with a 340 engine, is less than 5% of the value of the convertible 426 car (\$2.1 Million vs. ~\$87,000). This illustrates how significant various factors are to the valuation of the car, and shows the parallel utility of the Hedonic model to automotive valuation.

## The Portfolio

### Cars and Rationale

With the above characteristics in mind, I constructed portfolios of the following sizes:

- \$50,000
- \$500,000
- \$1 Million
- \$5 Million
- \$20 Million

Cars	Initial Cost	Total Cost to Buy	Insurance	Commentary
Nissan R34 V Spec	\$72,030	\$77,072	\$2,000	Japanese cars are increasing in value at a shocking rate, none higher than R34 GTRs - with more and more becoming trashed, clean originals in a desirable color like this are likely to appreciate
1988 Ferrari Testarossa	\$162,900	\$174,303	\$8,326	Testarossas have seen rapid appreciation for good reason, mid engine V12 Ferraris just don't dip below \$150k, and once they dropped below that they started popping back up. This is a good chance to get in on the uptick
1966 Corvette Coupe	\$68,995	\$73,825		C2's are great, nice driver here with discs and a stick and a 327. Patina is in, good way to build it here. Also original owner. Posi, 3.70, Muncie 4 Speed
2007 Porsche 911 GT3 Coupe	\$97,500	\$104,325	\$2,000	GT Porsches under 100 make a lot of sense, addition of Carbon Ceramics helps a lot, also it's a 997 and 996's are only ~20k cheaper
1961 Jaguar E Type 3.8	\$145,000	\$155,150	\$12,529	
1957 Chevy Nomad	\$75,000	\$80,250		
1988 Lamborghini LM002A	\$190,000	\$203,300		
Total	\$811,425	\$868,225	\$24,855	

I'll use the \$500,000 portfolio as an example and explain the reasoning behind several of the car choices, and walk through the assumptions associated with arriving at the final returns number.

The following cars and prices represent real cars that are on sale today. Due to the relatively short time frame of the thesis it was impossible to start with current sales values and

wait a long enough period of time for any meaningful appreciation to occur, therefore, I backtracked using a combination of the Hagerty Valuation Tool and past auction records from companies such as Mecum to arrive at 2011, or five years' past sales prices. This allowed me to apply insurance, maintenance and management fees to the cost, and arrive at a returns number.

The Nissan GT-R R34 V Spec is a very special car for several reasons. Firstly, it never was legally imported to the United States, which has only increased its popularity, due to its feature role in films such as Fast and Furious. Therefore, the very limited numbers in the U.S., combined with its widely appreciated looks and driving performance have made it a car so desirable that people risk having the cars crushed just to import them. This particular car could be brought in under U.S. Show and Display laws, which would limit the miles it could be driven per year until it is 25 years old, at which time it can be driven, titled and registered like a normal classic car.

The 1988 Ferrari Testarossa is an interesting car because it ticked all of the boxes for rapidly appreciating cars, but never really was recognized until about one year ago. A good condition Testarossa could be bought in 2011 for \$44,000, which shows the rapid appreciation the car has experienced in a short time. The reason it has seen so much love from investors in recent years is because it is a manual, mid-mounted V-12 Ferrari. There are one, maybe two models of Ferraris with those characteristics that are on the market right now for under \$100,000, and the price that Testarossas were trading at was simply too low. Couple that with the car's appearance in much loved shows such as Miami Vice, and its contemporary styling and performance, and it is poised to make a long run up.

The 1966 Corvette Coupe is in a similar situation as the Ferrari. Muscle cars from the '60s are very common, and as a result, it's possible for very good ones to fall through the cracks. This one has all the right characteristics for both a "driver" and "survivor" class car. A driver refers to a car not in concours condition, but which is perfectly drivable and is in original condition - which brings us to survivor class. Survivor cars are exploding in popularity amongst collectible car enthusiasts, and represents cars from eras gone which haven't been restored. They have original patina, scuffs, marks and smells. They have personality. This '66 Corvette is from one of two pre-smog generations of Corvette, and is following its big brother in the \$5 Million portfolio, the 1963 Split Window Z06, upwards in value.

Lastly, the 2007 Porsche 911 GT3 has been mentioned extensively in the paper thus far, and for good reason. It is the last GT Porsche with a manual transmission, and is extremely popular with Porsche collectors. Like the '66 Corvette, it is following closely the trajectory of its big brother in the \$5 Million portfolio, the GT3 RS 4.0.



## Returns and Assumptions

The following represents the 2011 values of the cars in the \$500,000 portfolio, the after tax purchase price of those cars, and then measures the effects of insurance, management fees and maintenance.

Gain Or Loss							
Tax Rate	Purchase	7%	Years to Sale	5	AUM	Gains	
Cars	Initial Cost	Notes	Total Cost to Buy	Sales Price	Fee	2%	20%
Nissan R34 V Spec	\$45,000		\$48,150	\$72,030			
1988 Ferrari Testarossa	\$43,300	Good condition on Ha	\$46,331	\$162,900			
1966 Corvette Coupe	\$36,200		\$38,734	\$68,995			
2007 Porsche 911 GT3 Coupe	\$131,450	Average condition	\$140,652	\$97,500			
1961 Jaguar E Type 3.8	\$92,000		\$98,440	\$145,000			
1957 Chevy Nomad	\$70,000		\$74,900	\$75,000			
1988 Lamborghini LM002A	\$90,000		\$96,300	\$190,000			
<b>Total</b>	<b>\$507,950</b>		<b>\$543,507</b>	<b>\$811,425.00</b>			
+ Management Fees			\$104,378.70				
+ Insurance			\$124,275.00				
+ Maintenance and Upkeep			\$76,192.50				
<b>Total</b>			<b>\$848,352.70</b>				
<b>Intangible Benefits</b>			<b>\$50,795.00</b>				
<b>Total w/ IB</b>			<b>\$797,557.70</b>				
<b>Gain/Loss</b>			<b>\$13,867.30</b>				
<b>%</b>			<b>3%</b>				

Here you can see the initial cost of purchasing the vehicles in 2011 with a 7% tax rate applied.

All of the assumptions are dynamic, and allow you to see at what set of circumstances the transaction is profitable. The sales price represents the cost of the vehicle today, based off of existing cars for sale right now. This set of returns is typical for the portfolio, and the main reason for that is the three set of fees applied after the purchase.

The first of the costs is the management fee. Traditional hedge fund structures are usually 2% of AUM and 20% of gains, which the paste in above reflects. This results in a substantial yet fair management fee, which I feel would be representative of an actual manager's fee. I assumed a 2 and 20 fee for the rest of the portfolios as well, which like this portfolio, provides a significant yet reasonable fee to the manager.

Insurance is from a quote received from the collectible car insurer Hagerty. Any cars too contemporary to be covered by Hagerty were quoted through GEICO. The assumptions I used for insurance were for a 25 year old, one person, one driver household, with no history of accidents or claims on insurance, with a primary daily driver, and all of the collectibles being driven 3,500 miles a year. Bundling insurance with a carrier by insuring multiple cars reduced the costs of insurance quite a bit.

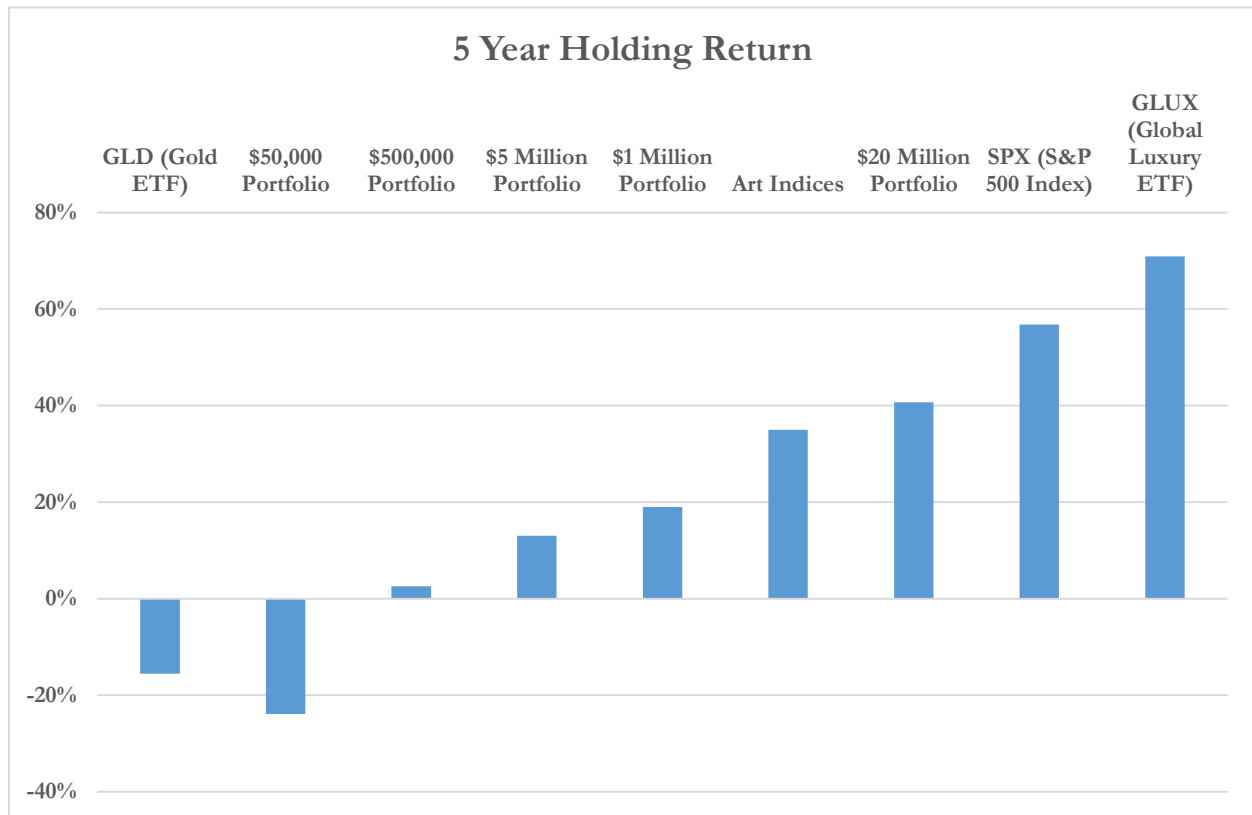
Maintenance and upkeep is entirely variable and difficult to predict. Currently forecasted as a percent of total AUM, intuitively the cost to upkeep is much higher, even when you lower the percent, at the higher portfolio values. 5% may seem a lofty number to pay a year, until you consider that the average oil change on a Testarossa is over \$1,000, and you need at least one a year just for that one car. All estimates were made after research on each individual car's common problems and past owner's opinions on maintenance costs.

Lastly, I included a line item in the model for the intangible benefits of owning the vehicles in the portfolio. These benefits stem from things like the joy of driving these vehicles, the pleasure one receives from purchasing and owning a coveted asset, and the attention one receives from owning and driving such vehicles. Similar to maintenance expense, I drove this number off of percent of portfolio value, and I made the assumption that as the number of vehicles and value of the portfolio increases, as does the intangible benefit the owner receives, hence why intangible benefit increases from 1% in the \$50,000 portfolio to 4% in the \$20 Million portfolio.

## Comparison to Benchmarks

The premise of the thesis is that investor's would choose collectible cars over other assets in the market portfolio, which would be things like art and gold. It is necessary to compare the returns of the portfolios against benchmarks amongst these alternative assets.

Below is a graph of the returns of each of the portfolios against various benchmarks:



- Gold – worst performer of the set, which certainly makes sense considering that Gold is an asset with negative beta – and in the return period the S&P was up over 50%, meaning Gold should be down which it is
- Art indices – these are a compilation of returns that I was able to find amongst various academic citations. The problem with getting one returns number for art is that there are various different types of artwork. For example – you could make

an index solely from Dutch painters in the 1770's, compared with a broader American art index versus a top 100 value art index. Each of them would yield a different return. The 35% number I applied was an average of the reported returns I was able to find. I have no doubt that the top 100 art index returned more, but that represents a minute proportion of the broader investable universe, thus I felt confident in applying a lower return number

- S&P 500 – The period considered for this returns analysis was one of strong recovery for the S&P, thus it is no surprise that it outperformed the majority of the benchmarks. An interesting exercise for a future study would a longer period examination of the relative returns for both asset classes
- GLUX – a compilation of returns from various consumer discretionary stocks like Diageo, Nike etc. Similar to the S&P this ETF benefitted from the global economic recovery and in a period with expanding discretionary spending it is not surprising that it outperformed all of the asset classes

That the \$20 Million portfolio outperformed all alternative asset classes says a lot about the viability of automotive investment versus other assets within the market portfolio and plays a large factor in the conclusion to this thesis.

### **Potential Sources of Error**

One of the biggest problems with the business idea is the repeatability and accuracy of sourcing vehicles. This is an area of concern that the majority of experts I've spoken with have mentioned. Simply speaking, purchasing a classic collectible vehicle is quite a variable task. The Ferrari Testarossa, for example, is a car that because it was so cheap for a while is liable to have

been owned by someone who didn't realize just how expensive Ferrari maintenance can be. Thus, you could purchase a Testarossa that has been owned and maintained fastidiously for 30 years, or you could purchase one which was neglected, and as a result the car which is now superficially sound because it was dressed up for sale in reality has a host of gremlins waiting to emerge. This applies for any used vehicle purchased. That is, however, where the power of an expert manager comes into play. An expert manager would in theory have a master mechanic (or be one), and would be able to determine likely sources of failure. In addition, there are ways of reducing this risk, such as only buying vehicles with full service histories and provenances, but even that is no sure thing. This is an area of variability that is difficult to quantify, but would affect a real portfolio significantly.

The selection of vehicles used in the model is another area of potential error. I am fundamentally biased and limited, due to already knowing which vehicles have appreciated substantially and which haven't. In addition, I am limited because my knowledge of the collectible vehicle universe, so to speak, while large is not exhaustive. There are other vehicles which may fit the appreciation characteristics better than the vehicles I selected, and as a result may impact the portfolio either positively or negatively.

## Discussion

After careful consideration of the model and the assumptions in it, in addition to conversations with many people in the collectible automotive industry, I believe it is absolutely possible to actively manage a portfolio of cars in a profitable business context, with certain caveats.

I think that the hedge fund structure proposed is a good way to charge for the truly expert services required to identify key factors for appreciation, and to then identify prime examples of the vehicles that were then identified and handle the purchasing of said vehicles. However, as the data showed, it is very difficult to generate a return capable of outperforming benchmarks when the portfolio value is quite small relative to the costs of insurance, maintenance and management. I found by testing the sensitivities of my model that breakeven occurs at roughly \$500,000, and \$1 Million is right around where you can start to generate some meaningful and outperforming returns. Insurance alone in the \$50,000 portfolio was 19% of overall value, compared with 5% of overall value in the \$20 million portfolio. Simply put, when you're applying growth rates to very big numbers to start (ex. A ~\$7 Million McLaren), the resulting number is much more able to cover insurance and management and maintenance while still generating a return, versus a \$3,500 Volkswagen GTI with ~\$500/year in insurance fees at a minimum.

Therefore, like a majority of hedge funds, I feel that there needs to be a minimum capital investment in order for this to be a viable business opportunity, and that that minimum should be \$1 Million. At that threshold an expert manager could still charge their fees and make money. As mentioned, this practice is consistent with all expert money managers, and I feel that its



**\$1 Million:**

Gain Or Loss						AUM	Gains
Tax Rate Purchase	7% Years to Sale			5	Fee	2%	20%
Cars	Initial Cost	Notes	Total Cost to Buy	Sales Price			
1973 Ferrari 246GTS Dino	\$169,000		\$180,830	\$359,500	Maintenance Assumption as % of PV 8%		
1969 Ford Mustang Boss 429	\$200,000	Excellent Condition	\$214,000	\$299,900			
1956 Mercedes Benz 190 SL	\$25,000		\$26,750	\$79,500	Intangible Benefit as Percent of PV 2%		
1975 BMW CSL	\$153,000	Good Condition	\$163,710	\$176,250			
1981 BMW M1	\$204,000		\$218,280	\$965,000			
1993 Jaguar XJ220	\$196,000		\$209,720	\$422,000			
<b>Total</b>	<b>\$947,000</b>		<b>\$1,013,290</b>	<b>\$2,302,150.00</b>			
+ Management Fees			\$352,472.00				
+ Insurance			\$460,000.00				
+ Maintenance and Upkeep			\$378,800.00				
<b>Total</b>			<b>\$2,204,562.00</b>				
<b>Intangible Benefits</b>			<b>\$94,700.00</b>				
<b>Total w/ IB</b>			<b>\$2,109,862.00</b>				
<b>Gain/Loss</b>			<b>\$192,288.00</b>				
%			19%				

**\$5 Million:**

Gain Or Loss						AUM	Gains
Tax Rate Purchase	7% Years to Sale			5	Fee	2%	20%
Cars	Initial Cost	Notes	Total Cost to Buy				
1963 Corvette Z06	\$258,200		\$276,274	\$395,000	Maintenance Assumption as % of PV 1%		
2011 GT3 RS	\$189,950		\$203,247	\$407,689			
2005 Ford GT coupe	\$140,000		\$149,800	\$289,000	Intangible Benefit as Percent of PV 3%		
1971 Ferrari 365 GTB/4 Daytona	\$337,000		\$360,590	\$740,000			
1972 Miura SV	\$950,000		\$1,016,500	\$1,950,000			
1964 Ferrari 275 GTB	\$750,000		\$802,500	\$2,900,000			
1957 Jaguar D-Type	\$2,000,000		\$2,140,000	\$3,400,000			
<b>Total</b>	<b>\$4,625,150</b>		<b>\$4,948,911</b>	<b>\$6,681,689.00</b>			
+ Management Fees			\$809,070.70				
+ Insurance			\$741,000.00				
+ Maintenance and Upkeep			\$231,257.50				
<b>Total</b>			<b>\$6,730,238.70</b>				
<b>Intangible Benefits</b>			<b>\$693,772.50</b>				
<b>Total w/ IB</b>			<b>\$6,036,466.20</b>				
<b>Gain/Loss</b>			<b>\$645,222.80</b>				
%			13%				

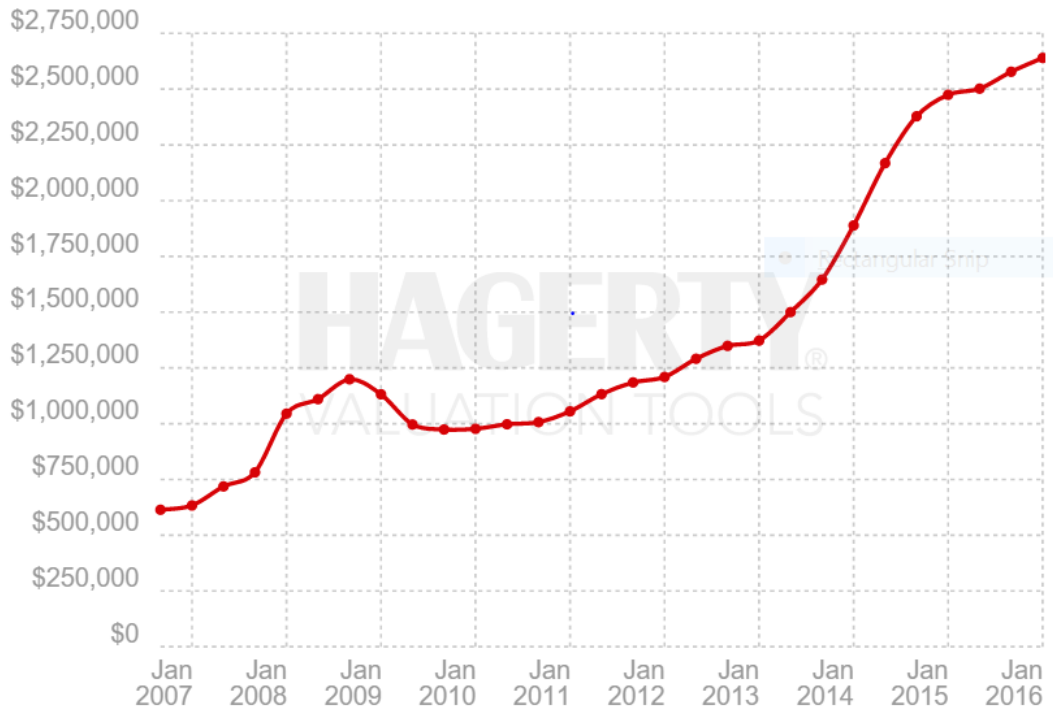


**\$20 Million:**

Gain Or Loss					Fee	AUM	Gains
Tax Rate	Purchase	7%	Years to Sale	5		2%	20%
<b>Cars</b>	<b>Initial Cost</b>	<b>Notes</b>	<b>Total Cost to Buy</b>	<b>Sales Price</b>			
1964 Shelby 289 Cobra	\$625,000	Period SCCA Race History	\$668,750	\$1,320,000			
1973 Porsche 917 CanAm	\$4,400,000		\$4,708,000	\$3,000,000			
1966 Ford GT40 Mk1	\$2,750,000		\$2,942,500	\$3,300,000			
1988 Porsche 959 Komfort	\$375,000		\$401,250	\$1,732,000			
1992 Ferrari F40	\$615,000		\$658,050	\$1,375,000			
1959 MB 300 SL Roadster	\$584,000		\$624,880	\$1,100,000			
1957 Ferrari 410 Superamerica	\$1,100,000		\$1,177,000	\$5,087,500			
1970 Dodge Hemi Challenger RT	\$751,000		\$803,570	\$1,650,000			
1995 McLaren F1 LM	\$6,750,000		\$7,222,500	\$13,750,000			
1966 Shelby Cobra 427	\$3,250,000		\$3,477,500	\$5,100,000			
<b>Total</b>	<b>\$21,200,000</b>		<b>\$22,684,000</b>	<b>\$37,414,500.00</b>			
+ Management Fees			\$5,066,100.00				
+ Insurance			\$2,024,800.00				
+ Maintenance and Upkeep			\$2,650,000.00				
<b>Total</b>			<b>\$32,424,900.00</b>				
<b>Intangible Benefits</b>			<b>\$4,240,000.00</b>				
<b>Total w/ IB</b>			<b>\$28,184,900.00</b>				
<b>Gain/Loss</b>			<b>\$9,229,600.00</b>				
<b>%</b>			<b>41%</b>				

The higher appreciation of the vehicles in the larger portfolios results in even greater returns and ability to absorb the various expenses detailed in the model. This definitely explains the flocking of alternative asset money towards the highest dollar collectibles, as shown by the Hagerty Blue Chip Index chart on the next page, and is consistent with the belief that larger portfolios on average will generate higher returns.

On a separate note, Mandel's article about why art as an asset class makes sense in both a high income and low income environment plays out in this chart and the high value portfolios as well. As you can see below, in 2008 investors flocked to the blue chips as a safe alternative asset, similar to gold, and continued to pour money into the space in the recovery periods as well, supporting the theory of the utility dividend.



In addition, I believe that the movement of money to high dollar collectible cars is very similar to the flight to quality in equity investing. When times get uncertain, investors flock to the highest quality assets and asset classes – which certainly explains the rapid appreciation of high dollar cars, art and blue chip equities in recent years.

## Implications

This is a field that is experiencing a large scale inflow of capital, and one in which I believe will receive an influx of attention in coming years. Companies like Hagerty are going to become more mainstream, and the broader car market will move the way of art – more companies doing more in depth analysis, with more experts managing funds. This is exciting because for decades art was the only asset class in the market portfolio that received large scale capital investment and academic research. I believe that with more and more capital invested in cars the academic and professional communities will take notice, which will further increase the sophistication of the research and the investors.

My findings serve to quantify and examine a collectible car market that has been thriving for decades, but one that has not received mainstream interest and large scale investment until recent years. I believe my findings help provide a framework to laypeople for what really goes on in car auctions and transactions. Collectible cars and collectors have a language and jargon that, unless indoctrinated and surrounded by it for a very long time, proves indecipherable for the majority of people. My thesis and findings show what these collectors are looking for when they buy and sell vehicles, and details the performance of these vehicles in relation to other assets in the market portfolio.

## Conclusion

The collectible car market has received relatively little attention from academics and professional investors alike for decades. I believe that that trend will reverse soon due to widespread media coverage of high dollar sales and large scale capital infusion into the space. As someone with keen interest in the hobby I've seen several different articles and papers about investing, but found that they always fall short of combining all of what I felt were the pieces necessary to make a definitive call whether it was a viable, sustainable opportunity. I felt that it was necessary to combine qualitative knowledge of the space – things like insurance, factors affecting future value etc., with quantitative analysis. As a result, I created a valuation model combining the qualitative information available with the data that had been scattered throughout the internet.

Given the assumptions in my valuation, I feel that it is possible, with careful vehicle selection and frugal maintenance, to consistently generate a positive return by investing in cars. I believe that the coming years will see an increase in institutional investment in collectible cars, an increase in sophistication of investors overall, an increase in academic research and an increase in capital invested in the space due to the reasons outlined in this thesis.

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