Alternative investment strategies: the case of designer bags

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Abstract

This thesis investigates the investment potential of 12 iconic designer bags from brand Hermès, Chanel, Louis Vuitton, and Dior. For the analyses, 17200 sales record on designer bags are extracted from the leading European online secondhand market: Vestiaire Collective and 2147 auction records from Heritage Auctions. With the help of Hedonic pricing method a price index is created for the full sample, sub-samples, and for each model to evaluate the absolute financial performance. Afterwards, the best performing designer bag indices are compared with the traditional asset classes such as stocks, bonds and commodities to evaluate the relative performance of luxury handbags. The findings show that the *Designer bag 12* index consisting of 12 models outperforms the other designer bag indices and market indices with a quarterly return of 1.85% and a quarterly volatility of 3.44% resulting in a Sharpe Ratio of 53.80%. The best performing model is Birkin with a a quarterly return of 3.36% and a quarterly volatility of 10.75% resulting in a Sharpe Ratio of 30.72%, which outperformed the World index, Commodities index, Fine Wine index, Total Gold index , and Stanley Gibbons index over 2011-2017 period.

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1 Introduction

A Hermès Birkin bag is a better investment than gold and S&P 500 in the last 35 years according to Baghunter (2016), an online market platform for designer handbags. Chanel bag has risen in value more than 230 per cent in 12 years (Financial Times, 2016) and best option for a long-term investor could be to buy a handbag (The Guardian, 2016). Despite a wide media coverage that emphasizes the investment potential of a designer bag, the academic research does not provide any views on this topic. According to Baghunter's own research, a Hermès Birkin handbag would offer an investor an average annual return of 14.2 percent during 1980 and 2015, while during the same period, S&P 500 had a real average annual return of 8.65 percent. The other noticeable presented fact is that the handbag, unlike S&P 500 and gold, has maintained or saw its value increase during the 35 years, even during times of recession. These claims may sound too good to be true, especially since the publisher of this research could be biased, since it trades in these luxury handbags. Therefore, this sounds more like a marketing slogan, than a trustworthy research. However, these claims shed light on a very important trend that is going on: people are being convinced to invest their money in a designer handbag, while there is a lack of objective academic research that supports the claim that a designer handbag is an investment product. Therefore, the aim of this thesis has been to conduct an academic research based on the study of Repkes and Prast (2015), which offers the individual investors an unbiased analysis on the investment opportunities of luxury bags such as of Hermès and Chanel.

Next to the lack of objective scientific studies in this area, there is another reason why this study looks beyond traditional investment products. The historically low interest rates in combination with poor performance of traditional asset classes forced the investors to search for alternative investments in the recent years. An alternative investment refers to various asset classes that fall outside of traditional investments, such as stocks, bonds, and cash. We can divide alternative investments further into two categories: traditional alternative investments and modern alternative investments. Real estate, private equity and commodities fall under the first category and managed futures, hedge funds and distress securities under the second category (Baker & Filbeck, 2013). If we zoom further into traditional alternative investment category, there is another group of products that acted as real assets for centuries: fine wines, art, jewelry, rare coins, classic cars, and iconic watches. These investment pieces are being known for their investment characteristic which generates financial value for their owners over time and provide diversification opportunities. Diversification among asset classes is the main instrument an investor can use to reduce portfolio's risk and stabilize the return. Therefore, this way of investment strategy was traditionally the most profitable one, until the markets around the world started to become increasingly interconnected. Presently, even investment products such as gold, which has been known to have a negative correlation with the stock market, starts to lose its hedge characteristic. Therefore, the search for new alternative profitable investments should be considered.

This study analyzed whether iconic designer bags could act as a new potential alternative investment class by creating a designer bag index consisting of four established designer brands: Hermès, Chanel, Louis Vuitton and Dior. Due the lack of official registered historical prices, one has to rely on the resell data from secondhand market where bidders and sellers determine the price of a designer bag at certain point in time, and therefore the value. By extracting a unique sample of 17200 sold records from Vestiaire Collective, a leading secondhand online market platform in Europe, and 2147 auction records from Heritage Auctions, the main American auction house for collectibles, this study built a database from the historical prices of iconic designer bags from 2011-2017 period. The information on prices and characteristics of designer bag was used to implement Hedonic pricing method to construct a designer bag index which demonstrate the impact of time on the value of these luxury bags.

1.1 Research Questions

The main research question of this thesis is: *are designer bags a potential tangible investment product that could generate positive financial returns to individual investor?* The following sub-questions should be considered first in order to form a general answer for the main research question:

1. What is the average quarterly geometric return on the *Designer bag 12* index consisting of 12 models from four different brands over 2011-2017 period?
2. Which model generates the highest quarterly financial risk-adjusted return?
3. Which quality characteristics affect the price of the selected designer bags?
4. How does the *Designer bag 12* index and in particular each model performs in comparison to other traditional asset classes?
5. Does the sample from Heritage Auctions supports the findings from Vestiaire Collective?
6. In case a designer bag generates positive financial value for its owner, is it still a suitable investment product for everyone?

As mentioned previously, this research builds on the study conducted by Repkes and Prast (2015). Their study consisting out of 3082 designer bags from Hermès and Chanel, showed that designer bags generate a positive quarterly average return of 1.14 percent. However, since their study was published, the numbers of sales increased tremendously on the online secondhand platform: Vestiaire Collective, as demonstrated in Figure 1. Therefore, this thesis contributes to literature in the following ways: it studies a larger sample due the increasing sales in the recent years and over a longer period of time, it adds two more brands to create a *Designer bag 12* index: Dior and Louis Vuitton, and tests whether the results can be generalized by using another source: Heritage Auctions.

The first question tests whether an investor for example who invests hypothetically in 12 different designer bag models can generate a positive financial return over time by reselling his or her portfolio. In case an investor has a limited budget, which model should this investor pick in order to generate a positive financial return. The third question looks into the relative performance of designer bags compared to other traditional and non-traditional assets. Question 4 is a robustness analysis to see whether the findings from one source can be generalized across other online platforms where one can sell and resell a designer bag. The last question dives deeper into the whole concept to emphasize additional returns from other values that a luxury bag possesses and the extra costs that it brings with it.

The remainder of the thesis is structured as follows; section 2 contains a brief literature review of tangible investments, and analyzes the designer bag more in depth as investment product. A detailed description of data and data sources can be found in section 3, along with relevant descriptive statistics. Section 4 dives into the methodology of Hedonic pricing methods which is used to create the *Designer bag 12* index. The empirical results are demonstrated in section 5. In section 6, the conclusion is presented, providing answers to the research questions posed along with recommendation for future research. For the benefit and understanding of the reader, several tables in the Appedix have been included.

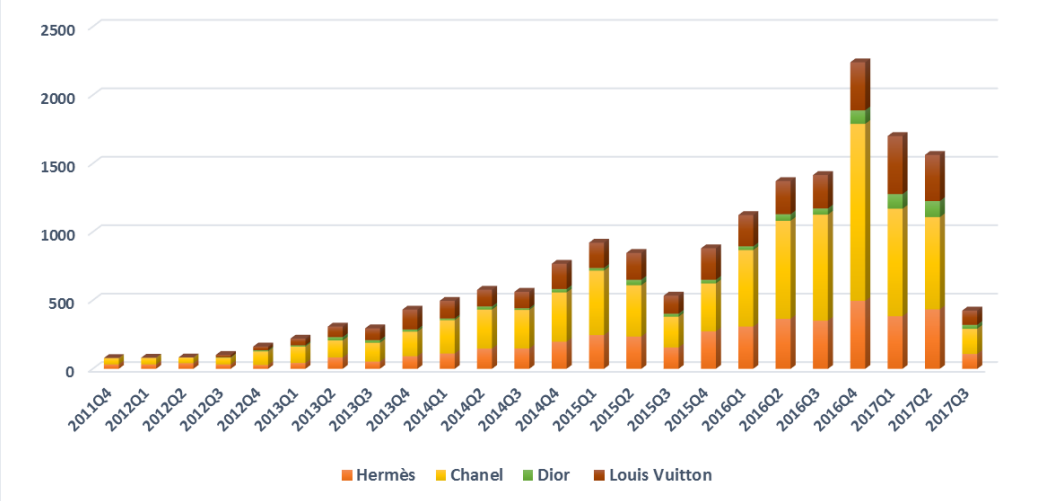


Figure 1 – Number of bags sold over time on Vestiaire Collective

2 Literature Review

2.1 Previous Studies on tangible assets

Repkes and Prast (2015) noticed the unique characteristic of the online marketplace: Vestiaire Collective, which trades in secondhand luxury designer goods. The website stores unlike other market places its sold items which are accessible by everyone. The authors made use of this characteristic and built a database in order to asses the investment potential of designer bags. Their study examined a sample of 3082 designer bags from Chanel and Hermès from the last quarter of 2011 till second quarter of 2015. The first conclusion of their research was that number of sales of designer bags grew enormously over the course of four years. The model with all the designer bag data showed a varying but upward trend which was statistically significant. The total designer bag's return on investment was calculated to be 1.14% quarterly, with 3.94% volatility. Hermès Birkin and Hermès Constance had the highest average price while Chanel Camera and Chanel Cocoon the lowest. With a Sharpe Ratio of 0.47, Hermès Birkin was also the best performer compared to other models. The lowest performer was Chanel 2.55 that generated no financial return. Lastly, the author compared the designer bag index to global stocks, European stocks, real estate, government bonds, commodities, a collectible trading company and wine index, and drew the conclusion that the total designer bag index resembles government bonds index. The total designer bag index performed better than commodities, wine index and collectible trading company, however it had a low Sharp Ratio. Due its low volatility characteristic, designer bags could form a good asset for risk-averse investors. This study is the only academic research that has been done on this area.

In general, the literature on alternative investment strategies that include tangible assets is quite scarce. Real estate is perhaps the most well-known tangible asset in which an individual can invest. However, it is interesting to look beyond a dwelling and explore new opportunities tangible assets offer. Goetzmann (1993) used transaction prices of paintings to construct an art return index. This index allowed him to compare the price movements of paintings to stock-market performance. The art return index and stock index of London Stock Exchange showed a high correlation, therefore there is little evidence that a risk-averse investor will find this an attractive asset to invest in. Besides art pieces, wine has been also considered by researchers as a potential alternative asset class. Burton and Jacobsen (2001) find that holding Bordeaux wines result in 8% return a year, which was less than equity return in the same period. Because of the strong secondary-market for fine wines, an exchange for investment-grade wine was founded in London in 1999: Liv-ex, where wine traders buy and sell fine wines. Liv-ex also publishes Liv-ex Fine Wine 100 Index. This index represent the benchmark for wine industry and demonstrates the price volatility of 100 of the most sought-after fine wines (Liv-ex, 2017). Even if wine provides some risk diversification, the wine market is very illiquid and transaction and storage costs are high. The paper by Dimson and Spaenjers (2014) reviewed the long-term investment performance of the three categories of emotional assets such as: stamps, art, and musical instruments. Then the authors compared these three tangible assets to the performance of financial assets. Their conclusion was that these collectibles seem to outperform government bonds and gold in the long-run. The authors did not take transaction costs and other expenses into account in their analysis. The paper also stresses some investment risks that come with investing in tangible assets. The first drawback is that one cannot buy a price index of set of collectibles easily on the market, which means that one cannot diversity across the portfolio. The changes in aesthetic tastes and in wealth patterns can also affect the demand for collectibles, and therefore the price. Forgeries and frauds are the issues that result in high transaction and storage costs which may limit the net return in long run.

As in any research on tangible investments, one should first identify the value determinants of an object in order to compare the price developments over time and across categories. San Martín, Brümmer, and Troncoso (2008) found for example that wine characteristics are relevant for value determination. These characteristics such as brand, region, bottle- and label conditions, vintage year, quality ratings, and type of grape determined the price of the wine. The same holds for valuing paintings, real estate, and vintage cars. Therefore, recognizing the value drivers of designer bags is the first natural step. Repkes and Prast (2015) considered the following characteristic in their research to have impact on designer bag price: the

brand, the model, the vintage status, whether it was a limited edition, the size of the bag, fashion season trait, color, material, condition, trust status of the seller, and seller likes. From their results it appeared that the larger size, more expensive materials, better condition of the bag, the brand, the model, and seasonality trait all had a significant positive effect on the price of the bag.

Research on alternative tangible investments have two things in common. First, there is a low transparency in the market investigated and there is often no official historical data available to rely on. The researchers are forced to find a natural source to collect their data from i.e. Repkes and Prast (2015) noticed Vestiaire Collective as a good option. Most secondhand markets use their sale data for their own research and do not make it publicly available. This is one of the main reasons why there is so little written about the investment opportunities of tangible investments. If there are studies on tangible investments, then their extracted data is from a well liquidated secondhand market which is dominated by rare items that are limited in supply. Secondly, the studies use mostly Hedonic pricing models, reviewed in Diewert (2003), to compare heterogeneous products from the same category. This enables the studies to create large samples consisting of heteregenous products to analyze.

2.2 Economics of luxury handbags

2.2.1 Definition of iconic designer bag

In the beginning of civilization the concept of luxury products used to be more clear than nowadays. This was mainly due the large differences that existed between social classes. The luxury products were solely meant for and used by the elite classes. As the income and wealth started to converge in the last century in Europe and the United States, so the concept of luxury became more blurry because common people started to have access on it. Therefore, it is hard to provide one definition for an iconic designer bag, since there is still no consensus about the definition of luxury products and brands (Heine, 2012). However, there is a need for a clear concept since it forms the solid base of every research. Heine (2012) provides a review on the concept of luxury product in his study, and can be summarized as follow: *"luxury productts have more than necessary and ordinary characteristics compared to other products of their category, which include their relatively high level of price, quality, aesthetics, rarity, extra-ordinariness and symbolic meaning"*

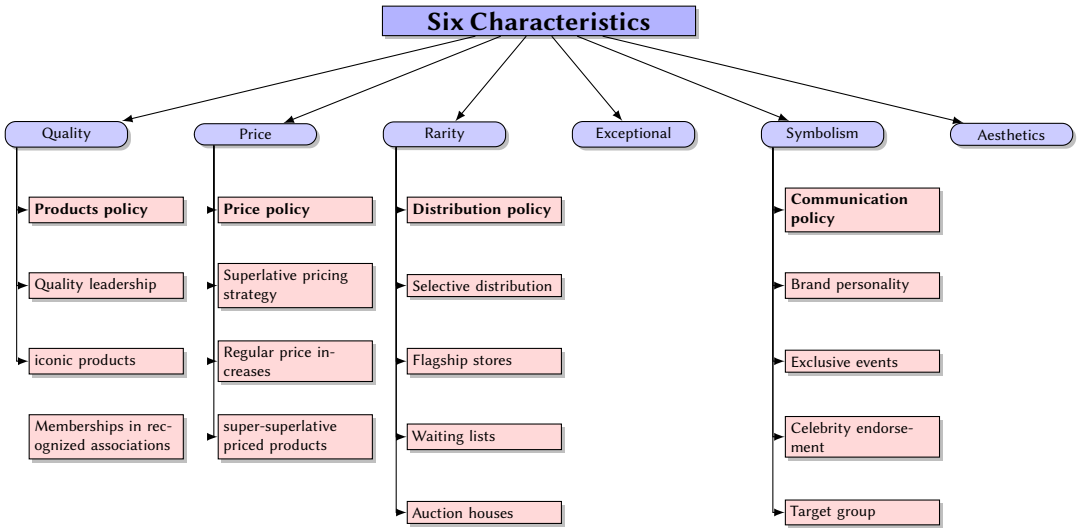


Figure 2 – Concept of luxury product

In Figure 2, six characteristics are presented that a designer bag has to have in order to be called iconic and which are explained more in detail below. These iconic models are used for this research, since they meet all or few requirements given in Figure 2. Since the data was extracted from an online secondhand

market place, the additional requirement was that the full name or description of the handbag had to contain the model name[1], only then the bag was selected for the database.

Symbolism

The selected French brands which are presented in Table 1 are being known for their timeless designer bags that never go out of style. Hermès is the oldest fashion house still in business, designing its first handbag in 1922. Their most successful and highly sought after models are Kelly and Birkin. Louis Vuitton, second oldest designer house, introduced Keepall, a big weekend bag as their first handbag. Soon after, a smaller version of the Keepal was introduced, the iconic Speedy in 1965. Gabrielle 'Coco' Chanel picked up the skill of sewing from the nuns in the orphanage and soon after introduced revolutionary comfortable clothes for women and timeless handbags. The Chanel 2.55 is still after 63 years a desired handbag around the world. The youngest brand in the list, Dior, was founded by the iconic designer Christian Dior in 1946. When First Lady of France, Bernadette Chirac gave a Dior bag to Diana Princess of Wales in 1995. Soon after, Dior renamed the same handbag to Lady Dior, which became the most iconic model of the brand. All these iconic models have one thing in common: they were inspired by a famous historical figure, or by the demand of certain type of products at that time.

Quality

Hermès emphasizes the extremely beautiful and delicate workmanship, which is the handwork of a single craftsman who spends approximately 18 hours to make one single bag and underwent four years of training before allowed to start working (The Economist, 2016). Each Lady Dior is made by hand, starting with manual cutting out of the leathers which then are assembled and sewed with precision. Even the Dior letters are shaped by hand. Chanel handbags are known for being perfectly stitched by the machines, because one cannot achieve the fine execution with manual-work. Louis Vuitton Speedy is being called indestructible. Furthermore, the models are made from superior materials which in combination with sophisticated manufacturing methods create products that can last a lifetime and could be even inherited by grandchildren.

Price & Rarity

Besides the fact that a Hermès bag costs more than 7000 euro, it is also not very easy to get your hands on it. What happens when one sends ordinary woman to buy an Hermès bag in London? This was an experiment done by Zoe Brennan (2016) for Daily Mail. Her conclusion was that nobody managed to buy it for several reasons: there were no handbags in stock and the sales assistants were not aware when the next stock will arrive due the security reasons. Furthermore, the waiting lists were abolished in UK and the only way one can buy a handbag from this prestigious brand is to build a relationship with the sales associates. The sales-assistants were addressing the limited production of bags as a culprit for their low stock. This is in line with the marketing strategy of Hermès, that tries to keep the supply as low as possible to drive the demand and therefore the price of a single handbag. *"A reasonable price is a price that appeals to reason, and therefore to comparison, but luxury is not comparative but superlative"* Heine (2012). The superlative pricing strategy of Hermès for example makes its handbags almost inaccessible and promotes image of extreme rarity. Same holds true for Chanel handbags but at the lesser extent since there are shorter waiting lists or you have to be lucky to find one in boutiques situated in fashion capitals.

[1] For example: A Hermès Birkin was placed in Birkin category, while Hermès handbag containing no model name was not considered for the research. Vestiaire Collective provides also the option to filter by model.

Exceptional & Aesthetics

The revolutionary approach taken by designers to create a handbag adds extra-ordinariness element to the product. Innovative functional attributes i.e. Chanel bags have a weird little zipper compartment that cannot be found in bags with similar structures. The manufacturing process of Hermès seem very sophisticated and can be seen as creating an art piece. The exceptional materials used such as from exotic crocodiles can add an additional component to the exceptional characteristic of a handbag. The aesthetics of a designer bag should go along with the taste of the upper class and differentiate itself from mass market manufacturers (Heine, 2012). The products should not only look beautiful, but should be pleasant to wear, smell and touch.

2.2.2 Demand drivers for iconic designer handbags

Complicated manufacturing process, high labour costs and the high input costs such as material explain the high price of an iconic handbag according to the fashion houses. However, does it still explain the exorbitant prices? Not according to an equity analysts at Exane BNP Paribas, the production cost of a basic Birkin is around $ 800, yet the price of a Hermès Birkin starts at $ 7000 (The Economist, 2016). In economics, there is a special term for these goods: Veblen good, named after the economist Thorstein Veblen. A Veblen good is a good or a service whose demand increases when its price increases. Looking at the case of designer bags from Hermès and Chanel, it seems that the more expensive they become, the more consumers desire to have it. It is important to stress that Veblen goods can be regarded as conspicuous consumption, the good will not be considered rare or special if the price starts to drop. From economic point of view, we should consider the Veblen effect, where people's preferences of buying a handbag increases as a direct correlation to its increase in price. When looking at the brand selection of this research, one can say that handbags from Louis Vuitton, Dior and Chanel are more likely to be a Veblen good than the handbags from Hermès. First, the handbags from these three brands have a strong presence of a logo, while few can spot a Hermès model according to The Economist (2016) which refers to "Signaling status with luxury goods: the role of brand prominence", which appeared in the Journal of Marketing in 2010. The paper divides consumers into two groups: the ones who want to associate themselves with trendsetters, and the ones that signal to equals but no the masses. Chanel, Dior, and Louis Vuitton are relative more focused on mass appeal to extend their customer base compared to Hermès. Second, the producers of Veblen goods should increase prices until they are just below the point at which normal economic laws start to work again. Yet, the existence of a flourishing secondary markets suggest, Hermès could charge far more than it does for a Birkin because of the long waiting lists. The waiting lists are explained by limited qualified craftsman that take four year training before they can start working. It seems that the rarity of the bags have a natural cause. This leads to a surplus demand, which means that if demand drops, the prices will not. From this analysis we can conclude that Hermès can be regarded as a saver brand choice than Chanel, Dior, and Louis Vuitton.

This may also be the reason why in the study of Repkes and Prast (2015), the Hermès models generated higher financial returns than the Chanel handbags. Despite the fact that all the designer bags could be characterized as a Veblen good, one can also argue that the iconic handbags from Chanel and Hermès became part of our global heritage due their historic element. Hermès was the first brand that launched the first leather handbag in 1920 and Chanel re-introduced the 2.55 bag in 1955, and after that many other famous brands followed. However, a Hermès or a Chanel handbag seems irreplaceable by any other new brand due the nostalgic feeling and rich history of the fashion houses.

In the study by Bianchi (2002): *"Novelty, preferences, and fashion: when goods are unsettling"*, the author points out that pleasure increases with exposure. There have been countless stories of people who started to gain interest in particular item because of their first purchase, and started to collect more from it. Even though the functionality of the good does not change, the new varying characteristics make the good desired. Therefore, the utility of past consumption increases the utility of present consumption (Bianchi, 2001). In the case for designer bags, this can mean the following: if someone decides to buy a Hermès handbag, first one has to invest time and energy to analyze the market and product. After receiving a clear view on the market, one has to design a strategy to buy one, since it is not very simple

as stated before. This time-consuming journey generates utility when one manages to purchase the handbag in the end. The next time you want to make the same or similar purchase, the barrier will be much lower, since you are *market literate* and already built a relationship with the brand that makes the purchase easier. This is the underlying process playing in the background (Bianchi, 2001). Also the growing preference for high segment luxury goods and increasing disposable income and wealth in emerging economies are the major demand drivers for designer bags. The preference is caused by higher exposure of these good on social media and online secondhand stores (Transparency Market Research, 2017).

In addition to financial value

Generating positive financial value over time is not always the sole reason why someone purchases a designer bag. If you expect that the product will rise further in price in the future you may decide to buy the product today. This will hedge the price risk and secures your future consumption. A handbag also provides user and emotional value which are beyond the financial value and dependent on the utility function of a single consumer. Luxury handbags can hold functional, individual and social value according Kusuma et al. (2016). If the handbags are thought to be functionally better because the brand is using extraordinary high quality materials and techniques to produce a bag thus raising the longevity of the bag, in that case the designer bag can hold a functional value. Consumers may also use designer bags to express certain self-identity or to integrate certain meanings into their identity. Others, experience a strong positive emotional experience when they purchase a luxury item or see it as a self-rewarding therapy. This subjective utility which triggers exciting feelings when purchasing a product with aesthetic properties generates an individual (emotional) value. As mentioned before, conspicuous consumption with the goal of being noticed, accepted by your circle of connections can be a sign of social value. Kusuma et al. (2016) conducted an empirical research on the demand determinants of purchasing a luxury handbag by the generation Y (target age: 20 -38 years old). They had four hypothesis regarding the reasons, and every hypothesis represented one of the four values to be a reason to buy a designer handbag: financial, individual, social, and functional value. Their sample size consisted of 200 survey respondents in Malaysia. Their findings show that there is a positive relationship between purchase intention and financial value, functional value, individual value and social value. A further analysis shows that individual value holds the strongest effect size followed by financial value.

Downside of investing in designer bags

Designer handbags are among the fastest growing sectors in the overall luxury market (Transparency Market Research, 2017). In 2016 the retail sales value were estimated to be 44 billion euro (Bain & Company, 2016). Also the secondhand market is flourishing which enhances the liquidity since the retail sector is quite illiquid. The biggest challenge however still remains: replicas on the market makes it very risky investment, especially if bought in secondhand market. Therefore, it is relevant to only buy from a website where experts test the bags on authenticity. The well-known and trusted secondhand market platforms require a premium for their services: this increases the transaction costs and may even impact the return on investment. The insurance and storage cost is lower compared to investments such as painting or fine wines. One can for example carry the bag in order to reduce the risk of theft. This however changes when one bag turns into a collection of bags. Because of the multiple values designer bags hold, assessing its value can become a challenge.

Although, the models selected for this research are timeless pieces and not subject to fashion trends, still one cannot predict the subjective taste of future generation. Especially since animal and eco-friendliness becomes widely popular and social desirable. If the influential figures would stop buying Birkins made from exotic crocodile to protect their reputation, then the popularity of the bags will decrease, thus the price and value.

Table 1 – Brief background on the iconic designer bags

Brand	Model	DOB	Retail Price 2017	Inspired by	DOB brand	Country
Hermès	Birkin	1984	5900-8700	Made for Jane Birkin (actress and singer)	1837	France
	Bolide	1923	7400-9500	Takes inspiration from the original 1923 design, made for travelling.	1837	France
	Constance	1959	7350	A timeless silhouette and reflective of Hermès' strive for impeccable craftsmanship.	1837	France
	Evelyne	1978	2700	Evelyne Bertrand	1837	France
	Kelly	1956	6300-7950	Hollywood actress turned Monaco Princess, Grace Kelly	1837	France
Chanel	Boy	2011	3800-4850	by Coco's longtime lover, polo player Boy Capel.	1909	France
	255	1955	5420	backpacks of soldiers: for women from all backgrounds	1909	France
	Timeless	1983	3990-5420	available in all seasons	1909	France
	Camera	2013	3095	Camera	1909	France
	Mademoiselle	2011	2500-4100	Since Coco Chanel never got married	1909	France
Louis Vuitton	Speedy	1965	942	Audrey Hepburn	1854	France
Dior	Lady	1994	3004	Lady Diana, Princess of Wales	1947	France

3 Data

3.1 Data sources:

Vestiaire Collective

The hardest part of conducting research on determining the investment opportunity of designer bags is that there are no historical official retail prices available, muss less secondary market prices. However, in the recent years the trend is going towards online second-hand luxury market because of appearance of very trusted secondhand online platforms which gained a lot of popularity. In Europe is Vestiaire Collective, Paris originated, the biggest re-seller of premium fashion. In the United States you have the company's biggest global competitor: TheRealReal and in China you have the MilanStation(Milnes, 2017).

This thesis will scrape[2] therefore the data from biggest re-seller of premium fashion, Vestiaire Collective, luxury online secondhand market place. This online platform which is active since 2009, has at the moment over 6 million members in Europe and United States. Every week 30,000 items in various categories such as handbags, clothes, shoes and accessories are added to the catalogue of 600,000 items. All the items are checked for authenticity by a team of experts, thus protecting the buyer from replicas. A seller has to pay Value added Tax, while buyer is only subject to shipping costs. In contrary to many other small online market places, Vestriaire Collective stores the sold items, and the pages are accessible by everyone. This characteristic of the website provided Repkes and Prast (2015) the opportunity to create a database of 3082 items which were sold between 2011 and 2015. Fortunately, the website still has this useful feature. This thesis managed to scrape data on 23000 items [3] within the six years' time-span (2011-2017), and kept only the sold items for the analysis, resulting in 17200 designer bags to study.

This study included most high-end classic brands, Chanel and Hermès because of two reasons: Repkes and Prast (2015) also used these two brands for their analysis, and one can only compare to their results if both studies contain same brands. Furthermore, next to the elaborate reasons mentioned in the literature review, there was a natural cause for picking these brands. Hermès and Chanel bags form the majority of Vestiaire Collective's sale archive. In order to investigate whether less expensive designer bags also generate returns over time, Louis Vuitton and Dior were included in the study. We included the most popular iconic model for each brand, Speedy and Lady Dior (Forbes, 2016 & Independent, 2017). This is especially interesting to consumers who may have lower budget, but still would like to invest in a designer bag. The relative low prices now make it also more attractive to invest in these models now, as they may rise through the roof in the future, as we have seen with Chanel bags. The second reason is that Vestiaire Collective provides sufficient historical sale data for these brands, which offers this research an appropriate sample to analyze. The visual representation of the website can be found in Figure 10 in Appendix.

Heritage Auctions

The second database was constructed by scraping auction records from Heritage Auctions archive, largest auctioneer in the world which was established in 1976 in Dallas, Texas. It is a trusted and efficient online marketplace, where bidders and sellers can register and bid on collectibles. It is a transparent marketplace where the past information is available to registered users. This characteristic again offers this study the opportunity to scrape historical sale data on designer handbags. Unfortunately, their database does not contain many brands and models. Largest number of bags are from the brand Hermès. Two models [4] are chosen from this brand, Birkin and Kelly, in order to look at the price development

[2] Web-scraping is a technique used to extract large amounts of data from websites whereby the data is extracted and saved to a local file in table (spreadsheet) format. This thesis used ParseHub and Octoparse software to extract data.

[3] This raw data contained the following brands: Hermès, Chanel, Louis Vuitton and Yves Saint Laurent. The latter brand was dropped from the analysis, because of the relative little observations.

[4] Hermès Birkin and Hermès Kelly were selected because these two models contained the largest observations.

from this source. Even though one cannot exactly compare the products from the two online market platforms, since Vestiaire Collective offers more 'affordable' pieces, while Heritage Auctions sample consists of many rare and exclusive samples. This however also provides this study to compare the most exotic samples with more normal ones, and look which offers best return. This data set contains 2357 items from period 2010 till 2017.

3.2 Dependent Variable

As stressed before, only sold handbags are used for creating the designer bag database. The value can be captured by the price at which the handbag is sold, because only then the buyer and the seller agreed on a price, which means that the market price is the equilibrium price at that point in time. Since we have the sold price, and sold date, we can construct an unbalanced panel data. The raw scraped prices were originally in dollars, and were converted to euros. This was necessarily, for the second step, correcting the prices for European inflation by using the Harmonized Indices of Consumer Prices (HCIPs)[5]. In order to limit the extreme values that can results in biased outcomes, the highest and lowest five percent of discounted price in euro is then converted to the nearest value. The log of winsorized discounted price in euro forms our dependent variable.

3.3 Hedonic Independent Variables

The independent variables are the control variables that are known to have a certain impact on the price of a designer bag as mentioned previously. These value drivers were also included in the research of Repkes and Prast (2015). This study however included one extra control variable: whether a seller is a professional or individual seller. The authenticity of a designer bag is very important, since no one wants to splash the cash only to find it is actually a replica. Therefore, controlling for seller characteristics by including more relevant variables may be better if these variables do not have high correlation with each other. It is worth to mention that almost all the characteristics which are mentioned on the website seem to be relevant for the buyer in order to value a product. The online marketplace naturally offers us the independent variables which impact or explain the price differences between designer bags, therefore it is quite intuitive that both studies use the same independent variables. These variables are presented in Table 2 for Vestriaire Collective and in Table 3 for Heritage Auctions.

Table 2 – Descriptive Statistics: Vestiaire Collective

Variable	N	Mean	Std. Dev.	Min	Max
Inflation adjusted price in €	17200	2.694	3.096	75.875	63983.77
Hedonic control variables					
Seller followers	17200	88211.56	630104.3	0	4886813
Seller likes	17200	12155.05	169510.8	0	4890841
Trusted profile dummy	17200	.525	.4993891	0	1
Professional seller dummy	17200	.2222093	.4157432	0	1
Size_width	17200	2.796.845	6.436.697	7.62	50.038
Fair condition dummy***	17200	.0944767	.2924993	0	1
Good condition dummy	17200	.3664535	.4818494	0	1
Excellent condition dummy	17200	.5386628	.4985174	0	1
Vintage dummy	17200	.0676744	.2511937	0	1
Limited Edition dummy	17200	.0418023	.200143	0	1
Other material dummy	17200	.0703488	.2557414	0	1
Exotic leather dummy***	17200	.0176744	.1317689	0	1
Patent leather dummy	17200	.0393023	.1943189	0	1
Leather dummy	17200	.7495349	.4332935	0	1
Cloth dummy	17200	.1028488	.3037702	0	1

[5] The inflation data was retrieved from Eurostat website and can be found in Table 14 in the Appendix.

Table 2 continued from previous page

Variable	N	Mean	Std. Dev.	Min	Max
Silk_cotton_suede dummy	17200	.0202907	.140997	0	1
Blue	17200	.0606395	.2386749	0	1
Brown	17200	.1881395	.3908349	0	1
Burgundy	17200	.0164535	.1272152	0	1
Gold	17200	.009186	.0954054	0	1
Green	17200	.0159302	.1252093	0	1
Grey	17200	.032093	.1762523	0	1
Khaki	17200	.004186	.064566	0	1
Navy	17200	.0134302	.1151114	0	1
Orange	17200	.0161047	.1258817	0	1
Pink	17200	.0312209	.1739194	0	1
Purple	17200	.0098256	.0986388	0	1
Python	17200	.0001163	.010783	0	1
Red	17200	.0422674	.2012045	0	1
Silver	17200	.0065698	.0807898	0	1
Turquoise	17200	.0027326	.0522039	0	1
White	17200	.0301163	.1709122	0	1
Yello	17200	.0056977	.0752698	0	1
Black***	17200	.3513953	.4774201	0	1
Beige	17200	.0809302	.2727359	0	1
Other colour	17200	.0830814	.2760132	0	1
Brand& Model dummies					
Chanel	17200	.4901163	.4999168	0	1
Dior	17200	.0423837	.2014689	0	1
Louis Vuitton	17200	.2111628	.4081455	0	1
Hermès***	17200	.2563372	.4366229	0	1
Birkin***	17200	.0981395	.2975119	0	1
Bolide	17200	.0131395	.1138756	0	1
Constance	17200	.0266279	.160998	0	1
Evelyne	17200	.0444186	.2060293	0	1
Kelly	17200	.0740116	.2617974	0	1
Boy	17200	.0940116	.2918534	0	1
255	17200	.1157558	.3199412	0	1
Timeless	17200	.245814	.4305813	0	1
Camera	17200	.0182558	.133879	0	1
Mademoiselle	17200	.0162791	.1265504	0	1
Speedy	17200	.2111628	.4081455	0	1
Dior Lady	17200	.0423837	.2014689	0	1
Autumn_Winter	17200	.2682558	.4430644	0	1
All seasons***	17200	.5308721	.4990605	0	1
Spring_summer	17200	.1822093	.3860282	0	1

The variables with *** are left out as reference in the OLS Regression in order to interpret the coefficients. The season dummy variables were made depending on the colour of the bag and description.

Table 3 – Descriptive Statistics: Vestiaire Collective

Variable	N	Mean	Std. Dev.	Min	Max
Inflation adjusted price in €	2,356	12367.7	12221.61	2.772.788	104608.5
Hedonic control variables					
Size width	2,148	332.448	4.708.319	15	55
Kelly	2,357	.4183284	.4933893	0	1

Table 3 continued from previous page

Variable	N	Mean	Std. Dev.	Min	Max
Brkin***	2,357	.5816716	.4933893	0	1
Material dummies					
Alligator	2,357	.0309716	.1732774	0	1
Ardennes leather	2,357	.0190921	.1368777	0	1
Box leather	2,357	.0004243	.0205978	0	1
Buffalo leather	2,357	.0093339	.0961806	0	1
calf box leather	2,357	.1069156	.3090714	0	1
Clemense leather	2,357	.1574035	.364258	0	1
Diamond integrated	2,357	.0021213	.0460189	0	1
Epsom leather	2,357	.06958	.2544918	0	1
Fjord leather	2,357	.0131523	.113951	0	1
Himalayan crocodile	2,357	.0046669	.0681699	0	1
Leather	2,357	.1900721	.3924411	0	1
Lizard	2,357	.0072126	.0846379	0	1
Nilo crocodile	2,357	.0360628	.186486	0	1
Nilo lizard	2,357	.0072126	.0846379	0	1
Ostrich Leather	2,357	.0441239	.2054139	0	1
Other material	2,357	.0084854	.0917438	0	1
Patent leather	2,357	.0004243	.0205978	0	1
Porc leather	2,357	.0012728	.0356612	0	1
Suede	2,357	.0021213	.0460189	0	1
Swift leather	2,357	.0610946	.2395546	0	1
Togo leather	2,357	.1535851	.3606271	0	1
Vinyl***	2,357	.0016971	.0411693	0	1
Porosus crocodile	2,357	.0729741	.2601492	0	1
Colour dummies					
Gold	2,357	.0907934	.287376	0	1
Grey	2,357	.0241833	.1536505	0	1
Orange	2,357	.0369113	.1885841	0	1
Other colour	2,357	.3826899	.4861467	0	1
Violet	2,357	.0055155	.0740769	0	1
White	2,357	.0318201	.1755582	0	1
Green	2,357	.0504879	.218996	0	1
Blue	2,357	.0067883	.0821284	0	1
Beige	2,357	.0016971	.0411693	0	1
Black***	2,357	.1735257	.3787814	0	1
Red	2,357	.0797624	.2709825	0	1
Pink	2,357	.017395	.1307657	0	1
Brown	2,357	.0207891	.1427081	0	1
Other dummies					
Shiny colour	2,357	.1154009	.319573	0	1
Matte colour	2,357	.0381841	.1916812	0	1
Limited edition	2,357	.0403055	.1967164	0	1
Gold hardware	2,357	.438269	.4962799	0	1
Palladium hardware	2,357	.4993636	.5001057	0	1
Spring summer	2,357	.0717013	.2580475	0	1
Autumn winter	2,357	.0296988	.169791	0	1
All seasons***	2,357	.7878659	.408906	0	1

The variables with *** are left out as reference in the OLS Regression in order to interpret the coefficients. The season dummy variables were made depending on the colour of the bag and description.

The control variables of the database Heritage Auctions and Vestiaire Collective differs since they come from different sources. Heritage Auctions does not report any seller's characteristics. Since the auction house has a reputation of world's most trusted and efficient marketplace, we can permit to not control for these characteristics. Their material selection is very exotic, however within this category there is also a varying choice. Furthermore, the auction house also categorizes the bags as shiny or matte, and whether the "chains" or other characteristics are in gold or silver (gold or palladium hardware) which are additional control variables that may affect the price of a bag. Furthermore, the conditions of these bags are always in excellent state.

For Vestiaire Collective we have the following seller's characteristic control variables: seller followers, seller likes, trusted profile, and whether a seller is professional or private seller. The first two variables control for the seller's popularity. Trusted profile can only be achieved by a seller if it meets the three criteria: if one sold multiple items that were authentic and passed the quality control, the seller responds quickly and adjust the information accordingly. The professional seller are the resale stores that sell items of private sellers. For the customer this holds than when you buy from a professional seller, you have the right to return the bought item within 14 days and will be refunded afterwards. In case of a private seller, you cannot return the bought item. You can list the item again on the website though. The professional seller asks for an additional commission from private sellers, this can translate into higher prices.

The product characteristics for which we should control are: size measured as the width of a bag in centimeters, condition of the bag, material, and colour. The dummies are created for the most common colours and materials, and the unusual in these categories are merged into one dummy: other. Furthermore, model dummies are included, since one model of a brand may be perceived more as iconic and rare than the other, and therefore may be valued more. Limited edition, vintage and season dummies are included to control for demand factors. Limited edition bags are produced in even smaller quantities, and are therefore more rare and may affect the demand for them. If the description of the bag contained the following words: limited, special, and collector's item then the bag was labeled as limited edition. The vintage dummies were created if there was a vintage label next to the bag. The season dummies were created to address the seasonality effect on the bag: in the description it is sometimes mentioned for which season the bag is meant, and otherwise one can categorize the bags depending on their colour.[6]

The descriptive statistics for Vestiaire Collective (from here on: VC) and Heritage Auctions (from here on: HA) are represented in Table 2 and Table 3 respectively. From Table 2 we see that the average real price for VC sample is 2694.00 euro. You can already be the owner of an iconic bag by spending 76 euro on a Louis Vuitton bag which is quite damaged, or one can spend a fortune on Hermès Birkin made from exotic Himalayan crocodile leather. The average price of a designer bag for HA sample is 12376.70 euro, and the minimum price is still higher than the average price of a designer bag on Vestiaire Collective. This is mainly because HA data sample contains models from Hermès. Birkin and Kelly are by default more expensive than Chanel, Dior and Louis Vuitton models. Second, the auction house trades in very exclusive handbags made from very exotic materials that are in excellent condition, as one can notice from Table 3. Third, the sale price presented on HA is hammer price plus the buyer's premium. In Table 15 these premiums are summarized.

The market indices in Table 4 are used to determine the relative performance of designer bags compared to other asset classes. These indices were also used in the previous study on designer bags: the authors emphasize the popularity and well ranked characteristics of these particular indices which track different asset classes. in order to be able to compare the results to their study, this thesis will use the same indices and add AEX index and Gold as an extra asset. Gold was added because it is one of the commodities that people buy as an accessory i.e. ring with the thought of that it may hold its value at least. Designer bags can be potentially regarded as an upcoming competitor for jewelry sector. AEX index was chosen because many Dutch like to see the comparison with their favourite asset class (Home bias).

[6] In the Appendix Table 15 one can find these criteria on which seasonality was based.

Table 4 – Market data for relative comparison

Index	Ticker	Description
Vanguard Total World Stock Index	VT	Tracks global stock market, in $
Vanguard FTSE Europe Index	VGK	Tracks European stock market, in $
Ishares FTSE/EPRA European Property	IPRP	Tracks European real estate market, in €
Ishares Core Euro Government Bond	IEGA	Tracks European governement bond market, in €
PowerShares DB Commodity Index	DBD	Tracks global commodity market, in $
Stanley Gibbons Group	SGI	Tracks stocks of Stanley Gibbons Group, company of rare stamp collections, in $
Liv-ex Fine Wine 100 Index	LIVF100	Fine wine industry's leading benchmark, 100 most sought-after-fine wines, in £
AEX Index	AMSTEOE	Index represent the stocks of the 25 leading companies listed on Amsterdam Exchange
Gold	GSGCTOT	Gold Index fund

4 Methodology

In alternative investment literature two methods are represented to create a price index from sales data: repeated sales method and hedonic pricing method. For the repeater sales method one needs buy and sell prices of identical products over time in order to calculate the average changes in the value. Hedonic pricing method originates from Lancaster's (1966) theory of consumer's demand. He provided a new approach in economics to measure hedonic utility from consumption of goods. The old approach stated that a consumer derives utility directly from a good, which has one characteristic, and that is the good itself. In contrary to the old approach, the Lancaster's approach shows that a good exists of many properties and characteristics, from which consumers derive utility. Therefore, a buyer makes their purchasing decision based on the number of good's features as well as per unit cost of each features. Lancaster's theory was further completed by Rosen (1974) who created a theory on hedonic pricing method. The hedonic pricing method states that an object can be valued by its attributes. An item's total price exists of price of each homogeneous characteristics, and each characteristics has a particular implicit price in an equilibrium market (Xiao, 2017). Ginsburgh, Mei, and Moses (2006) compared in their study repeated sales method and hedonic pricing method for the art market by using Monte Carlo simulations. Their conclusion was that Hedonic pricing method performs better than repeated sales method, and the latter should not be used if the time frame is smaller than 20 years. Repkes and Prast (2015) used the Hedonic pricing method for two reasons: firstly, the dataset of designer handbags did not offer the opportunity to identify repeated sales, and even if it did, the method will reduce the sample significantly. Secondly, the hedonic pricing method avoids the complication of sample selection bias because it uses the full data set in which quality effects are separated from time effects. Triplett (2004) provides an entire review on hedonic pricing methodology, and suggest to use dummy Hedonic pricing method specifically if the characteristics do not change over time. The literature provides a clear evidence on the advantage of using the Hedonic pricing method to create a price index, and therefore should be used in this study.

4.1 Theoretical Basis: Dummy unweighted Hedonic pricing method

A Hedonic price index is any price index that makes use of a Hedonic function. A Hedonic function is a relation between the prices of different varieties of a product, such as the various models of designer bags, and the quantities of characteristics in them (Triplett, 2004). Therefore, the price function of a designer bag P_i can be demonstrated as:

$$P_i = P(X_i, \beta, \epsilon) \tag{1}$$

Where,

P_i: the implicit price respected to the characteristics

X full set of property characteristics

β: vector of parameters to be estimated

ϵ: stochastic residual term

Repkes and Prast (2015) used the dummy Hedonic pricing method, and followed Fogarty and Sadler (2014) to apply their methodology. Fogarty and Sadler, (2014) based on their turn their methodology on Triplett (2014). Their approach describes the model for dummy Hedonic pricing method, and can be applied to our model:

$$LN(P_{bt}) = \beta_0 + \sum_{k=1}^{K} \beta_k x_{kbt} + \sum_{t=1}^{T} \gamma_t d_{bt} + \varepsilon_{bt} \tag{2}$$

Where,

$LN(P_{bt})$: log of price designer bag b sold at time t

β_k: the rate at which the price increases at a certain level, given the attribute, and (k)=(k=1..K)

β_0: interception parameter which offers information about the reference groups of dummies

d_{bt}: a dummy variable that takes 1 when bag is sold at time t, and 0 otherwise, and t=(t=1….24), since we will have 24 quarters in total

ε_{bt} :the error term + random part time independent specification error part

As mentioned previously, each quality characteristic has an impact on the overall price of a designer bag, and these effects are absorbed by x_{kbt}. The time dummy coefficients are representing the changes in value over time. The price index is created by taking the antilogarithm of dummy coefficients, and deduction 1 from it.

$$(e^{dbt} - 1) * 100 = \text{quality adjusted price change over time} \tag{3}$$

The semi-log model can be estimated using ordinary least squares (OLS regression), with periodical returns calculated from the γ_t estimates (Fogarty & Sadler, 2014). The advantage of using dummy Hedonic model is that one can use all sold item observations, and thus creating a large database. Furthermore, the method is more flexible to changes in tastes between periods since it controls for bag characteristics, it conserves degrees of freedom, and there is no uncertainty about the measure of total price change between period t-1 and t (Diewert, 2003). However, there are series of econometric problems that come along with this approach that leads to biased estimates (Xiao, 2017).

4.2 Statistical Issues

The first issue with Hedonic pricing method is misspecification bias. In the model above it is assumed that the independent variables and dependent variable have a linear relationship. Sometimes Hedonic pricing method and/or observation of data will not suggest that there is a linear relationship between variables. Even though the linear approach is the most straightforward one to use, if the functional form is non-linear, the estimated coefficients are inconsistent (Xiao, 2017). Hedonic pricing method forms can be divided into four categories: Linear-, semi-log-, log-log-, and Box-Cox specification. This study decided to choose the semi-log form for two reasons: Diewert (2003) conducted a systematic review on the unresolved issues in Hedonic pricing methods and tried to answer the question whether to log the dependent variable. He stressed the fact that the errors in semi-log regression are more likely to be homoscedastic compared to the errors in linear model where dependent variable is a continuous number. The second reason for choosing semi-log form is that its coefficient are easy to interpret and that it can deal with dummy variables for characteristics (Xiao, 2017).

Second issue that often comes across when attempting to estimate the hedonic function is Multicollinearity. When two or more independent variables are highly correlated, and are both included in the regression, one will encounter this statistical problem. In our case, it is very likely that following explanatory variables are highly correlated: number of seller likes, number of seller followers, trusted profile, and whether a seller is professional or individual seller. When a seller is a professional seller, it is likely that it is trusted more, will have more followers and likes. All four of the variables have a positive effect on the price, therefore it is hard to distinguish the individual effects of these variables on the price of a designer bag. There is no direct solution to this issue, however one can apply VIF test to test for Multicollinearity in first place. When the VIF has a score of 10 or higher, one can confirm the presence of Multicollinearity and choose the explanatory variables with highest predictive power R^2. In the case of the four mentioned variables, there seem to be no high correlation between them, and the VIF test is equal to 1.05. Therefore, we keep all these four control variables in our model.

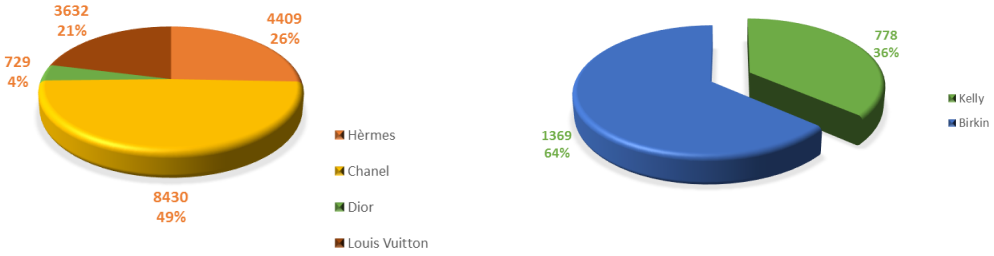
Hedonic pricing method incorporates a large number of explanatory variables, which may contribute to Heteroscedasticity of the error term. Heteroscedasticity, the third issue, is a statistical problem where the variance of the error term of the Hedonic model is correlated with the dependent variable.

Hedonic pricing method is using OLS regression to obtain its estimates. One of the assumptions of OLS regression states that the variance of the error should not be correlated with the dependent variable. Since heteroscedasticity has a constant variance, it does not lead to biased coefficients, but to inefficient estimates which can lead to untrustworthy confidence intervals in t and F tests. The empirical literature provides two solutions to correct for Heteroscedasticity: correcting the standard errors (White, 1980) or adopting a Weighted Least Squares (WLS) approach to transform the data. . This thesis will be using the White test to detect the heteroscedasticity in the error terms. If the data set contains heteroscedasticity, the White Standard Errors will be used to correct the standard errors, because transforming the data by applying WLS method, will likely produce biased coefficients.

5 Aggregate Results

In Section 3 the descriptive statistics was represented to provide the reader an overview on the different bag characteristics which are going to be controlled for in the OLS regression. This section will summarize the data briefly as a stepping stone to the next section where we are going to discuss the empirical results.

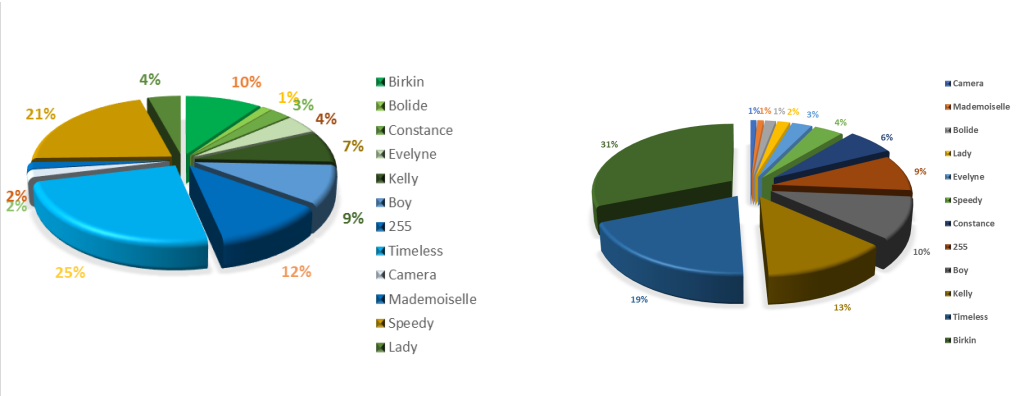
Figure 3 – Share of Brands & Models in Total Number of Sales



(a) Vestiaire Collective **(b)** Heritage Auctions

Figure 6 shows the exponential growth in sales in the last periods. This can be due the rising growth of the website which drew more attention from buyers and sellers over time. One can also see that Chanel was one of the rising stars from the four brands. Chanel also makes 49 percent of our data, followed by Hermès (26 %), Louis Vuitton (21%), and Dior 4%. It is important to mention though, that Louis Vuitton and Dior contain one model each, which makes the amount of observable per model quite desirable for the analyses. The data sample for Vestiaire Collective contains 4228 Chanel Timeless designer handbags, which accounts for 25 percent of our data sample. In Repkes and Prast (2015) Chanel Timeless also accounted for 33 percent of the data sample, which translated into the 1250 items. This means that the sales for this model grew by 238 percent in 9 quarters. There are few models such as Bolide, Camera, Mademoiselle that contain very little observations compared to the other models in our sample. This may suppress the statistical validity of the results, and these should therefore be interpreted with caution.

Figure 4 – Vestiaire Collective: Share of Models in:



(a) Total Number of Sales **(b)** Total Value of Sales

In Table 5 the average inflation adjusted prices are given for each model. Birkin is with the average price of 8540.58 euro the most expensive model, and Speedy the cheapest as expected. In Figure 5, We can see that Birkin also has the highest share in total value of designers bag. The total value of our sample is approximately 47 million euro. The sample of Heritage Auctions exist of 1369 (64 %) Birkin bags, and 778 (36 %) Kelly bags. The total value of this sample is approximately 29 million euro.

Table 5 – Average real price in euros per model

Models	Mean	SD	Min	Max
Birkin	8540.58	4635.20	374.32	63983.77
Bolide	2876.36	1704.45	360.60	16091.61
Constance	6462.05	4250.79	511.66	29266.94
Evelyne	1599.73	475.96	476.76	3163.41
Kelly	4632.40	3396.86	218.99	48504.81
Boy	2923.08	832.18	322.65	7008.71
255	2044.34	882.25	283.74	6210.41
Timeless	2141.42	942.43	389.23	12073.95
Camera	1132.60	500.05	394.05	4825.73
Mademoiselle	1357.29	719.37	154.27	5773.86
Speedy	491.72	251.04	75.87	2253.35
Lady Dior	1035.03	665.49	90.164	8044.31

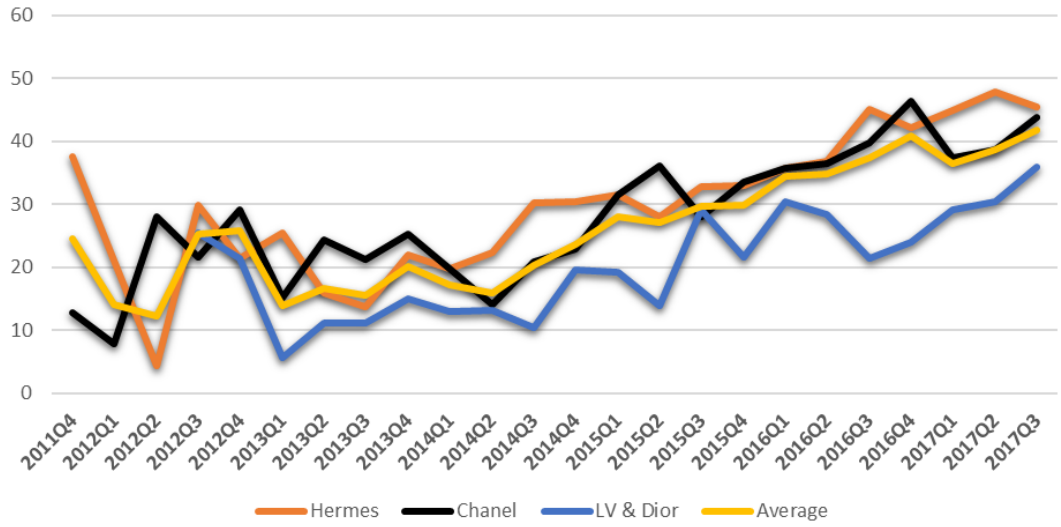
Liquidity of secondhand designer bags

Table 6 shows the average number of days a certain model is listed on Vestiaire Collective [7] before it is sold. This was calculated by the difference between the listing date and sold date. Around 1294 products did not have this information, and were therefore dropped. From Table 6, we can conclude that the average listing day is 32, and that Speedy has the shortest listing day, and therefore is most liquid.

Table 6 – Liquidity: average listing day per model - VC

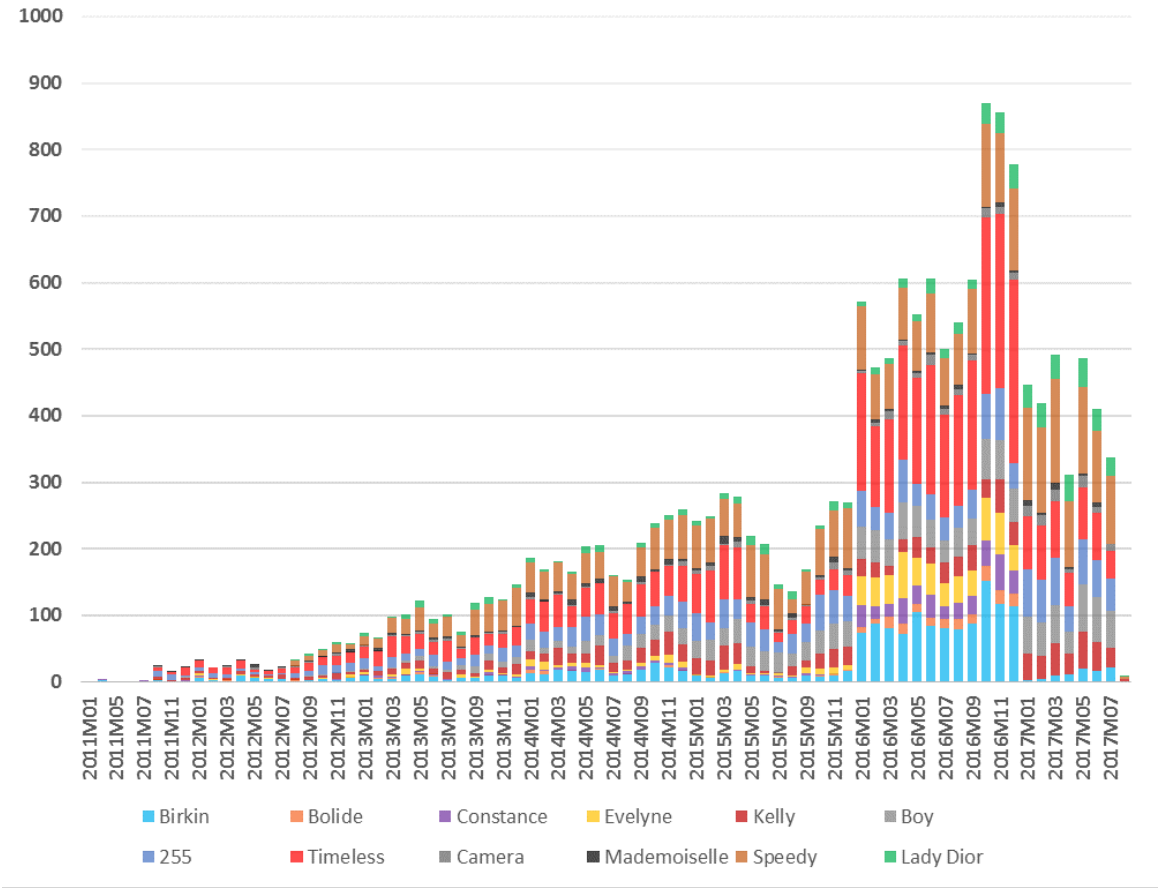
Models	Mean	SD	Min	Max
Birkin	38	68	0	830
Bolide	65	124	0	729
Constance	31	71	0	593
Evelyne	25	57	0	468
Kelly	40	78	0	937
Boy	26	53	0	513
255	43	101	0	1500
Timeless	34	100	0	1503
Camera	44	82	0	750
Maemoiselle	53	107	0	762
Speedy	20	53	0	897
Lady	39	77	0	1116

Figure 5 – Average listing day by brand over time



[7] Heritage Auctions did not contain the listing day information. Therefore, it is hard to provide information on liquidity for this source.

Figure 6 – Monthly number of designer bag sales per Model



The higher the number in Table 6, the longer the listing day is on average, and therefore the less liquid an item is considered. In order to look at liquidity over time, the average listing day is compared over time for every brand and on average. From Figure 6, we could see that sales over time were increasing, therefore more transactions were done which could mean that liquidity also rose over time. However, from Figure 5 the opposite seem to be happening. The average liquidity decreased over time for all four brands and on average. Louis Vuitton and Dior perform liquidity wise better than Hermès and Chanel. This may be due the lower average prices these bags have compared to Hermès and Chanel. The most expensive bag in our sample for example was listed on February 9, 2016 and was sold for 63983,77 euro on August 6, 2016. The item was thus listed for 179 days on Vestiaire Collective. When scrolling down for comments, one can see that people express their doubt on authenticity, quality and the high price. Hermès bags may be less liquid since there are less people who are willing to or are able to invest this very expensive brand, or they need more time to contemplate their decision in comparison with a Louis Vuitton Speedy that cost *only* few hundreds euro. The higher supply of designer bags over time as showed in Figure 1 and 6 can also be caused by the higher registered members over time. The secondhand market place grew enormously in the recent years. However, when more designer bags are supplied, the more options buyers have, and the longer their decision can take.

So at one hand we have the inaccessible market if one wants to buy a brand new Hermès bag, and on the other hand it is relatively difficult to re-sell it quickly on the secondhand market. However, it is also important to emphasize that designer bags are not solely bought or sold for the sake of investment. A buyer can also take her or his taste into account when purchasing a designer bag. This means that even if you know that a certain bag may generate return over time, you still would take your preference for certain material, colour, and size into account. This can also translate into longer listing days.

6 Empirical Results

In order to create price indices for designer bag samples, Hedonic pricing method is used as discussed in Section 4. First, we have to control for the heterogeneous features to isolate the impact of time on the value of designer bags. The dependent variable is the logarithm of the winsorized price adjusted for inflation in euro for both samples: Vestiaire Collective and Heritage Auctions. The hedonic variables, presented in Section 3, form the independent variables. These explanatory variables differ between our two samples, since the source did not contain the same information.

First, for each sample an OLS regression was performed to find which bag characteristics seem to affect the price of a designer bag. After that, we can use the coefficient from the time dummies to create a designer bag index containing all 12 models. Second, it is important to look at the performance of individual models since an individual investor may be interested in purchasing one or few bags. With the view to get more insight about how sub-groups are performing, indices are created for following categories: per brand, source (sample), and condition. As last, the best performing designer bag indices are selected for the relative comparison with other traditional asset classes.

6.1 Hedonic Regressions

The results for full-sample regression can be found in Table 8 for Vestiaire Collective and Table 11 for Heritage Auctions (Appendix). For the full-sample of Vestiaire Collective 17200 designer bags are used in the OLS regression, that returns an adjusted R-squared of 84% which indicates that 84 % of the variation around the mean of dependent variable is explained by the model. This is quite a high large value, which is not very surprising since the product specifications can predict the variability in prices quite well. The same high value of R-squared can be seen in the Hedonic research literature i.e. Repkes and Prast (2015) and Kräussl and van Elsland (2008). It is not very informative nor relevant to discuss every sign and significance of the estimated coefficients of every regression performed. The main focus was on the coefficients of the time dummies, which were used to create a price index for each regression as represented in Table 9. However, it is useful to look at the qualitative characteristics which have a significant impact on the value of a designer bag, because it provides the investor the desirable features that have positive impact on the price.

The impact of quality features on the price of a designer bag

Starting with continuous variables such as seller followers, seller likes, and size are all significant at 1% level, however the coefficients of the first two are close to zero, indicating the small impact on the dependent variable. The average price of the bag increases by 0.5 %, if the size of the bag increases by one centimeter in width. A larger bag requires more input materials which translates into higher retail price that the owner have paid. The seller will therefore require higher price on the secondhand market.

The rest of our hedonic explanatory variables were converted into dummies. For every category, one dummy was left out as the reference point. The coefficients of this dummy variables should be therefore interpreted as a comparison with the reference dummy. The dummy variables vintage, limited edition, trusted profile, and professional seller take 0 or 1 and their coefficients are displaying the impact on average price when the dummy is equal to 1. Limited edition designer bags have a positive and significant impact on the price of a designer bag. When a bag is labeled as limited edition, then its price increases on average with 9.2 %, holding all other variables constant. This is quite intuitive, since limited edition bags are quite scarce because of their limited supply, and since the designer bag industry is all about scarcity, it was expected that it would translate into higher average prices. The label vintage on the other hand seem to negatively affect (-9.6 %) the average price of a designer bag which is counter-intuitive at first. The same negative effect was found in Repkes and Prast (2015). The average price of vintage bags are lower than non-vintage bags in the sample. The vintage bags were produced 20 years ago, and were sold at much lower retail prices than today. The sudden increase in the retail price of designer bags

in the recent years seem to outperform the value appreciation of vintage bags (Repkes & Prast, 2015). When a seller is a professional, the average price increases by 1.7 % compared to when a seller is an individual. This is likely due the fact that professional seller requires an extra commission from private sellers that reflects in the higher price. Trusted profile does not seem to have a significant impact on the price.

The material dummies are all significant at 1 % level. The exotic leather is taken as reference point, and as expected all other materials have negative signs reflecting their negative impact on the price compared to exotic leather. Same holds true for the model dummies. The most expensive model, Birkin, has been dropped to form the reference point. Other models were expected to have negative signs, since they are valued less in the market. The results confirm this hypothesis since all of the model dummies are significant at 1% level and contain the negative sign. The model Speedy seems to have the most negative impact on the price compared to Birkin. Hermès bags seem to sell for higher prices compared to Chanel bags considering their lower coefficients.

Different signs and significance levels are found for the colour dummies. The colour black forms here the reference dummy. Black is very neutral, season independent, and timeless colour and therefore it is expected that other colours will sell for lower prices compared to black bags. Table 8 shows that brown, orange, pink, turquoise, white, yellow, beige, and other colour bags tend to impact prices negatively compared to black handbags. However, the bags with colour khaki seem to positively impact the price of a bag compared to black counterparts.

It is difficult to draw a conclusion when it comes to colours which are heavily dependent on personal taste and trends. However, the condition of the bag should affect the price since it is not subject to taste or preference. It is logical to assume that a buyer is willing to pay more for a bag that is in excellent condition compared to a bag that is in fair condition. Luckily, the coefficients show similar relationship. The bags in excellent or good condition have a significant positive impact on the average price *ceteris paribus* compared to bags that are in fair condition. When moving to our last control variable, season dummies, it seems that bags that are made for summer and spring are selling for higher prices than bags that can be worn throughout the year. This requires a deeper look into this variable in order to understand the reason behind this effect. From Table 12 one can see the varying sign and significance levels when the regressions are performed for each model. It seems that this seasonality effect is very model dependent. The brands are releasing certain models for a specific season, and some of the models may become very sought-after than others.

It is also interesting to look at the sample of Heritage Auctions to evaluate the quality characteristics of designer bag. In Table 11, the regression outputs can be found for the full sample, and for each model. The first thing that catches the eye, is the negative and significant effect of size on the average price of a designer bag. This is quite strange, since one expects that a larger bag should be more expensive. The impact is small, but present for Birkin bags. The price and size measured as width in centimeters seem also to show negative correlation of -0.1 in the HA sample. One explanation for this may be that Heritage Auctions sales very exclusive items, and when an item is so extraordinary, the size of the bag does not matter or the smaller sizes are more in demand. Looking at the rest of the variables: material dummies again here shows its significance. When taking Vinyl as reference dummy, all the other exotic materials seem to show the expected positive sign. The crocodile and lizard seem to have the biggest upward impact on the price of a designer bag. When looking at colour dummies, pink bags seem to have a significant and positive impact on the price compared to black bags. The colour brown seem to have significant and negative effect on the price, similar to our other sample. Limited edition bags also show here a significant positive sign. When looking at additional characteristics such as the hardware and top coat of the bag, we can conclude that matte top coat and palladium hardware are having higher positive impact on the prices than shiny top coat and gold hardware. The sign for season dummies differ here too per model. Overall, the winter autumn collections seem to affect the price positively compared to all season dummy. For Birkin bags this is the case for spring and summer editions. Again, it seems that season labels are very dependent on the model.

One conclusion one can draw from the impact of quality characteristics on the average price of a designer bag holding all other variables constant is that it depends quite on the model. Some features such as

condition, material, the model of the bag, vintage label and limited edition label seem always to have persistent sign and significance along the models and samples. However, the sign and significance of other features such as colour, size, season dummies, seller characteristics seem to vary per model, sample or category.

The next step is to create price indices from the coefficients of the time dummies for each regression performed. The year 2011 and last quarter is taken as base, and set equal to 100 (2011Q4= Index 100). Afterwards the impact of each year quarter dummy coefficient is calculated as described in methodology, and added or subtracted from the base. The sample of Heritage Auctions has a different base: year 2011, quarter 2 and unfortunately there are some gaps because of zero observations in certain quarters. The summary of all the indices can be found in Table 9, along with the number of observations, average quarterly returns and quarterly volatility's, and computed Sharpe Ratios. The coloured cells indicate at which level the coefficient of time dummies were significant. The following subsections will dive deeper into the analyses of absolute performance of designer bags.

6.2 Absolute Performance

The absolute performance of the designer bag is done in four ways: price index containing all 12 models, independent indices for each model, price sub-indices for each brand, category, and sources. The total designer bag index containing all 12 models assumes that one can invest hypothetically in a price index containing these 12 models. In order to compare and evaluate the absolute performance of these indices, the following is considered: the average quarterly geometric return, quarterly volatility, the Sharpe Ratio, and the significance of the time dummies. Sharpe Ratio is widely used in the financial research to calculate risk-adjusted return.The ratios were calculated by dividing the geometric return by the quarterly volatility of the asset. Since the risk-free rate was almost zero in the recent years in Europe, it was not necessarily to subtract that from our average quarterly geometric returns.

Designer Bag 12 index

Designer Bag 12 index consisting of 17200 items generated a quarterly geometric return of 1.85% with 3.44% volatility. Furthermore, it has the highest Sharpe Ratio over 6 years among all other designer bag indices which makes it the most preferred index to invest in. As shown in Table 9, *Designer Bag 12* index never falls under 100, which means that it never falls below its initial value. Furthermore, 21 out of 24 of its time coefficients are significant at 1 % level.

Model Indices

The large sample size of Vestiaire Collective lends itself for further analyses on the model level. This will provide the investor deeper insight into investment possibilities of different models. An individual investor may be budget constraint or may not obtain user or hedonic value from every model that is included in *Designer Bag 12* index. In Table 9, the index values along with their significance, quarterly returns, quarterly volatility's and Sharpe Ratios are given for each model. Depending on investor's taste for risk, one can prefer to maximize or minimize these values, and therefore it is hard to provide one judgment on the performance of these bags. The best way for this research to compare these designer bags models with each other, is to look at Sharpe Ratios and quarterly geometric returns. The top three models that generate the highest geometric return are: Constance, Birkin, and Kelly which have a quarterly geometric return of 4.29%, 3.36%, and 3.32% respectively. The sample size for Birkin and Kelly contained over 1000 items, and the time coefficients were significant at 1% level from the last quarter of 2014. The Hermès models also perform better when looking at risk-adjusted returns: Birkin has the highest Sharpe Ratio of 30.72%, followed by Evelyne 27.43% and Constance 26.67%. Since the *Hermès Constance* index starts at last quarter of 2012 because no bags from this model were sold before that, the sample size is relatively small. The index however starts to rise significantly from second quarter of 2015, reaching its peak on the second quarter of 2016.

Moving to Chanel models, all four models generate positive financial value over time but their returns are lower than Hermès models. The best performing Chanel model is Timeless which has a Sharpe Ratio of 19.33%, but the highest geometric return of 2.57% is generated by Chanel Camera. However, as emphasized by the example of Hermès Constance, also Chanel Camera contains less observations compared to Chanel Timeless and Chanel 255, even though 17 out of 24 of its time coefficients are significant at 1% level. Chanel Boy seems the worse performer considering the 2.46% Sharpe Ratio and 0.56% quarterly return. Despite the large sample of 1617 items, the model also has a low R-squared of 0.23 and only four time coefficients are significant at 10% level. The models Louis Vuitton Speedy and Lady Dior perform below average but better than Chanel Boy. Lady Dior is the second worse performer after Chanel Boy, but only one of her time coefficients is significant. Speedy performs though slightly better than Chanel Camera because of its low volatility and higher Sharpe Ratio, but its time coefficients are partially significant. The models Bolide and Mademoisselle were not included in Table 9 due their insignificant time coefficients and small sample size.

Sub-Indices

Moving to our *Hermès 5* index containing Birkin, Bolide, Constance, Evelyne, and Kelly generates a quarterly return of 2.64% which is 0.79% higher than *Chanel 5* index and *Designer Bag 12* index. The *Excellent condition* index have the highest Sharpe Ratio of 36.58% in the sub-indices category. The combined *Chanel & Hermès* index serves as a comparison for Repkes and Prast (2015). Their study only included these two brands, therefore one can only compare the returns if we use the same brands and models. [8]First, the sample increased by 9037 items over 9 additional quarters which results now in a quarterly return of 2.15% with 6.62% volatility against 1.14% quarterly return and 3.94% volatility. Thus, the return, volatility, and Sharpe ratio increased due the larger sample size and time frame.

Vestiaire Collective vs. Heritage Auctions

Last but not least, *Kelly & Birkin* index was created to compare the financial performance of Vestiaire Collective to Heritage Auctions full sample. The index did not only contain Birkin and Kelly models, but they also had to be in excellent condition. This resulted in 2184 handbags to compare with 2147 handbags from Heritage Auction. The handbags traded on Vestiaire Collective generate a positive quarterly return of 3.36% against the negative quarterly return of -.35% on Heritage Auctions. It is very interesting to see this contradictory results when looking at another source. As emphasized before, the items on Heritage Auctions are very exclusive compared to Vestiaire Collective and the buyers pay quite a lot of premium on top of the value of the bag which may form a potential explanation why it does not generate positive value over time. This feature also makes it very difficult to compare this two samples, since transaction fees on Heritage Auctions are more present than on Vestiaire Collective as demonstrated in Table 7.

Table 7 – Short summary of results: HA vs. VC

Sources:	Heritage Auction	Vestiaire Collective
Models:	Kelly & Birkin	Kelly & Birkin
N	2073	2184
Return(q)	-0.35%	3.36%
Volatility(q)	15.92%	9.94%
Sharpe Ratio (q)	-2.18%	33.80%
R-squared Model	0.6872	0.4230
Buyer's premium	yes	no
Seller's identity	private	public
Seller's tax	yes	yes

[8] Repkes and Prast (2015) also included Chanel Cocoon in their Total Designer bag index, which is not included in this study. The effect is not very big though, since Cocoon made 2% of their data sample

Table 8 – Hedonic model: OLS Regression on full sample -Vestiaire Collective

Independent Variables	coefficient	se	[95 % Conf.interval]	t-statistics	Value Impact
size_width	0.005***	0.001	0.004 - 0.006	8.73	0.5%
seller_followers	-0.000**	0.000	-0.000 - -0.000	-2.44	0.0%
seller_likes	0.000**	0.000	0.000 - 0.000	2.14	0.0%
dum_Bolide	-0.964***	0.030	-1.023 - -0.906	-32.15	-61.9%
dum_Constance	-0.258***	0.022	-0.301 - -0.215	-11.79	-22.7%
dum_Evelyne	-1.489***	0.012	-1.513 - -1.465	-121.53	-77.4%
dum_Kelly	-0.537***	0.018	-0.572 - -0.501	-29.38	-41.6%
dum_Boy	-0.933***	0.012	-0.956 - -0.910	-79.22	-60.7%
dum_255	-1.246***	0.013	-1.271 - -1.221	-98.73	-71.2%
dum_timeless	-1.217***	0.011	-1.239 - -1.196	-109.47	-70.4%
dum_camera	-1.778***	0.020	-1.817 - -1.739	-89.45	-83.1%
dum_made	-1.617***	0.028	-1.671 - -1.563	-58.76	-80.2%
dum_speedy	-2.364***	0.013	-2.389 - -2.340	-188.52	-90.6%
dum_lady	-1.935***	0.020	-1.975 - -1.895	-95.50	-85.6%
blue	0.007	0.013	-0.018 - 0.032	0.56	0.7%
brown	-0.163***	0.047	-0.255 - -0.071	-3.48	-15.0%
burgundy	-0.048	0.052	-0.149 - 0.053	-0.93	-4.7%
gold	0.001	0.036	-0.069 - 0.071	0.03	0.1%
green	0.013	0.024	-0.035 - 0.061	0.54	1.3%
grey	0.090*	0.048	-0.003 - 0.183	1.89	9.4%
khaki	0.146**	0.060	0.029 - 0.264	2.44	15.7%
navy	-0.059	0.051	-0.160 - 0.041	-1.16	-5.7%
orange	-0.198***	0.042	-0.281 - -0.115	-4.69	-18.0%
pink	-0.137***	0.035	-0.205 - -0.069	-3.94	-12.8%
purple	0.071	0.053	-0.032 - 0.174	1.35	7.4%
python	-0.226	0.228	-0.672 - 0.221	-0.99	-20.2%
red	-0.004	0.014	-0.032 - 0.025	-0.27	-0.4%
silver	0.023	0.043	-0.061 - 0.108	0.54	2.3%
turquoise	-0.186***	0.050	-0.284 - -0.088	-3.73	-17.0%
white	-0.337***	0.039	-0.414 - -0.260	-8.62	-28.6%
yellow	-0.128**	0.051	-0.228 - -0.029	-2.53	-12.0%
other	-0.028*	0.015	-0.057 - 0.001	-1.88	-2.8%
beige	-0.230***	0.033	-0.294 - -0.166	-7.07	-20.5%
Other material	-0.647***	0.031	-0.707 - -0.587	-21.02	-47.6%
Patent leather	-0.481***	0.030	-0.539 - -0.423	-16.30	-38.2%
leather	-0.429***	0.025	-0.477 - -0.380	-17.38	-34.9%
cloth	-0.598***	0.027	-0.651 - -0.544	-21.85	-45.0%
silk_cotton_suede	-0.769***	0.037	-0.842 - -0.695	-20.51	-53.7%
Good Condition	0.342***	0.011	0.320 - 0.363	31.36	40.8%
Excellent Condition	0.634***	0.011	0.613 - 0.655	58.84	88.5%
Vintage	-0.101***	0.013	-0.127 - -0.074	-7.53	-9.6%
Limited Edition	0.088***	0.021	0.047 - 0.129	4.22	9.2%
Trusted profile	0.004	0.006	-0.008 - 0.015	0.60	0.4%
Professional seller	0.017**	0.008	0.002 - 0.033	2.18	1.7%
Spring_summer	0.158***	0.030	0.098 - 0.218	5.20	17.1%
Autumn_winter	-0.032	0.045	-0.120 - 0.055	-0.72	-3.1%
2012Q1	0.059	0.066	-0.070 - 0.189	0.90	6.1%
2012Q2	0.129**	0.062	0.007 - 0.251	2.07	13.8%
2012Q3	0.190***	0.066	0.060 - 0.320	2.86	20.9%
2012Q4	0.190***	0.062	0.068 - 0.311	3.06	20.9%
2013Q1	0.191***	0.061	0.070 - 0.311	3.11	21.0%
2013Q2	0.170***	0.057	0.057 - 0.282	2.96	18.5%
2013Q3	0.222***	0.057	0.111 - 0.334	3.91	24.9%
2013Q4	0.261***	0.055	0.153 - 0.369	4.74	29.8%
2014Q1	0.225***	0.055	0.117 - 0.333	4.08	25.2%
2014Q2	0.237***	0.055	0.129 - 0.344	4.32	26.7%
2014Q3	0.273***	0.055	0.166 - 0.381	5.01	31.4%
2014Q4	0.301***	0.054	0.195 - 0.407	5.57	35.1%
2015Q1	0.332***	0.054	0.226 - 0.437	6.17	39.4%
2015Q2	0.380***	0.054	0.275 - 0.486	7.06	46.2%
2015Q3	0.418***	0.055	0.311 - 0.526	7.61	51.9%
2015Q4	0.417***	0.054	0.312 - 0.522	7.75	51.7%
2016Q1	0.437***	0.054	0.332 - 0.542	8.15	54.8%
2016Q2	0.426***	0.054	0.321 - 0.531	7.94	53.1%
2016Q3	0.461***	0.054	0.356 - 0.566	8.60	58.6%
2016Q4	0.479***	0.053	0.375 - 0.584	8.99	61.4%
2017Q1	0.402***	0.053	0.297 - 0.506	7.51	49.5%
2017Q2	0.424***	0.054	0.319 - 0.529	7.91	52.8%
2017Q3	0.422***	0.055	0.314 - 0.531	7.66	53%
Constant	8.249***	0.065	8.122 - 8.376	127.30	
N	17,200				
R-squared	0.842				
Adj. R-squared	0.84				

***p<0.01, ** p<0.05, * p<0.1

The following variables form the reference dummy: Birkin, black, exotic material, fair condition, all seasons, and 2011Q4. OLS with White Standard Errors

Figure 7 – Absolute performance among categories - VC

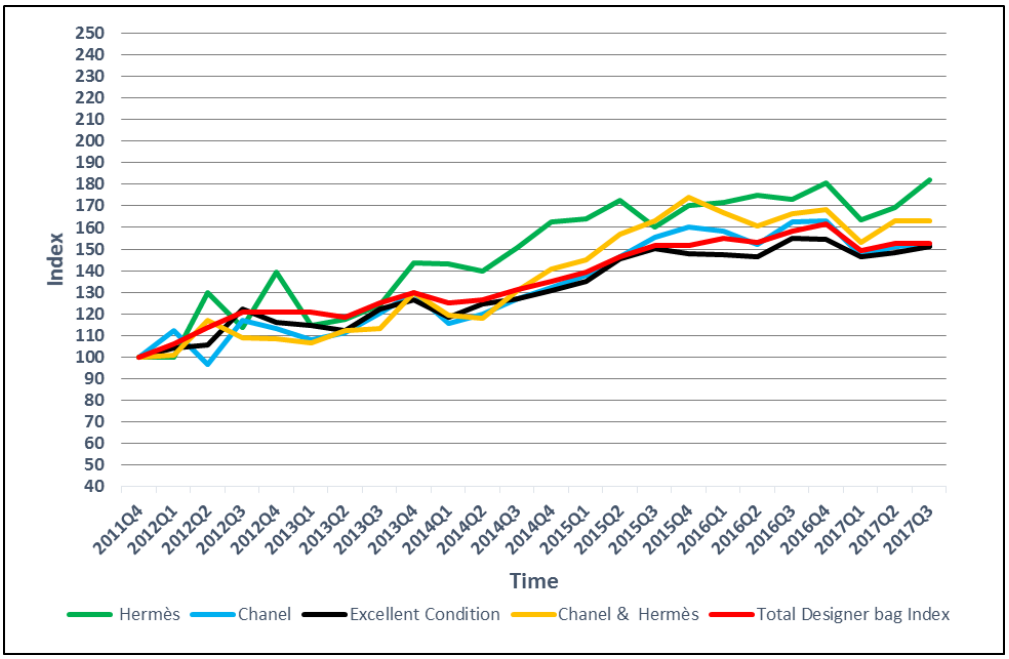


Figure 8 – Absolute performance among models - VC

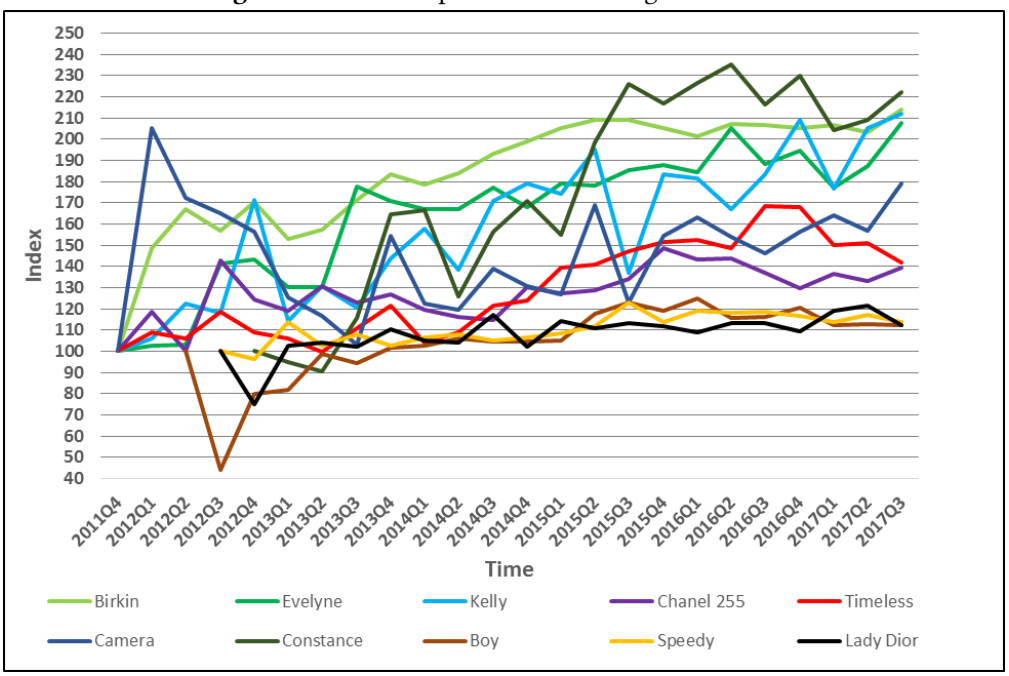


Table 9 – Relative performance: an overview

Per Asset Class											Per Model										Per Category (sub-indices)					Heritage Auctions		
TIME	World	Europe	RE	GB	Com	AEX	Tangibles	Gold	Wine	TDB	Birkin	Evelyne	Kelly	255	Timeless	Camera	Constance	Boy	Speedy	Lady Dior	Hermès	Chanel	K & B	EXC.	Chanel & Hermès	K & B	Kelly	Birkin
2011Q2																										100		100
2011Q4	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100					100	100	100	100	100	144		146
2012Q1	104	109	102	102	106	107	114	109	92	106	148	102	106	119	109	205					100	112	123	104	101			
2012Q2	101	112	104	103	104	101	140	105	97	114	167	103	123	100	106	172		100			130	97	147	105	117	112	100	121
2012Q3	107	113	112	104	110	109	148	110	92	121	157	141	118	143	119	165		44	100	100	114	117	138	122	109			
2012Q4	107	115	113	107	104	111	136	111	86	121	171	143	172	124	109	156	100	80	97	75	140	113	165	116	109	119	113	134
2013Q1	112	116	114	107	103	117	164	107	84	121	153	130	114	119	106	125	95	82	114	103	115	108	130	115	106			
2013Q2	118	126	123	111	99	117	172	91	89	119	157	130	131	131	100	117	91	99	103	104	118	111	144	112	112	120	132	124
2013Q3	118	127	117	107	96	122	192	85	86	125	171	178	120	123	111	103	116	94	108	102	124	121	143	122	113	140	140	149
2013Q4	125	131	118	109	93	128	204	81	85	130	183	171	144	144	121	154	165	102	103	110	127	130	168	127	130	124	130	126
2014Q1	122	126	116	110	91	126	222	77	84	125	178	167	158	120	104	122	167	103	107	105	143	115	167	118	119			
2014Q2	130	134	128	113	93	131	193	78	82	127	184	167	138	116	109	119	126	106	108	104	140	120	163	125	118	127	136	128
2014Q3	126	139	131	115	92	131	180	81	81	131	193	177	171	115	122	139	156	105	105	117	151	127	169	127	131	145	169	142
2014Q4	128	150	130	117	87	134	171	81	81	135	199	168	179	130	124	131	171	105	107	102	163	132	186	131	141	129	135	135
2015Q1	142	161	162	122	78	150	224	96	86	139	205	179	174	127	139	127	155	105	108	114	164	138	189	135	145	118	117	123
2015Q2	152	175	161	122	80	160	208	92	91	146	209	178	195	129	141	169	198	118	112	111	173	147	203	145	157	118	138	112
2015Q3	151	172	156	119	69	164	187	83	93	152	209	185	137	134	147	123	226	123	123	113	160	156	192	150	163	101	118	99
2015Q4	143	169	159	120	69	153	86	88	91	152	205	188	184	149	152	155	217	119	114	112	170	160	191	148	174	106	118	106
2016Q1	126	147	150	122	56	137	59	84	85	155	201	193	182	143	153	163	227	125	119	109	172	159	185	147	167	127	136	128
2016Q2	128	157	160	123	61	142	18	91	87	153	207	205	167	144	148	154	235	116	118	113	175	152	197	146	161	113	137	108
2016Q3	127	165	170	126	63	145	17	100	84	159	207	189	184	137	169	146	216	116	118	113	173	162	197	155	166	97	116	94
2016Q4	125	163	155	124	66	145	13	96	85	161	205	194	209	130	168	157	230	121	117	110	181	163	197	154	168	99	110	100
2017Q1	137	180	156	120	73	160	15	93	93	149	207	177	177	136	150	164	204	112	114	119	151	147	204	146	153	102	105	106
2017Q2	148	188	168	121	66	172	11	99	98	153	203	187	205	133	164	157	209	113	117	122	169	151	196	148	163	104	114	105
2017Q3	144	180	170	122	61	173	11	88	92	153	214	208	212	139	142	179	222	113	114	112	182	152	214	151	163			
Arithmetic Avg (q)	1.73%	2.72%	2.55%	0.87%	-1.85%	2.54%	-5.37%	-0.26%	-0.23%	1.91%	3.83%	3.79%	4.93%	2.05%	1.82%	5.37%	5.43%	3.05%	0.81%	1.21%	3.14%	2.13%	3.82%	1.93%	2.35%	0.79%	1.44%	0.95%
Geometric Avg (q)	1.59%	2.59%	2.34%	0.85%	-2.10%	2.40%	-9.27%	-0.54%	-0.34%	1.85%	3.36%	3.22%	3.32%	1.45%	1.52%	2.57%	4.29%	0.56%	0.64%	0.58%	2.64%	1.85%	3.36%	1.82%	2.15%	-0.35%	0.62%	-0.21%
Quarterly Volatility	5.45%	5.25%	6.82%	1.95%	7.04%	5.38%	23.68%	7.70%	4.79%	3.44%	10.95%	11.76%	18.34%	11.89%	7.89%	28.04%	16.10%	22.91%	6.12%	11.76%	10.42%	7.78%	9.94%	4.97%	6.62%	15.92%	13.20%	16.36%
Sharpe Ratio	29.16%	49.25%	34.31%	43.59%	-29.86%	44.62%	-39.14%	-7.02%	-7.14%	53.80%	30.72%	27.43%	18.10%	12.19%	19.33%	9.17%	26.67%	2.46%	10.40%	4.95%	25.36%	23.74%	33.80%	36.58%	32.44%	-2.18%	4.70%	-1.28%
N										17200	1688	764	1273	1991	4228	314	458	1617	3632	729	4409	8430	2184	9265	12839	2147	778	1369
sig***	sig**	sig*																										

Note:The following abbreviations stand for: World: Vanguard Total World Stock index, EU: Vanguard FTSE Europe index, RE:Ishares FTSE European Property, GB: Ishares Core Euro Government index, Com: PowerShares DB Commodity index, Tangibles: Stanley Gibbons Group, Gold: Gold index, Wine: Liv-ex Fine Wine 100 index, TDB: Designer bag 12 index, K&B: Kelly & Birkin index, EXC: Excellent condition bags index.

Table 10 – Descriptive statistics of market indices & designer bag indices

	World	Europe	RE	GB	Com	AEX	Tangibles	Gold	Wine	TDB	Birkin	Evelyne	Kelly	Timeless	Constance
Arithm. mean	1.73%	2.72%	2.55%	0.87%	-1.85%	2.54%	-5.37%	-0.26%	-0.23%	1.91%	3.83%	3.79%	4.93%	1.82%	5.43%
Geom. mean	1.59%	2.59%	2.34%	0.85%	-2.10%	2.40%	-9.27%	-0.54%	-0.34%	1.85%	3.36%	3.22%	3.32%	1.52%	4.29%
Std.deviation	5.45%	5.25%	6.82%	1.95%	7.04%	5.38%	23.68%	7.70%	4.79%	3.44%	10.95%	11.76%	18.34%	7.89%	16.10%
Sharpe Ratio	29.16%	49.25%	34.31%	43.59%	-29.86%	44.62%	-39.14%	-7.02%	-7.14%	53.80%	30.72%	27.43%	18.10%	19.33%	26.67%
Sample size										17200	1688	764	1273	4228	428
Minimum	101	109	102	102	56	101	11	77	81	106	148	102	106	100	91
Maximum	152	188	170	126	110	173	224	111	98	161	214	208	212	169	235
Median	126	143	130	116	89	133	144	92	86	133	196	177	169	123	185
Skewness	-0.39	-0.93	1.37	-0.74	-0.40	-0.58	-1.04	0.38	0.41	-0.80	2.96	1.88	-0.08	-0.15	0.52
Kurtosis	2.96	3.98	6.24	3.12	2.91	3.24	3.94	2.92	2.20	3.67	13.07	6.17	3.11	2.13	2.99
N-quarters	23	23	23	23	23	23	23	23	23	23	23	23	23	23	19
Jarguq-Bera test	1.17	5.99	11.86	3.61	1.18	2.79	6.52	1.08	1.65	4.8	26.7	14.63	0.56	1.04	1.84
Probability	0.5575	0.0500	0.0027	0.1643	0.5550	0.2480	0.0384	0.5837	0.4387	0.0908	0.0000	0.0007	0.7562	0.5936	0.3983

6.3 Relative Performance

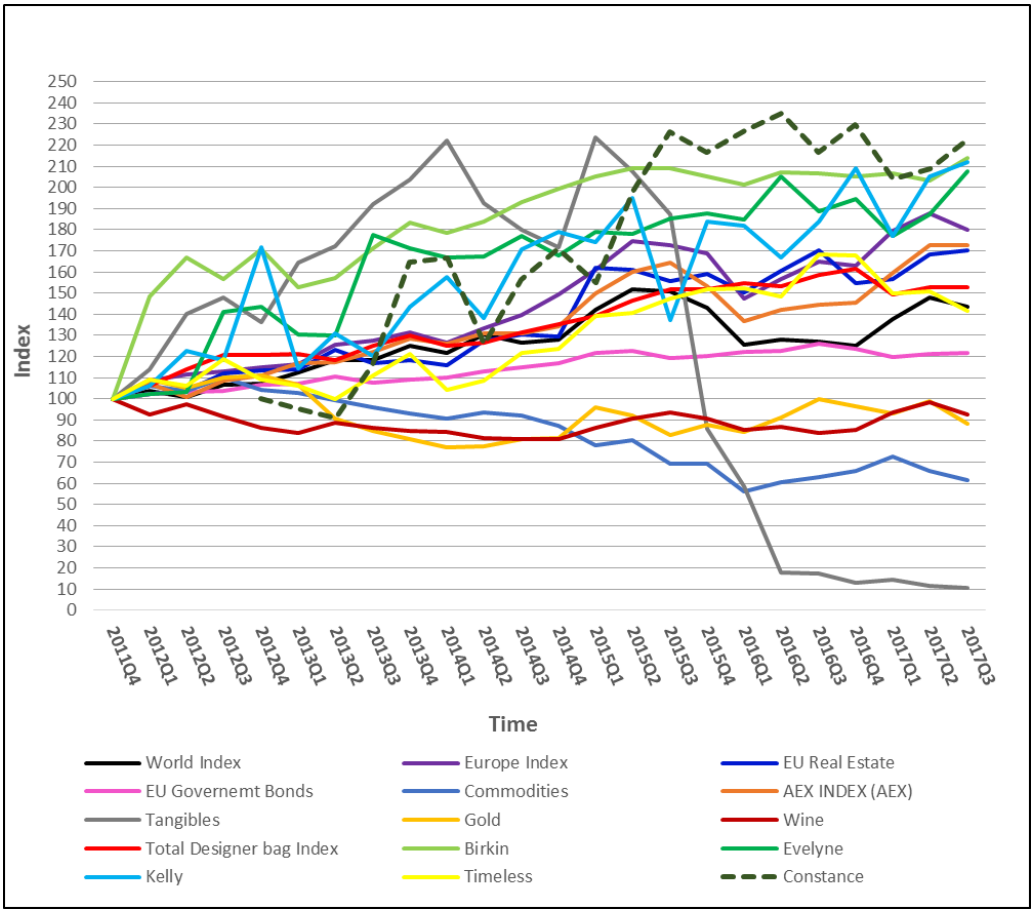
As previously highlighted in the introduction, the media tries to convince women that a designer bag has next to user value also investment value, and that these luxury products outperformed the market in the past. The relative performance is necessary to test these claims in order to provide an investor an objectified judgment. The inflation-adjusted price data was extracted for the following equity trackers and indices representing major asset classes: world stock Index, Europe stock Index, European Property Index, European government bonds, commodity index, rare stamps and coins collectibles index, wine Index, AEX, and Gold. These asset classes are also summarized in Table 4. The best performing and significant designer bag indices were chosen from the previous section to analyze whether they outperformed the market. Table 10 present the main statistics we use to compare the indices with each other, and in Figure 9 a visual representation is provided.

Figure 9 shows the development of the price indices over 24 quarters starting from last quarter of 2011. All four models of the brand Hermès climb to the top in the last quarter. The Stanley Gibbons index representing the rare stamp price development shows a very promising trend in the beginning, but declines after 2014 reaching almost the bottom in 2017 due the poor management of the firm (The Guardian, 2016). It is also remarkable to see that other tangible assets are performing quite badly such as Liv-ex Fine Wine index, gold, and commodities index.

Table 10 presents more detailed statistics which can be used to compare the indices. Using Sharpe Ratio as a measurement tool, we can conclude that *Designer bag 12* index provides the best risk-return trade-off. However, it is not really possible or maybe desirable to invest in a *Designer bag 12* index at the moment since the index was created for hypothetical analysis. Therefore, Birkin should be considered as the best performer in its category with a Sharpe Ratio of 30.72%. Birkin outperforms World index, commodities index, Stanley Gibbons index (stamps, coins) index, and Fine Wine Index. European stock index, real estate index, government bonds and the AEX provide higher returns for one unit risk taken. When solely looking at quarterly geometric returns then Constance peaks with 4.29% quarterly return, followed by Birkin with 3.36%, Kelly: 3.32%, and Evelyne: 3.22%. All four models seem to outperform the market indices with these returns. Furthermore, Table 10 indicates that the Jarque-Bera test strongly rejects the normal distribution for returns of *Designer bag 12* index, *Birkin* index, *Evelyne* index, European Property index and Stanley Gibbons index. *Birkin* index and *Evelyne* index have the most positively skewed distribution. This means that the occurrence of extreme high returns on these models have a higher probability than the occurrence of extreme low returns. Both models also have quite high level of Kurtosis which indicates that the an event of extreme observations is more likely compared to normally distributed returns. This is not very appealing to risk-averse investors who dislike the high level of uncertainty.

The findings suggest that from investing perspective it pays-off to purchase a *Designer bag 12* index since it had the highest risk-adjusted return from 2011 till 2017. However, European Stock index, European Property index, European government bonds, the AEX are the next in line to be picked when one focuses solely on maximizing the Sharpe Ratio. In the research of Repkes and Prast (2015) the Sharpe Ratio of their Total Designer bag index was equal to 29%, which can be compared to the 32.44% Sharpe Ratio of *Hermès & Chanel* index. This ratio went up by extending the sample size, models selection, and time frame. Birkin stays still the best performing model. Chanel Timeless does better than gold, Fine Wine index, Stanley Gibbons index, commodities index which form the tangible asset category. It is also important to take into account that designer bags hold more than just financial value. The user, hedonic, and emotional value also play a part in decision making process of an investor. One may prefer to invest in a model that generates lower value over time, but may maximize the overall utility of an investor because of the additional utility gains. Therefore, it is quite sophisticated to compare designer bag indices with traditional asset classes such as stocks and bonds. However, investing in a Birkin, Constance, Evelyne, Kelly, Chanel Timeless or any model at this point will generate more value for its owner than investing in wine, gold, commodities, and collectibles such as stamps and coins.

Figure 9 – Relative performance among asset classes - VC



7 Limitations, Recommendations and Conclusion

7.1 Conclusion

In the introduction, five research questions were posed regarding the investment opportunities of designer bags. In order to investigate this, data on 17200 sold designer bags were scraped from Vestiaire Collective and 2147 from Heritage Auctions. The dummy unweighted Hedonic pricing method was applied to isolate the quality price effects on designer bag from time effects. The coefficients of time dummies served as input variables to create a price index for total designer bag sample, sub-sample, and for each model. Afterwards, the quarterly geometric returns and Sharpe ratios were calculated which provided a tool for measurement across designer bag indices and traditional asset classes.

The average quarterly geometric return for *Designer Bag 12* index over period 2011-2017 was 1.85%. Due its low volatility of 3.44% which results in 53.80% Sharpe ratio, the designer bag Index outperforms all other designer bag and market indices. However, since the index was created to model a hypothetically situation, it is much more interesting to see the individual performance of the 12 models. The best performing model due the its high Sharpe ratio is Hermès Birkin. Hermès Constance generated the highest return of 4.29% and could be interesting to more risky investors. Chanel Boy performs the worst from all the models followed by Lady Dior and Louis Vuitton Speedy. This is in line from what we expected regarding the literature review on designer bags. Louis Vuitton and Dior are relatively more accessible to a wider public because of lower prices and higher supply, making them less iconic and exclusive compared to a Hermès and Chanel. Even though our sample for Chanel Boy was quite large, it did not show much value created over time compared to Chanel Camera. The lower sample size of Chanel Camera, 314, in combination with its highly significant time coefficient suggests that its limited supply is connected with its high return. If the model is trading less frequently on the secondhand market place, then it may be perceived as rare by the consumers or might be even rare in reality which

drives the prices upwards over time. However, due its high volatility of 28.04% it is not the best performer compared to Chanel Timeless and 255.

The relative performance analyses provided a positive view in general for investment opportunities of designer bags. The *Designer Bag 12* index forms a the best alternative index for risk-averse investors. Purely looking at the quarterly returns, The following Hermès models: Constance, Birkin, Kelly and Evelyne outperform all the other market returns over period 2011-2017. Considering the Sharpe Ratio, it is still better to invest in any designer bag model than other tangible alternatives on the market. Furthermore, the designer bag's value goes beyond the financial perks. It is not a mere investment product but posses also user, hedonic and emotional value which cannot be measured by a price tag.

The impact of quality characteristics on a designer bag price is quite in line with the study of Repkes and Prast (2015). The size, condition, material, limited edition, vintage label, season trait, brand, and the model of the designer bag are significant value drivers. The new added variable professional seller dummy was significant and had a positive impact on the price of a designer bag.

Comparing the *Kelly & Birkin* index of Vestiaire Collective to the *Kelly & Birkin* index of Heritage Auction provided this thesis another view on the investment opportunities in the context of multiple markets. The *Kelly & Birkin* index of Heritage Auction had a negative quarterly return of -0.35% in contrary to the positive quarterly return of 3.36% of Vestiaire Collective sample. Heritage Auction is a auction house trading in exclusive secondhand luxury products where the buyers are subject to high buyers premiums. Vestiaire Collective is an online-market place where the buyers have the option to submit an offer, however the buyers are not subject to any premiums. Although we are not exactly comparing apples with apples here, it still does not alter the fact that the Birkin and Kelly hand bags do not seem to generate positive financial value in auction settings. According to Ekelund et.al (2017) not excluding the buyer's premium in the sale price leads to overestimation of returns, however excluding causes more shortcomings. Therefore, the returns for Heritage Auction sample may be even lower in reality. This phenomenon highlights the inconsistent financial performance of designer bags across different markets.

In general, the designer bags in the sample of Vestiaire Collective generate positive financial returns over time, therefore one can recommend it as an additional asset which can be added to the investor's portfolio. The big question remains whether these iconic luxury products are suitable for all types of investors? Due the absence of official index trackers in the market, the institutional investors may pass on this opportunity due the complicated nature of the investment. Designer bags are thus more attractive to individual investors at the moment. There is only one issue that can play a part in decision making process of investors: since a handbag is a physical product compared to shares of stock which can be bought through a click, it can become more than an investment product to an investor over time. Would the investor act rationally and sell the handbag to generate return, or did the handbag became priceless to the investor?

7.2 Limitations and Recommendations for Future Research

Repkes and Prast (2015) recommended the future researchers on this topic to extend the sample size, the time frame, and to include other feasible sources. This study extended the sample size by 14118 items and time frame by approximately two years as a result of the increasing sales on Vestiaire Collective in the recent years. Furthermore, Heritage Auction was considered as an additional source which acted as the robustness test for returns for the models Birkin and Kelly. However, a larger data sample also has its disadvantage in this study: as stressed before, the data on designer bags was extracted from online secondhand platforms, and unfortunately these online-market places are not regulated with regards to quality as DataStream. The information on certain characteristics such as size are not always correctly specified or are missing. Furthermore, the study assumed that all the displayed sold prices and sold data are correct and not subject to typo's. When one has 17200 items, it is quite time consuming to do a manual check, therefore this study only double-checked the items that were showing odd statistics. The description of the handbags also contains valuable information, and may improve the explanatory power of the model if a detailed text analysis is performed. It is therefore a recommendation for future research to collaborate on data management level to strengthen the quality of scrapped data. Regardless of large data sample used for this research, the number of observations was quite uneven distributed among the models unfortunately. The comparison of absolute performance among the models is therefore done with caution.

Transactions costs such seller's tax, buyer's premium, shipping, storage, and insurance costs are not taken into consideration for the financial performance analyses. This may distort the demand for designer bags and therefore the required return especially if they have changed over time. It was not feasible for this study to incorporate these costs since many assumptions would have been needed that would make the analyses over complicated. For the relative comparison we also did not take the transaction costs of traditional assets into account. It is however possible to define a model in which transaction costs are integrated in case less time is required on the data management part due the collaboration. The same holds for extending the econometric analysis: it is recommended to apply DCC-GARCH model as it is done by Bouri and Roubaud (2016) to control for time-varying conditional correlation if more data is available over larger time frame in the future.

Another recommendation for future study on this topic is to keep an close eye on the database The-RealReal which was noted during this study. This American online secondhand market place started in 2011 and is the biggest competitor of Vestiaire Collective nowadays. This website also posses the feature that it saves its sold items, however its archive is quite limited at the moment. Therefore, this online luxury secondhand platform may be a fruitful source for the future research for a robustness test. However, Vestiaire Collective should also be kept used as a source since it is the oldest and most trustworthy secondhand market place.

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9 Appendices

Table 11 – Hedonic model: OLS Regression - Heritage Auctions

	(1) Combined	(2) Birkin	(3) Kelly
Size width	-0.0123***	-0.0197***	-0.0042
	0.0024	0.0031	0.0042
Kelly	-0.3570***	0.0000	0.0000
	0.0217	.	.
Alligator	1.0607***	1.0544***	1.2314***
	0.1411	0.2960	0.1914
Ardennes Leather	0.4137***	0.4735***	0.3282**
	0.0672	0.0422	0.1319
Box Leather	0.4065***	0.3666***	0.0000
	0.1094	0.1082	.
Buffalo Leather	0.5104***	0.5333***	0.7097***
	0.1194	0.0882	0.2460
Calf Box	0.3090***	0.4554***	0.3777***
	0.0645	0.0589	0.1047
Clemence Leather	0.4982***	0.5613***	0.6022***
	0.0633	0.0400	0.1063
Diamond	0.5779	0.5758	0.0000
	0.7381	0.7559	.
Epsom Leather	0.6286***	0.6876***	0.8487***
	0.0705	0.0463	0.1315
Fjord Leather	0.5192***	0.6792***	0.1843
	0.0806	0.0586	0.1380
Himalayan Crocodile	1.1679***	1.2297***	0.0000
	0.1488	0.3017	.
Leather	0.4217***	0.4534***	0.5720***
	0.0636	0.0408	0.1002
Lizard	1.0297***	1.1298***	1.0909***
	0.1696	0.2284	0.1946
Nilo Crocodile	0.9106***	0.9192***	1.0362***
	0.1264	0.2709	0.2198
Nilo Lizard	1.2394***	1.4317***	1.0297***
	0.1465	0.1101	0.2916
Ostrich	1.0909***	1.1504***	1.1417***
	0.0717	0.0463	0.1274
Other material	0.7369***	0.9756***	-0.1124
	0.1660	0.1130	0.1587
Patent Leather	-0.0317	0.0000	-0.1097
	0.1097	.	0.3560
Porc leather	-0.1471*	0.0000	-0.0920
	0.0860	.	0.1267
Suede	0.4885***	0.5489***	0.8679***
	0.1029	0.0709	0.1665
Swift Leather	0.4193***	0.4703***	0.5299***
	0.0691	0.0445	0.1192
Togo Leather	0.6404***	0.7044***	0.6630***
	0.0636	0.0392	0.1043
Porosus crocodile	0.9789***	1.1259***	0.8908***
	0.1132	0.2670	0.1518

Gold	-0.0075	-0.0428	-0.1345**
	0.0327	0.0360	0.0659
Grey	-0.0019	0.1496*	0.0000
	0.1049	0.0856	.
Orange	-0.1870	-0.3987***	-0.0766
	0.1396	0.1395	0.1808
Other	-0.0802***	-0.1415***	0.0246
	0.0232	0.0253	0.0443
Violet	0.0000	0.0000	0.8099***
	.	.	0.1306
White	-0.0510	-0.2890**	-0.0229
	0.1439	0.1467	0.1906
green	0.0135	-0.0605	0.1472*
	0.0410	0.0457	0.0811
blue	0.0554	-0.0446	0.4336***
	0.0459	0.0428	0.0765
beige	-0.0926	0.3825***	-0.1935**
	0.2038	0.0698	0.0979
red	0.0222	-0.0800**	0.1623***
	0.0310	0.0363	0.0524
pink	0.1690***	0.1254**	0.3624
	0.0591	0.0571	0.2336
brown	-0.2005***	-0.2427***	-0.1352
	0.0457	0.0507	0.0957
Shiny	0.6753***	0.6789**	0.7166***
	0.0870	0.2652	0.0945
Matte	0.7193***	0.7425***	0.0000
	0.1061	0.2744	.
Limited edition	0.3069***	0.3179***	0.0000
	0.0522	0.0478	.
Gold hardware	0.0250	0.1101*	-0.3536
	0.0615	0.0584	0.3106
Palladium hardware	0.1133*	0.1337**	-0.1906
	0.0600	0.0568	0.3096
spring_summer	0.0881	0.2582*	0.0967
	0.1337	0.1331	0.1549
autumn_winter	0.2235**	0.0808	-0.0012
	0.0911	0.0659	0.1049
2011Q2	0.2307**	0.2751**	0.0000
	0.1018	0.1137	.
2011Q4	0.3662***	0.3782***	0.0000
	0.0803	0.0845	.
2012Q2	0.1151	0.1881**	0.1228
	0.0774	0.0819	0.1583
2012Q4	0.1759**	0.2907***	0.1262
	0.0769	0.0828	0.1449
2013Q2	0.1848**	0.2152**	0.2758*
	0.0772	0.0865	0.1466
2013Q3	0.3402***	0.4018***	0.3385**
	0.0719	0.0770	0.1433
2013Q4	0.2119***	0.2349***	0.2647*
	0.0712	0.0800	0.1352
2014Q2	0.2417***	0.2481***	0.3113**
	0.0744	0.0837	0.1470

2014Q3	0.3708***	0.3537***	0.5240***
	0.0840	0.0896	0.1719
2014Q4	0.2534***	0.2967***	0.2979*
	0.0824	0.0862	0.1637
2015Q1	0.1678**	0.2042***	0.1543
	0.0796	0.0785	0.1737
2015Q2	0.1623**	0.1138	0.3229**
	0.0684	0.0742	0.1372
2015Q3	0.0116	-0.0069	0.1652
	0.0693	0.0750	0.1404
2015Q4	0.0626	0.0608	0.1620
	0.0744	0.0827	0.1457
2016Q1	0.2376***	0.2440***	0.3113*
	0.0758	0.0811	0.1656
2016Q2	0.1250*	0.0771	0.3122**
	0.0717	0.0782	0.1390
2016Q3	-0.0259	-0.0635	0.1470
	0.0683	0.0736	0.1367
2016Q4	-0.0056	0.0044	0.0955
	0.0753	0.0834	0.1436
2017Q1	0.0161	0.0608	0.0505
	0.0840	0.0895	0.1662
2017Q2	0.0420	0.0482	0.1273
	0.0716	0.0755	0.1459
Constant	8.7848***	8.9589***	8.2795***
	0.1422	0.1226	0.3869
Observations	2073	1367	706
$\mathbf{R}^2$	0.6872	0.7252	0.5663

Standard White robust errors in blue

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The following dummies are dropped for the reference: Vinyl, black, all seasons, and Birkin.

Table 12 – Hedonic model: OLS Regression per model- Vestiaire Collective

	(1) Birkin	(2) Bolide	(3) Constance	(4) Evelyne	(5) Kelly	(6) Boy	(7) Chanel_255	(8) Timeless	(9) Camera	(10) Mademoiselle	(11) Speedy	(12) Lady_Dior
size width	-0.0040***	-0.0023	-0.0002	0.0080***	0.0002	0.0022	0.0123***	0.0110***	0.0089**	-0.0007	0.0035***	0.0023
	0.0013	0.0064	0.0054	0.0021	0.0038	0.0016	0.0018	0.0013	0.0038	0.0043	0.0007	0.0026
Seller followers	0.0000	-0.0000**	-0.0000	-0.0000*	0.0000	-0.0000	0.0000	-0.0000***	-0.0000**	-0.0000*	0.0000**	-0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seller likes	-0.0000	0.0000*	0.0000	0.0000	0.0000**	0.0000	-0.0000	0.0000***	0.0000**	0.0000	-0.0000	-0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Blue	0.0015	-0.0641	0.1511**	0.0273	0.0869	-0.0437*	-0.0066	-0.0349	-0.0654	-0.0235	-0.0198	0.1552***
	0.0251	0.1068	0.0590	0.0399	0.0562	0.0237	0.0410	0.0278	0.1117	0.1022	0.0516	0.0582
Brown	0.1425	-0.4482***	-0.4363***	-0.0893	-0.3335***	-0.0707	-0.1902**	-0.0255	0.2217	0.2909	-0.6573***	0.2035
	0.1246	0.1509	0.1116	0.0721	0.0797	0.0976	0.0838	0.1392	0.3076	0.3146	0.1800	0.3618
Burgundy	0.1353	0.1488	-0.4469***	-0.0249	-0.3033***	0.0355	-0.0321	0.0086	0.2168	0.7682**	-0.1206	0.4775
	0.1407	0.1703	0.1343	0.0885	0.0908	0.0864	0.0948	0.1450	0.3004	0.3249	0.2245	0.3688
Gold	-0.0007	0.1618*	-0.4047***	0.0583	0.2848**	0.0407	-0.1168	-0.1121	-0.4365***	-0.3509**	0.2962*	-0.1663
	0.0321	0.0949	0.1114	0.0515	0.1146	0.0600	0.0959	0.0766	0.1156	0.1726	0.1661	0.2247
Green	0.0444*	-0.2359	0.2560***	0.0008	0.2591***	-0.1038**	-0.1818**	0.0058	-0.0482	-0.5337***	0.1144	-0.0154
	0.0240	0.1710	0.0874	0.0772	0.0689	0.0520	0.0767	0.0617	0.2146	0.1687	0.0902	0.1205
Grey	0.2435*	-0.0794	0.0571	0.1075	0.0811	-0.0129	0.0512	0.0833	0.5899*	0.6866*	-0.6264***	0.4366
	0.1250	0.1840	0.1377	0.0734	0.0856	0.0830	0.0755	0.1410	0.3003	0.3519	0.1853	0.3652
Khaki	0.0000	0.0000	0.0000	0.0879	-0.0100	0.0289	0.2208	0.2057	0.0000	1.0868***	-0.3193	0.0000
	.	.	.	0.0914	0.1386	0.0969	0.1388	0.1612	.	0.3474	0.2160	.
Navy	0.1652	-0.3080	-0.3626**	0.0000	-0.2128*	-0.0038	-0.0189	0.0595	0.1628	0.4235	-0.6952***	0.0445
	0.1454	0.2130	0.1471	.	0.1089	0.0865	0.1042	0.1410	0.3133	0.4014	0.1916	0.3653
Orange	-0.1119***	0.9591*	0.0324	0.2903**	-0.4195**	0.0123	-0.4304**	0.0089	0.0000	0.0000	-0.1510*	-0.5196*
	0.0382	0.5571	0.1259	0.1425	0.1839	0.0936	0.2024	0.1307	.	.	0.0890	0.2698
Pink	-0.0395	0.6534	0.1424	0.5333***	-0.2001	-0.0390	-0.1072	-0.0271	0.0046	-0.3163	-0.0499	-0.3105
	0.0346	0.6239	0.1203	0.1426	0.1751	0.0662	0.1164	0.0760	0.1172	0.2568	0.0891	0.2678
Purple	0.3015**	-0.3009*	-0.1761	0.0933	0.0000	-0.1058	0.0492	0.0730	0.5700*	0.6486*	-0.4268**	0.2638
	0.1278	0.1813	0.1346	0.0893	.	0.1080	0.0933	0.1517	0.3154	0.3572	0.1972	0.3772
Python	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.1716	0.0000	0.0000	0.0000	0.0000
	.	.	.	.	.	.	.	0.2504	.	.	.	.
Red	0.0183	-0.1025	0.2039***	-0.0720*	0.1686***	-0.0494*	-0.0606	-0.0115	-0.0723	0.0405	-0.0801	0.1396
	0.0202	0.1567	0.0625	0.0415	0.0593	0.0285	0.0467	0.0283	0.0869	0.0905	0.0544	0.0924
Silver	0.0000	0.0000	0.0000	0.0000	0.0000	0.0887	-0.2531***	-0.1413**	-0.0322	0.1420	0.1339	0.1755
	.	.	.	.	.	0.0773	0.0780	0.0627	0.0860	0.1484	0.1168	0.1241

Turquoise	-0.1928***	1.0919**	0.0000	0.4624***	-0.5660*	0.1076	0.2064	0.0126	0.0000	-0.3813	0.0000	0.0000
	0.0727	0.5390	.	0.1451	0.3070	0.0752	0.1636	0.0966	.	0.2674	.	.
White	-0.2384***	1.1631**	-0.0974	0.1563	-1.1196***	-0.2233***	-0.1378	-0.1341	0.0000	-0.4227	-0.3960***	-0.5697**
	0.0478	0.5636	0.1867	0.1537	0.2145	0.0759	0.1206	0.0817	.	0.3121	0.0489	0.2743
Yellow	-0.1891**	0.9292*	0.0833	0.4326***	-0.1917	-0.0297	-0.2900	-0.0494	0.0000	-0.5806**	-0.3132***	-0.3968
	0.0861	0.5408	0.1510	0.1478	0.2186	0.1128	0.2783	0.1064	.	0.2677	0.0959	0.3572
Other colour	-0.0107	0.0575	0.1685**	0.0772**	-0.0178	-0.0019	-0.0761*	0.0196	-0.0899	0.1580	-0.1926***	0.1045
	0.0193	0.1056	0.0835	0.0383	0.0646	0.0328	0.0460	0.0399	0.2243	0.1225	0.0295	0.1078
Beige	-0.1572***	0.9902*	-0.1547	0.3010**	-0.3445**	-0.0110	-0.1222	-0.0764	0.0727	-0.3708	-0.4964***	-0.4628*
	0.0339	0.5354	0.1260	0.1398	0.1719	0.0622	0.1138	0.0741	0.1327	0.2471	0.0455	0.2687
Other material	-0.0693*	-0.8693***	-0.2125	0.3800**	-1.6005***	-0.3038***	-0.5827***	-0.6231***	-1.0675***	-1.2336***	-0.0427	-0.9952***
	0.0401	0.2325	0.1417	0.1637	0.1728	0.0616	0.1156	0.0888	0.1606	0.3116	0.0300	0.2142
Patent leather	0.0127	0.0000	0.0000	0.0000	-0.2260	-0.3488***	-0.5048***	-0.4964***	-0.6994***	-1.0293***	-0.0378	-0.3373
	0.1951	.	.	.	0.2873	0.0572	0.1179	0.0815	0.1643	0.3041	0.0736	0.2107
Leather	-0.1551***	-0.8531***	-0.3525***	0.5097***	-0.6327***	-0.2192***	-0.2779**	-0.4174***	-0.5442***	-0.9920***	-0.0780***	-0.3766*
	0.0247	0.1658	0.0598	0.1366	0.0511	0.0453	0.1110	0.0793	0.1411	0.3001	0.0269	0.2088
Cloth	-0.4571***	-0.9221***	-0.3211*	0.2652	-0.7216***	-0.3755***	-0.9178***	-0.7933***	-1.5219***	-0.8855**	-0.0577**	-1.0890***
	0.1480	0.2704	0.1735	0.1655	0.1360	0.0737	0.1275	0.0990	0.1664	0.3882	0.0290	0.2103
Silk suede cotton	-0.7208*	-1.6064	-0.0917	0.0000	-2.1842***	-0.4008***	-0.7897***	-0.6832***	-0.3706**	-1.6371***	-0.0546	-1.0619***
	0.4164	0.9771	0.0837	.	0.3109	0.0529	0.1216	0.0969	0.1501	0.3538	0.0536	0.2180
Good	0.2608***	0.3609**	0.3502***	0.3948***	0.4823***	0.2098***	0.4616***	0.3758***	0.3529***	0.4022***	0.1750***	0.2938***
	0.0366	0.1391	0.0779	0.0525	0.0366	0.0556	0.0373	0.0231	0.0513	0.1002	0.0091	0.0470
Excellent	0.4245***	0.6742***	0.7905***	0.5933***	0.9714***	0.4125***	0.7372***	0.6292***	0.6494***	0.6271***	0.4090***	0.6976***
	0.0356	0.1340	0.0820	0.0511	0.0378	0.0541	0.0360	0.0228	0.0574	0.1013	0.0114	0.0480
Vintage	-0.1600**	-0.0645	-0.1245*	-0.0061	-0.2943***	0.0000	-0.1333**	-0.0554***	-0.0330	-0.1237	0.0491**	-0.1551***
	0.0810	0.0859	0.0648	0.0723	0.0460	.	0.0565	0.0168	0.0857	0.1074	0.0246	0.0537
Limtied edition	0.0215	0.6939*	-0.0263	0.0182	-0.3622***	0.0062	-0.0550	0.0664**	-0.0763	0.3569*	0.4951***	0.0729
	0.0459	0.3788	0.1620	0.0973	0.1127	0.0274	0.0378	0.0315	0.1144	0.1962	0.0290	0.1401
Trusted profile	0.0188*	0.0929	-0.0475	-0.0000	0.0466*	-0.0073	0.0071	-0.0249**	-0.0293	-0.0242	0.0014	0.0106
	0.0104	0.0640	0.0381	0.0206	0.0280	0.0147	0.0180	0.0118	0.0401	0.0565	0.0101	0.0332
professional	-0.0555*	0.0623	0.0215	0.1248***	-0.0346	0.1244***	0.0563*	-0.0066	-0.0249	0.0542	-0.0677***	0.0706
	0.0291	0.0989	0.0552	0.0383	0.0373	0.0269	0.0319	0.0156	0.0536	0.1089	0.0132	0.0545
spring_summer	0.1107***	-1.1096**	0.0628	-0.4138***	0.5056***	-0.0099	-0.0904	0.0070	-0.1979*	0.2021	0.2213***	0.5030*
	0.0287	0.5273	0.0920	0.1348	0.1633	0.0569	0.1065	0.0704	0.1023	0.2151	0.0357	0.2624
autumn_winter	-0.1896	0.1928	0.2797***	-0.0252	0.2493***	-0.0127	-0.0760	-0.1328	-0.4079	-0.5830*	0.3385*	-0.1660
	0.1239	0.1326	0.1068	0.0719	0.0756	0.0758	0.0669	0.1345	0.2958	0.3111	0.1784	0.3529
2012Q1	0.3947*	0.2401	-0.2832	0.0242	0.0594	0.0000	0.1709	0.0848	0.7184***	0.1615	0.0000	0.0000
	0.2064	0.2482	0.2131	0.0715	0.1863	.	0.1197	0.0898	0.0281	0.2928	.	.
2012Q2	0.5125**	0.0000	0.0000	0.0298	0.2035	0.0000	0.0030	0.0587	0.5455***	0.1435	0.0000	0.0000
	0.2039	.	.	0.1277	0.1859	.	0.1508	0.0987	0.1583	0.2028	.	.
2012Q3	0.4489**	-0.0724	0.0000	0.3453***	0.1674	-0.8243***	0.3569**	0.1724*	0.5005***	-0.1316	0.0000	0.0000
	0.2110	0.5960	.	0.0748	0.1669	0.0988	0.1473	0.0903	0.1532	0.3082	.	.
2012Q4	0.5342**	0.0000	0.0000	0.3607**	0.5401**	-0.2256	0.2174*	0.0877	0.4456***	-0.0170	-0.0354	-0.2840
	0.2091	.	.	0.1582	0.2231	0.2191	0.1220	0.0913	0.1216	0.1456	0.1028	0.2216
2013Q1	0.4244**	-0.6061*	-0.0513	0.2639	0.1341	-0.1990	0.1744	0.0590	0.2248*	-0.1163	0.1305	0.0250
	0.2105	0.3133	0.2373	0.1621	0.1931	0.1394	0.1226	0.0865	0.1292	0.2005	0.0942	0.2052
2013Q2	0.4532**	0.0308	-0.0969	0.2632*	0.2682**	-0.0121	0.2682**	-0.0021	0.1544	0.1373	0.0261	0.0405
	0.2049	0.2389	0.2011	0.1496	0.1344	0.1023	0.1201	0.0912	0.0941	0.1448	0.0823	0.1342
2013Q3	0.5387**	-0.0976	0.1485	0.5743***	0.1846	-0.0582	0.2074*	0.1030	0.0319	0.2174	0.0760	0.0211
	0.2101	0.2684	0.2372	0.0537	0.1417	0.1029	0.1218	0.0851	0.1847	0.1987	0.0808	0.1361
2013Q4	0.6057***	0.2080	0.4983*	0.5371***	0.3635***	0.0188	0.2392**	0.1944**	0.4327***	0.0422	0.0283	0.0968
	0.2017	0.2011	0.2616	0.0701	0.1245	0.1056	0.1119	0.0874	0.0395	0.2069	0.0763	0.1464
2014Q1	0.5791***	-0.2113	0.5113**	0.5122***	0.4547***	0.0267	0.1801	0.0410	0.2008*	-0.0877	0.0649	0.0481
	0.2046	0.2217	0.2037	0.0728	0.1310	0.1003	0.1167	0.0798	0.1104	0.1851	0.0771	0.1133
2014Q2	0.6097***	-0.1839	0.2300	0.5142***	0.3252**	0.0595	0.1521	0.0843	0.1784	0.0793	0.0783	0.0423
	0.2046	0.2388	0.1961	0.0792	0.1289	0.1033	0.1125	0.0789	0.2586	0.1603	0.0774	0.1313
2014Q3	0.6593***	-0.4583*	0.4461**	0.5709***	0.5347***	0.0449	0.1373	0.1963**	0.3278***	0.0708	0.0495	0.1590
	0.2035	0.2685	0.1963	0.0628	0.1354	0.1030	0.1119	0.0765	0.1159	0.1594	0.0770	0.1370
2014Q4	0.6892***	0.1504	0.5362**	0.5186***	0.5820***	0.0464	0.2630**	0.2137***	0.2675**	-0.0199	0.0653	0.0203
	0.2040	0.2640	0.2157	0.0573	0.1192	0.0996	0.1120	0.0753	0.1207	0.1671	0.0758	0.1212
2015Q1	0.7188***	0.3184	0.4387**	0.5834***	0.5564***	0.0508	0.2396**	0.3306***	0.2392***	0.1140	0.0805	0.1336
	0.2028	0.2113	0.2151	0.0516	0.1240	0.0972	0.1105	0.0740	0.0748	0.1668	0.0763	0.1325
2015Q2	0.7374***	0.2387	0.6849***	0.5779***	0.6690***	0.1641*	0.2537**	0.3405***	0.5238***	0.1551	0.1141	0.1048
	0.2028	0.2617	0.2042	0.0515	0.1250	0.0955	0.1146	0.0761	0.0644	0.1693	0.0764	0.1060
2015Q3	0.7376***	0.0984	0.8157***	0.6175***	0.3159**	0.2062**	0.2922**	0.3885***	0.2058	-0.0775	0.2073***	0.1230
	0.2042	0.2171	0.2045	0.0599	0.1479	0.0935	0.1145	0.0864	0.1439	0.1852	0.0792	0.1327
2015Q4	0.7193***	0.0767	0.7734***	0.6308***	0.6081***	0.1732*	0.3975***	0.4173***	0.4358***	0.3408	0.1293*	0.1119
	0.2033	0.2043	0.2000	0.0579	0.1255	0.0975	0.1096	0.0842	0.0781	0.2128	0.0759	0.1210
2016Q1	0.6996***	0.2092	0.8175***	0.6130***	0.5968***	0.2238**	0.3591***	0.4220***	0.4891***	0.0839	0.1733**	0.0878
	0.2030	0.2385	0.1779	0.0576	0.1270	0.0933	0.1098	0.0740	0.0905	0.1994	0.0777	0.1419
2016Q2	0.7282***	0.2098	0.8550***	0.7188***	0.5118***	0.1464	0.3641***	0.3947***	0.4322***	0.1007	0.1680**	0.1249
	0.2025	0.2218	0.1839	0.0549	0.1237	0.0951	0.1106	0.0727	0.0778	0.2023	0.0763	0.1094
2016Q3	0.7262***	0.2672	0.7716***	0.6338***	0.6077***	0.1507	0.3136***	0.5218***	0.3797***	-0.0934	0.1693**	0.1241
	0.2034	0.2210	0.1949	0.0561	0.1205	0.0949	0.1118	0.0723	0.0860	0.2003	0.0767	0.1269
2016Q4	0.7204***	0.3062	0.8319***	0.6651***	0.7369***	0.1871**	0.2612**	0.5195***	0.4478***	0.1881	0.1537**	0.0921
	0.2030	0.2333	0.1767	0.0513	0.1204	0.0945	0.1103	0.0717	0.0786	0.2050	0.0762	0.1035
2017Q1	0.7261***	0.0333	0.7143***	0.5725***	0.5698***	0.1161	0.3096***	0.4065***	0.4952***	-0.1460	0.1298*	0.1746*
	0.2056	0.2264	0.1834	0.0439	0.1214	0.0936	0.1093	0.0726	0.0673	0.1537	0.0759	0.1003
2017Q2	0.7101***	-0.0020	0.7366***	0.6274***	0.7202***	0.1199	0.2872***	0.4122***	0.4491***	-0.0694	0.1589**	0.1951*
	0.2040	0.2471	0.1892	0.0499	0.1176	0.0979	0.1102	0.0731	0.0978	0.1909	0.0766	0.1057
2017Q3	0.7614***	-0.0398	0.7995***	0.7297***	0.7509***	0.1184	0.3305***	0.3477***	0.5842***	0.0000	0.1269	0.1157
	0.2040	0.2387	0.1905	0.0619	0.1346	0.0976	0.1148	0.0836	0.1034	.	0.0785	0.1173
Constant	8.1131***	8.1223***	7.6076***	5.5188***	7.6869***	7.6430***	6.7357***	6.8827***	6.4844***	7.6050***	5.9835***	6.6230***
	0.2169	0.4235	0.2721	0.1680	0.1768	0.1236	0.1692	0.1125	0.1983	0.3550	0.0795	0.2617
Observations	1688	226	458	764	1273	1617	1991	4228	314	280	3632	729
$\mathbf{R}^2$	0.3741	0.5264	0.6124	0.4545	0.6202	0.2336	0.4066	0.3382	0.5505	0.4093	0.5208	0.6183

White Standard robust errors in grey
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13 – Hedonic model: OLS Regression per category - Vestiaire Collective

	(1) Hermès	(2) Chanel	(3) Hermès & Chanel	(4) Excellent Condition	(5) Kelly & Birkin Excellent Condition
Size width	0.0001	0.0089***	0.0056***	0.0067***	-0.0034**
	0.0013	0.0008	0.0007	0.0008	0.0015
Seller followers	-0.0000	-0.0000***	-0.0000***	-0.0000**	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000
Seller likes	0.0000**	0.0000***	0.0000*	0.0000***	0.0000***
	0.0000	0.0000	0.0000	0.0000	0.0000

Bolide	-0.9192***		-0.9617***	-0.9041***	
	0.0329		0.0302	0.0414	
Constance	-0.2750***		-0.2446***	-0.0594**	
	0.0272		0.0228	0.0249	
Evelyne	-1.5171***		-1.4871***	-1.4640***	
	0.0149		0.0126	0.0139	
Kelly	-0.4699***		-0.5140***	-0.3061***	-0.2715***
	0.0169		0.0178	0.0232	0.0198
Boy		0.3277***	-0.8986***	-0.8865***	
		0.0123	0.0128	0.0139	
255		0.0022	-1.1996***	-1.1757***	
		0.0113	0.0119	0.0140	
Timeless		-0.5507***	-1.7613***	-1.6824***	
		0.0200	0.0202	0.0309	
Camera		-0.3760***	-1.5714***	-1.5797***	
		0.0280	0.0284	0.0366	
Mademoiselle			-1.2053***	-1.1690***	
			0.0132	0.0156	
Speedy				-2.3192***	
				0.0186	
Lady Dior				-1.7524***	
				0.0270	
Silver		-0.1007**	-0.0789*	-0.0242	0.0000
		0.0446	0.0447	0.0544	.
Python		-0.1126	-0.1894	-0.0743	0.0000
		0.2543	0.2749	0.2295	.
Navy		0.0230	0.0241	0.0324	0.0000
		0.0552	0.0521	0.0564	.
Blue	0.0541**	-0.0208	0.0053	0.0156	0.0074
	0.0210	0.0171	0.0131	0.0149	0.0259
Brown	-0.0168	-0.0704	-0.0372	-0.0357	-0.0852
	0.0494	0.0526	0.0481	0.0490	0.0689
Burgundy	-0.0625	0.0365	-0.0122	0.1804***	-0.0503
	0.0601	0.0568	0.0519	0.0552	0.0879
Gold	0.0665	-0.0897**	-0.0362	0.0186	0.0271
	0.0512	0.0453	0.0359	0.0455	0.0334
Green	0.1124***	-0.0791**	0.0019	-0.0311	0.0591**
	0.0293	0.0356	0.0243	0.0297	0.0299
Grey	0.2376***	0.1103**	0.1627***	0.1777***	0.0540
	0.0510	0.0510	0.0484	0.0496	0.0696
Khaki	0.1647**	0.1650**	0.1727***	0.2696***	-0.0504
	0.0837	0.0660	0.0612	0.0635	0.1280
Orange	-0.1099	-0.1689*	-0.1373**	-0.1794***	-0.2352***
	0.1214	0.0992	0.0545	0.0483	0.0675
Pink	0.0717	-0.1058**	-0.0939*	-0.0816**	-0.0853
	0.1220	0.0503	0.0482	0.0402	0.0662
Purple	0.2078***	0.0676	0.1460***	0.1800***	0.1250
	0.0595	0.0621	0.0536	0.0562	0.0767
Red	0.0587**	-0.0307	-0.0063	-0.0037	0.0364
	0.0233	0.0188	0.0148	0.0170	0.0244
Turquoise	-0.0967	-0.0595	-0.1106*	-0.1990***	-0.3143***
	0.1275	0.0759	0.0601	0.0634	0.0884
White	-0.4021***	-0.2256***	-0.3436***	-0.3542***	-0.6519***
	0.1307	0.0542	0.0557	0.0550	0.1006
Yellow	0.0352	-0.1112	-0.0531	-0.1050*	-0.2955***
	0.1273	0.0825	0.0618	0.0590	0.0967
Other colour	0.0263	-0.0035	-0.0109	0.0098	0.0069
	0.0244	0.0230	0.0178	0.0159	0.0224
Beige	-0.0706	-0.1264***	-0.1428***	-0.1753***	-0.2355***
	0.1194	0.0489	0.0470	0.0391	0.0633
Other material	-1.0541***	-0.5661***	-0.7323***	-0.4689***	-0.6799***
	0.1025	0.0479	0.0384	0.0395	0.1345
Patent leather	-0.0427	-0.4671***	-0.5430***	-0.3568***	-0.0850
	0.2009	0.0454	0.0296	0.0361	0.1974
Leather	-0.4452***	-0.3458***	-0.4107***	-0.2791***	-0.1911***
	0.0295	0.0425	0.0241	0.0311	0.0360
Cloth	-0.6154***	-0.7724***	-0.8084***	-0.5137***	-0.4042**
	0.0720	0.0578	0.0435	0.0375	0.1742
Silk Cotton Suede	-1.2875***	-0.6285***	-0.7796***	-0.6398***	-0.8359**
	0.2241	0.0489	0.0421	0.0461	0.3441
Good Condition	0.4603***	0.3975***	0.4269***		0.2668***
	0.0254	0.0177	0.0152		0.0397
Excellent Condition	0.7572***	0.6550***	0.7053***		0.4221***
	0.0246	0.0174	0.0147		0.0389
Vintage	-0.1948***	-0.0642***	-0.1068***	-0.1803***	-0.2796***
	0.0297	0.0153	0.0145	0.0223	0.0663
Limited Edition	-0.2722***	0.0226	-0.0450**	0.0876***	-0.3477***
	0.0740	0.0191	0.0226	0.0251	0.0899
Trusted profile	0.0295**	-0.0170**	-0.0030	0.0181**	0.0219*
	0.0118	0.0082	0.0069	0.0076	0.0123
Professional seller	0.0070	0.0362***	0.0441***	0.0668***	-0.0426*
	0.0203	0.0129	0.0095	0.0112	0.0254
Spring summer	0.0976	0.0360	0.0854*	0.1283***	0.2175***
	0.1174	0.0460	0.0451	0.0356	0.0600
Autumn winter	-0.0598	-0.1059**	-0.1032**	-0.1450***	0.0377
	0.0482	0.0466	0.0455	0.0456	0.0674
20121	-0.0016	0.0895	0.0593	0.0421	0.2805**
	0.1136	0.0708	0.0655	0.0656	0.1402
20122	0.2622**	0.0323	0.1177*	0.0528	0.3875***
	0.1108	0.0765	0.0621	0.0594	0.1396
20123	0.1299	0.1894**	0.1778**	0.2002***	0.3253*
	0.1233	0.0775	0.0698	0.0660	0.1822
20124	0.3332**	0.1191*	0.2067***	0.1486**	0.4988***
	0.1361	0.0670	0.0631	0.0602	0.1632
20131	0.1358	0.0670	0.1203*	0.1362**	0.2613*
	0.1254	0.0661	0.0622	0.0587	0.1528
20132	0.1680	0.0932	0.1366**	0.1172**	0.3647***
	0.1070	0.0649	0.0592	0.0518	0.1340
20133	0.2167*	0.1227*	0.1880***	0.2011***	0.3583**
	0.1111	0.0628	0.0586	0.0516	0.1420
20134	0.3627***	0.1749***	0.2670***	0.2365***	0.5182***
	0.1033	0.0622	0.0567	0.0481	0.1274
20141	0.3599***	0.0838	0.2026***	0.1679***	0.5113***
	0.1038	0.0603	0.0560	0.0487	0.1300

20142	0.3340***	0.1105*	0.2091***	0.2211***	0.4896***
	0.1034	0.0590	0.0552	0.0475	0.1313
20143	0.4091***	0.1624***	0.2687***	0.2382***	0.5255***
	0.1039	0.0583	0.0552	0.0476	0.1341
20144	0.4858***	0.1934***	0.3218***	0.2671***	0.6224***
	0.1018	0.0579	0.0545	0.0459	0.1287
20151	0.4948***	0.2529***	0.3591***	0.3005***	0.6340***
	0.1016	0.0568	0.0539	0.0453	0.1283
20152	0.5455***	0.2942***	0.4053***	0.3738***	0.7079***
	0.1007	0.0579	0.0542	0.0455	0.1272
20153	0.4701***	0.3237***	0.3954***	0.4070***	0.6549***
	0.1029	0.0595	0.0555	0.0480	0.1305
20154	0.5310***	0.3644***	0.4507***	0.3909***	0.6470***
	0.1008	0.0580	0.0541	0.0454	0.1275
20161	0.5400***	0.3574***	0.4408***	0.3874***	0.6563***
	0.1010	0.0565	0.0536	0.0449	0.1271
20162	0.5604***	0.3189***	0.4243***	0.3809***	0.6784***
	0.1013	0.0562	0.0537	0.0451	0.1272
20163	0.5480***	0.3942***	0.4794***	0.4385***	0.6766***
	0.1009	0.0563	0.0536	0.0450	0.1274
20164	0.5913***	0.3952***	0.4923***	0.4350***	0.6874***
	0.1006	0.0557	0.0532	0.0442	0.1269
20171	0.4924***	0.2997***	0.3884***	0.3811***	0.7140***
	0.1016	0.0560	0.0537	0.0443	0.1277
20172	0.5268***	0.3044***	0.4064***	0.3931***	0.6739***
	0.1007	0.0564	0.0537	0.0448	0.1273
20173	0.5999***	0.3009***	0.4337***	0.4138***	0.7598***
	0.1033	0.0594	0.0558	0.0474	0.1282
Constant	8.1481***	6.9152***	8.1385***	8.6457***	8.1841***
	0.1207	0.0754	0.0675	0.0601	0.1523
Observations	4409	8430	12839	9265	2184
R^2	0.7445	0.4459	0.6929	0.8199	0.4230

With White Standard errors

$^{*}\ p < 0.10,\ ^{**}\ p < 0.05,\ ^{***}\ p < 0.01$

Table 14 – Discount rates from European cumulative inflation rates

Date	Cum.Inflation	Discount rate			
2010M02	0,1171	1,12			
2010M03	0,1135	1,11	**2013M12**	0,02016	1,02
2010M04	0,1034	1,10	**2013M11**	0,01934	1,02
2010M05	0,0987	1,10	**2014M01**	0,01679	1,02
2010M06	0,0971	1,10	**2014M02**	0,02582	1,03
2010M07	0,0966	1,10	**2014M03**	0,02252	1,02
2010M08	0,0998	1,10	**2014M04**	0,01527	1,02
2010M09	0,0976	1,10	**2014M05**	0,01345	1,01
2010M10	0,0946	1,09	**2014M06**	0,01436	1,01
2010M11	0,0914	1,09	**2014M07**	0,01335	1,01
2010M12	0,0897	1,09	**2014M08**	0,01863	1,02
2011M01	0,0827	1,08	**2014M09**	0,01751	1,02
2011M02	0,0872	1,09	**2014M10**	0,01436	1,01
2011M03	0,0823	1,08	**2014M11**	0,01456	1,01
2011M04	0,0705	1,07	**2014M12**	0,01659	1,02
2011M05	0,0640	1,06	**2015M01**	0,01761	1,02
2011M06	0,0631	1,06	**2015M02**	0,03071	1,03
2011M07	0,0637	1,06	**2015M03**	0,02530	1,03
2011M08	0,0683	1,07	**2015M04**	0,01639	1,02
2011M09	0,0661	1,07	**2015M05**	0,01375	1,01
2011M10	0,0594	1,06	**2015M06**	0,01154	1,01
2011M11	0,0561	1,06	**2015M07**	0,01204	1,01
2011M12	0,0544	1,05	**2015M08**	0,01700	1,02
2012M01	0,0508	1,05	**2015M09**	0,01710	1,02
2012M02	0,0567	1,06	**2015M10**	0,01578	1,02
2012M03	0,0514	1,05	**2015M11**	0,01446	1,01
2012M04	0,0406	1,04	**2015M12**	0,01578	1,02
2012M05	0,0357	1,04	**2016M01**	0,01588	1,02
2012M06	0,0367	1,04	**2016M02**	0,02789	1,03
2012M07	0,0379	1,04	**2016M03**	0,02644	1,03
2012M08	0,0418	1,04	**2016M04**	0,01669	1,02
2012M09	0,0381	1,04	**2016M05**	0,01598	1,02
2012M10	0,0316	1,03	**2016M06**	0,01275	1,01
2012M11	0,0288	1,03	**2016M07**	0,01113	1,01
2012M12	0,0302	1,03	**2016M08**	0,01537	1,02
2013M01	0,0268	1,03	**2016M09**	0,01456	1,01
2013M02	0,0350	1,04	**2016M10**	0,01154	1,01
2013M03	0,0308	1,03	**2016M11**	0,00903	1,01
2013M04	0,0214	1,02	**2016M12**	0,00933	1,01
2013M05	0,0216	1,02	**2017M01**	0,00425	1,00
2013M06	0,0206	1,02	**2017M02**	0,01073	1,01
2013M07	0,0201	1,02	**2017M03**	0,00643	1,01
2013M08	0,0241	1,02	**2017M04**	0,00020	1,00
2013M09	0,0227	1,02	**2017M05**	-0,00362	1,00
2013M10	0,0186	1,02	**2017M06**	-0,00333	1,00
2013M11	0,0193	1,02	**2017M07**	-0,00343	1,00

Figure 10 – Vestiaire Collective: the webpage representation

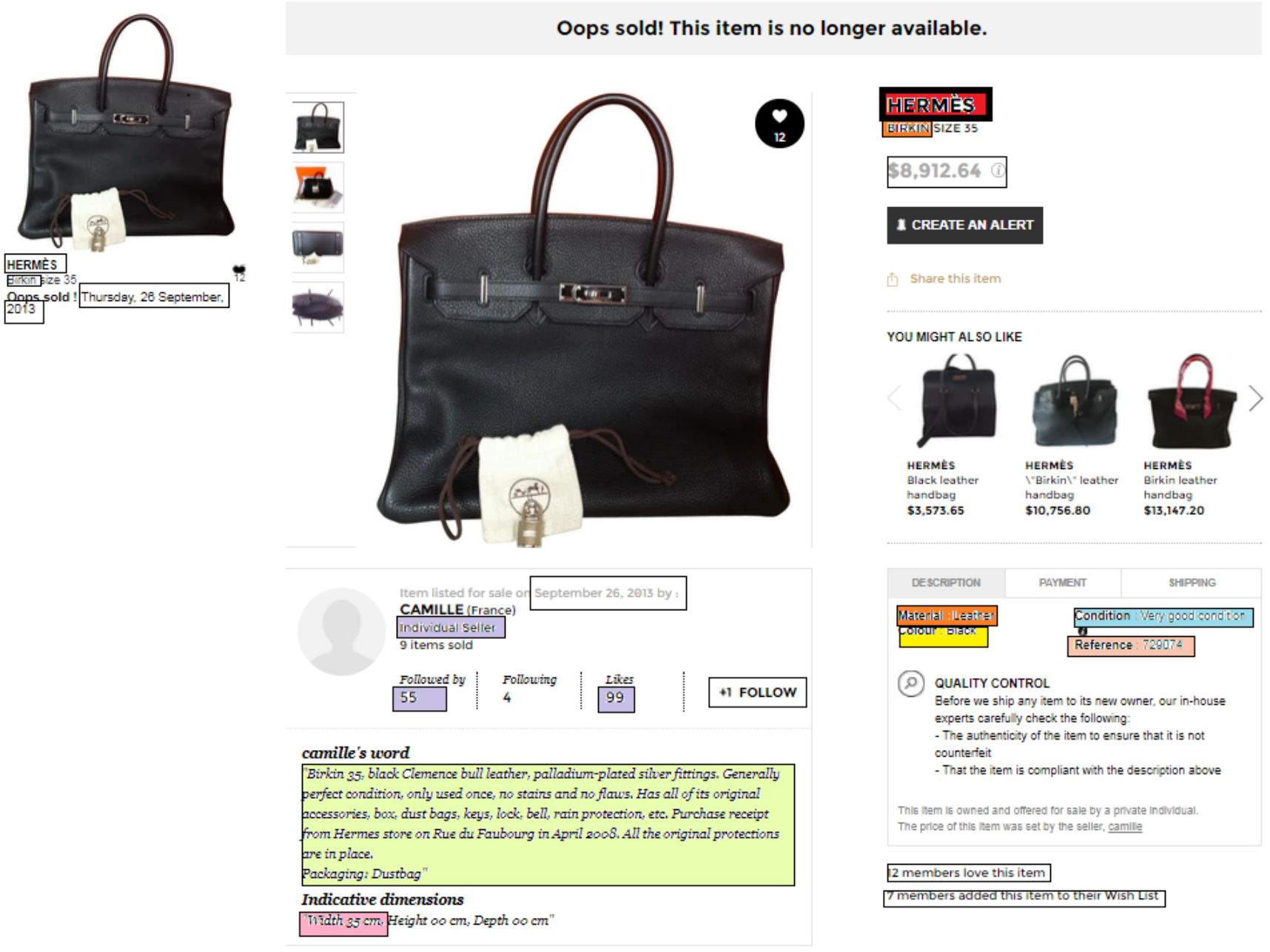

Figure 11 – Heritage Auctions: the webpage representation

Hermes Limited Edition 30cm Matte So Black Nilo Crocodile Birkin Bag with PVD Hardware

N Square, 2010

Auction 5244 | Lot: 58296 | Apr 18, 2016

Sold For: **$125,000.00**

Description

Hermes Limited Edition 30cm Matte So Black Nilo Crocodile Birkin Bag with PVD Hardware

N Square, 2010

Pristine Condition

12" Width x 8" Height x 6" Depth

First appearing in Hermes Boutiques in the United States the end of 2010, the Limited Edition So Black handbags are distinctly rare, with an unsurpassable all black look. The Limited Edition handbags iconically feature stunning Black PVD Hardware in addition to their sleek black bodies. The effect given off from this combination is an all black, or So Black appearance. Bags from this collection are even more hard to come by than the already elusive Birkin bag, making them a true indication of status and access within the secretive fashion house. To top off the impressive back story of this incredible collection, this Birkin bag is done in Matte Black Niloticus Crocodile, this bag is the most elusive of the entire series. This bag is a once in a lifetime opportunity to add one of Hermes's most impressive handbags to a collection. This bag features two rolled handles, astounding Black PVD Hardware, and a flap top with a turnlock closure. The interior is done in Black Chevre Leather, featuring one zip pocket and one slip pocket. This bag includes two keys, a lock, and a clochette.

This bag is in Pristine Condition. There are no signs of wear. The protective plastic is intact on the hardware. This bag includes an Hermes So Black box, dustbag, and a rain protector.

CITES compliance applies to this lot. International Bidders may not have the lot shipped to them. See further limitations: see page 8, Jewelry, Watch & Luxury Accessory Term M, of our Terms & Conditions. Due to the nature of exotic wildlife materials, please be aware that inconsistencies may naturally be present.

NOTICE of CITES COMPLIANCE: When purchasing items made from protected species: Any property made of or incorporating endangered or protected species or wildlife may have import and export restrictions established by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). These items may not be available to ship internationally. By placing a bid the bidder acknowledges that he or she is aware of the restriction and takes responsibility in obtaining and paying for any license or permit relevant to delivery of the product. Lots containing potentially regulated wildlife material are noted in the description as a convenience to our clients. Heritage Auctions does not accept liability for errors or failure to mark lots containing protected or regulated species. For further assistance, please contact client services at 1-800-872-6467.

Figure 12 – Hermès Birkin

Figure 13 – Hermès Bolide

Figure 14 – Hermès Constance

Figure 15 – Hermès Evelyne

Figure 16 – Hermès Kelly

Figure 17 – Chanel 255

Figure 18 – Chanel Boy

Figure 19 – Chanel Camera

Figure 20 – Chanel Mademoiselle

Figure 21 – Chanel Timeless

Figure 22 – Lady Dior

Figure 23 – Louis Vuitton Speedy

Table 15 – Seasonality

Seasonality dummies:	
Requirements	
Text	In product description if not: select on colour of the handbag
Colour	All season: blue, red, other, gold, silver, black
	Fall: brown, burgundy, khaki, navy blue, purple, grey, metallic
	Spring: white, beige, camel, yellow, pink, turquoise, multicolor,orange