The investment performance of art and other collectibles

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Agenda

- Overview of art and collectibles
- Wine
- Literature and theory
- Data
- Results
  - Aging
  - Returns
- Summary and questions
A significant HNW asset

Chart 1: Treasure Map

Percentage of wealth in treasure map shows top three most popular regions.

- 10% US
- 7% UK
- 6% Switzerland
- 3% India
- 17% China
- 9% Japan
- 16% Singapore
- 14% Hong Kong
- 14% Spanish
- 11% South Africa
- 9% Mexico
- 15% Brazil
- 7% Monaco
- 5% UAE

Source: Ledbury Research and Barclays

Long-term evidence: Art

- Data on 1,336 repeated sales in UK over 1765–2007 from 2 sources
  - 1,096 sales pairs in Reitlinger’s *The Economics of Taste* (1961)
  - Look up these items in the Art Sales Index, and search for unique matches
  - Update index with art market returns from Artprice.com

*SIR LAWRENCE ALMA-TADEMA, 1836–1913*

The great days of this painter began in the 1870’s, but he lived a long time and his reputation was singularly unassailable. In spite of a small intellectual movement of disfavour, going back at least to the 1880’s, there were writers on art on the eve of the First World War who still found these frigid reconstructions comparable with the greatest masters of the past. The market for Alma-Tadema was fairly strong as late as 1925, but in the winter of 1950 when two of his most famous works reappeared on Christie’s walls, they were not even mentioned in the newspapers.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1861</td>
<td>Royal Academy</td>
<td>The childhood of Cloothild (see 1872). 420 £</td>
</tr>
<tr>
<td>1870</td>
<td>George Bennie</td>
<td>C. The artist’s studio. 472 316 £</td>
</tr>
<tr>
<td>1872</td>
<td>Marrieta</td>
<td>C. The childhood of Cloothild (see 1861). 1,102 102 £</td>
</tr>
</tbody>
</table>
Long-term returns on art

![Graph showing long-term returns on art, including inflation, nominal return on art, and deflated art price index.]

Long-term evidence: Stamps

- Catalogues and price lists
  - e.g., Stanley Gibbons stamp catalogues

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GREAT BRITAIN.

<table>
<thead>
<tr>
<th>1840–47: Letters in lower angles only.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1d. Rect.</td>
</tr>
<tr>
<td>1d. &quot;</td>
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<tr>
<td>1d. &quot;</td>
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<tr>
<td>2d. &quot;</td>
</tr>
<tr>
<td>6d. Oct.</td>
</tr>
<tr>
<td>10d. &quot;</td>
</tr>
<tr>
<td>1s. &quot;</td>
</tr>
</tbody>
</table>
Long-term returns on stamps

- Inflation (in %, left axis)
- Nominal return on stamps (in %, left axis)
- Deflated stamp price index (right axis)

Long-term evidence: Musical instruments

- Data source:
  - Sales of violins at dealers and auction houses: Graddy and Margolis (2011)
Long-term returns on musical instruments

Total returns from since 1900
Agenda

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The price of wine
A global market

Specialized vehicles
Specialist education

"Called Fine and Rare Specialist, the week-long course from 28 June to 3 July was held at the Palais Coburg, and generously supported by the hotel's owner Peter Pühringer…"

"Highlights of the seven-day course included the chance to taste a 1907 d'Oliveiras Madeira, a 1974 Punotto Barolo, several vintages of Gaja Barbaresco and Tignanello, a 1969 Domäne Wachau Riesling Spatlese, an 1990 Nikolaihof Gruner Veltliner, 1990 Lafite-Rothschild, 1982 Haut-Brion, 1981 Cheval Blanc and 1962 d’Yquem…"

"Also poured during the course were 2002 Bollinger Vieilles Vignes Françaises, 1998 Domaine de la Romanée-Conti La Tâche, 1962 Vega Sicilia Unico, 1983 Chave Hermitage, 1919 Huet Vouvray Haut Lieu and 1973 Dom Pérignon…"
Yet huge gaps in our knowledge

- Wine ages into a collectible
  - This makes its price path challenging to understand
- No studies of wine’s long-term return-generating process
  - Potential insights for other collectibles
- We examine effects of aging on wine prices
  - Interaction between drinkability / collectability and financial returns
- We estimate investment performance of wine over very long run
  - Why the knowledge gap? Lack of long-term data (till now)

Why interesting?

Wine is an emotional asset – an investment of passion

- Highly illiquid
- High transaction costs
- Lack of transparency
- Heterogeneous
- No future cash flows (except resale)

Emotional assets are under-researched
Agenda

- Wine
- Literature and theory
  - Data
  - Results
    - Aging
    - Returns
- Summary and questions

Literature

- Non-pecuniary benefits and financial returns

- Long-term asset returns

- Wine
Our model

- Two types of wine:
  - Low-quality wines (which decrease in quality over time)
  - High-quality wines (which first improve in quality)

- Both the value of consuming a bottle of wine and the pleasure of owning a bottle depend on its quality, type, age, and wealth

- At each date, fundamental value of a bottle of wine is max of:
  - The benefit of immediate consumption
  - PV of consumption at maturity + PV of "psychic dividend" received till then
  - The present value of infinite storage

Cross-sectionally,

Low-quality: Modest appreciation after brief period. Price is soon determined by value as a collectible.

High-quality: Strong appreciation, then V-shaped. For long time, price reflects value of consumption.

- Return on pre-maturity high-quality wines exceeds return on post-maturity wines.
- The difference may be attributed to the "psychic return" from collectible wines.
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Data

- Hand-collected database of investment-quality wine prices
  - 36,271 prices since 1899
- Coverage: Five Bordeaux first growths (premiers crus)
  - Haut-Brion, Lafite-Rothschild, Latour, Margaux, Mouton-Rothschild
  - Vintages since 1855
  - Standard bottles
- Two types of prices
  - Auction: Christie's London (hammer price + buyer's premium)
  - Dealer: Berry Bros. & Rudd (duty-paid list prices inclusive of VAT)
- Prices for 9,492 year/château/vintage/transaction combinations
Christie's London

Sources

- 1899-1971  Annotated catalogues (including Restell)
- 1972-1979  Christie's Wine Review
- 1980-1984  Christie's Vintage Wine Price Index
- 1985-1998  Liquid Assets database
- 1999-2012  Christie's website
Christie’s Wine Review

Bordeaux, red

The acknowledged first growths, preceded by the re-classified médoc (see p.7) are followed by châteaux in alphabetical order. The districts and classification of each wine appears in brackets. Prices are sh...
Berry Bros. & Rudd

Sources

- 1905-1978  Bound price lists (and a few loose lists)
- 1979-2012  Loose price lists (including a few “blue lists”)
- 2012       BBR website

BBR price lists
Loose price lists

Berry Bros. & Co.
Established in the XVII Century,
at 3 St James’s Street, London, S.W.

Cellars—
C. h. & b. Pickingers Place, S. W.
May’s Miniature Vaults, Berkeley Sq., W.
28 Savile Row, W.

Bonded Warehouses—
London, Glasgow, and Southampton.


Berry Bros. & Co.

CLARET—continued

Per Doz.

Via Ordinaire... 12.50
Clos du Prune... 16.00
St Estephe... 18.00
Médoc Superieur... 21.00

Ch. Rochemer... 30.00
Ch. Moulin de Caion Negre... 45.00
Ch. d’Alcauz Becker... 45.00
Ch. Chasse Spleen... 45.00
Ch. Moulin Berthschedel... 60.00

Ch. Labat Boche... 30.00
Ch. Lestelle, Proven... 45.00
Ch. Lascazes... 45.00
Ch. Brown Cameron... 60.00
Ch. Lafite... 75.00

Ch. La Mission Haut Brion... 75.00
Ch. Lestelle, Lascazes... 60.00
Ch. Lestelle... 75.00
Ch. Phelan Burcet... 50.00
Ch. Palmer Margaux... 90.00

Ch. Lestelle... 100.00
Ch. Lefranc, in wine Bottles... 100.00
Ch. Margaux... 95.00

Ch. Lafite, Grand Vin, Ch. Bontie... 100.00
Ch. Lafite, possibly 1869... 100.00

3, St James’s Street, London, S.W.

BBR website

[Website content]
## 9,492 year/château/vintage/transaction combinations

<table>
<thead>
<tr>
<th>Period</th>
<th>Transaction type</th>
<th>Château</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Auction Dealer</td>
<td>Haut-Brion</td>
<td>Lafite</td>
</tr>
<tr>
<td>1899-1909</td>
<td>179</td>
<td>47</td>
<td>12</td>
</tr>
<tr>
<td>1910-1919</td>
<td>37</td>
<td>69</td>
<td>10</td>
</tr>
<tr>
<td>1920-1929</td>
<td>54</td>
<td>86</td>
<td>9</td>
</tr>
<tr>
<td>1930-1939</td>
<td>62</td>
<td>141</td>
<td>24</td>
</tr>
<tr>
<td>1940-1949</td>
<td>88</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>1950-1959</td>
<td>47</td>
<td>131</td>
<td>24</td>
</tr>
<tr>
<td>1960-1969</td>
<td>163</td>
<td>96</td>
<td>47</td>
</tr>
<tr>
<td>1970-1979</td>
<td>1,568</td>
<td>89</td>
<td>251</td>
</tr>
<tr>
<td>1980-1989</td>
<td>1,839</td>
<td>96</td>
<td>341</td>
</tr>
<tr>
<td>1990-1999</td>
<td>1,956</td>
<td>198</td>
<td>360</td>
</tr>
<tr>
<td>2000-2009</td>
<td>1,830</td>
<td>254</td>
<td>320</td>
</tr>
<tr>
<td>2010-2012</td>
<td>409</td>
<td>38</td>
<td>63</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8,232</strong></td>
<td><strong>1,260</strong></td>
<td><strong>1,479</strong></td>
</tr>
</tbody>
</table>

### Price per bottle (in GBP)

<table>
<thead>
<tr>
<th>Period</th>
<th>Nominal</th>
<th>Real</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>1899-1909</td>
<td>0.25</td>
<td>0.17</td>
</tr>
<tr>
<td>1910-1919</td>
<td>0.36</td>
<td>0.20</td>
</tr>
<tr>
<td>1920-1929</td>
<td>0.51</td>
<td>0.24</td>
</tr>
<tr>
<td>1930-1939</td>
<td>0.53</td>
<td>0.28</td>
</tr>
<tr>
<td>1940-1949</td>
<td>1.88</td>
<td>1.09</td>
</tr>
<tr>
<td>1950-1959</td>
<td>1.51</td>
<td>0.66</td>
</tr>
<tr>
<td>1960-1969</td>
<td>4.31</td>
<td>9.65</td>
</tr>
<tr>
<td>1970-1979</td>
<td>29.96</td>
<td>58.30</td>
</tr>
<tr>
<td>1980-1989</td>
<td>90.84</td>
<td>157.45</td>
</tr>
<tr>
<td>1990-1999</td>
<td>174.05</td>
<td>358.15</td>
</tr>
<tr>
<td>2000-2009</td>
<td>300.34</td>
<td>542.81</td>
</tr>
<tr>
<td>2010-2012</td>
<td>758.46</td>
<td>1,161.84</td>
</tr>
</tbody>
</table>
Trading volume and vintage quality

- Dealers sell a poorer wine (1974) at a younger age than a wine from a good vintage.
- Auction volumes stay higher for a longer time for a good vintage (1975)

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Time effects (average price per bottle in nominal GBP)

Château effects (average price per bottle in GBP)

- Haut-Brion
- Mouton
**Vintage effects** (all sales; average price per bottle in GBP)

**Transaction-type effects** (average price per bottle in GBP)
**Age effects** (average price in nominal GBP: all sales 2000–12)

![Graph showing age effects](image)

* Not controlling for vintage and time effects

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### Disentangling wine fundamentals

- Ideally use this additive model:

  \[
  \ln(p_{i,j,t}) = \alpha_i + \alpha_j + \alpha_t + \alpha_l + \beta'X_{j,t} + \varepsilon_{i,j,t,t}
  \]

  - Château fixed effects
  - Vintage year fixed effects
  - Transaction type fixed effects
  - Year of sale fixed effects
  - Age polynomial

- However, multicolinearity between time, vintage and age
  - So replace vintage effects with variable measuring production and weather

- Also, effect of aging may depend on vintage quality
  - So interact age polynomial with weather quality
Production and weather

- Final regression model:
  \[ \ln(P_{i,j,t}) = \alpha_i + \alpha_t + \phi V_i + \psi W_j + \beta' X_{j,t} + \gamma' (X_{j,t} \times W_j) + \epsilon_{i,j,t} \]
  - Variable measuring production yield
  - Variable measuring weather quality
  - Interaction between age polynomial and weather quality variable

- Annual yield data from Chevet et al (2011)
- Weather quality 1873–2011 is a score (max 20) based on
  - Average temperature April–August
  - (Lack of) rainfall August–September
  - Data mainly from Bordeaux weather station (occasionally imputed from other French cities)

Regression results

<table>
<thead>
<tr>
<th>Time dummies:</th>
<th>[Included]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction type dummy:</td>
<td>Dealer .4869 (.0527) ***</td>
</tr>
<tr>
<td>Château dummies:</td>
<td>Lafite .1616 (.0326) ***</td>
</tr>
<tr>
<td></td>
<td>Latour .1726 (.0153) ***</td>
</tr>
<tr>
<td></td>
<td>Margaux .0410 (.0169) **</td>
</tr>
<tr>
<td></td>
<td>Mouton .3104 (.0369) ***</td>
</tr>
<tr>
<td>Proxies for vintage effects:</td>
<td>Log (Yield) -.1918 (.0196) ***</td>
</tr>
<tr>
<td></td>
<td>Weather quality .0544 (.0126) ***</td>
</tr>
<tr>
<td>Age and age-weather variables:</td>
<td>[Included]</td>
</tr>
<tr>
<td>F-test age variables</td>
<td>35.02 ***</td>
</tr>
<tr>
<td>F-test age-weather variables</td>
<td>8.37 ***</td>
</tr>
<tr>
<td>N</td>
<td>9224</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.74</td>
</tr>
</tbody>
</table>
Aging and wine prices

Over first 25 years of its life, a bottle from a high-quality vintage will be about 3% more expensive for each extra year of age.

Underperformance of wines long beyond maturity relative to maturing wines suggests a “psychic return” of about 1% on collectible wines.

Patterns generally consistent with illustrative model presented earlier.

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Investment performance

Methodology

- Value-weighted arithmetic repeat-sales regression
- 8,582 price pairs with identical château, vintage year (and transaction)
- Correct resulting index for storage and insurance costs
  - Time-varying storage cost based on BBR price lists
  - Constant wine insurance cost of 0.5%

Deflated price index

- Negative real return over first quarter of 20th century
- Boom and bust around WW2
- Strong growth in last half-century, but periodic setbacks (often in recession)
Comparison with other assets

- Transaction costs are relatively high for collectibles
- Outperformance of wine vs art and stamps may not be surprising
- Substantial positive correlation between equities and wine returns

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Summary on wine

- Success bias: returns should be considered as upper bound
  - Over last four decades, slightly lower returns for Yquem and port
- Highest return for young high-quality wines that are maturing
  - These are the wines that do not give a “psychic return”
- Over 1900–2012, annualized real return of 4.1%
  - Wine underperforms stocks, but outperforms bonds and art
- Positive correlation between wine and equities

Invest with care

- Which Gauguin *Vase de Fleurs (Lilas)* would you buy?
  - Sotheby’s, May 2000
  - Christies, May 2000
  - from NYC art dealer Sakhai
  - with full certificate of authenticity

- Which Petrus would you buy?
  - Clue: Which bottle would you **not** buy?
Conclusion

- Since 1900, emotional assets beat bonds, Treasury bills, and gold
- Long-term returns were not as high as some enthusiasts assert
- Given waves in market and transaction costs, a long view is needed
- Higher returns in some submarkets reflect changing wealth or tastes
- Benefits from diversification and from inflation-hedging still unclear
- But there is a psychic dividend that financial assets cannot provide