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Title
The Inflation Hedging Effectiveness of Wine

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Research Question
Is wine an effective hedge against inflation?

Methods
Various measures of wine returns are statistically related to actual, expected and unexpected inflation using an added variable approach

Results
Research in progress

Abstract
THE INFLATION HEDGING
EFFECTIVENESS OF WINE

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One objective of holding an investment portfolio is to provide an investor with a positive real rate-of-return. During periods of inflation, certain financial instruments not only do not protect the investor, but actually perform as a perverse hedge, i.e., decrease in value as inflation increases. Nelson, Jaffe and Mandelker, and Stulz, among others, have shown that common stock has served as a perverse hedge in the United States. Others, such as Gultekin, Mandelker and Tandon, and Peel and Pope have noted such a relationship between common stocks and inflation on an international basis. Other work by Bodie and Herbst and others have examined the inflation-hedging effectiveness of various other investment media including gold, commodities, futures, and collectibles such as diamonds and art/antiques, stamps, coins and comic books. Fama and Schwert , Fogler, et al. , and Hartzell, et al., have examined the effectiveness of real estate as an inflation hedge as do Rubens, Bond and Webb.

What about wine? Investment grade wine is a tangible and consumable asset, which should be expected to offset rising inflation. According to Trellis Wine Investments from 2001 to 2011 one measure of wine prices had a low but positive correlation of 0.32 with the US Consumer Price Index. This suggests that over the last decade, the price of the investment grade wine market has not been significantly affected by the movement in the US inflation rate. Accordingly, the slight positive correlation with US-CPI suggests that investment grade wine may provide an effective hedge against an increase in the US.
The purpose of this study is to examine the inflation-hedging effectiveness of wine as individual assets and as portions of mean/variance efficient portfolios. All return measures will be examined relative to actual, expected and unexpected inflation. By dividing inflation into the two return components, the hedging effectiveness can be better examined.

There appear to be several measures of wine values that can be tested in the study. These include but are not limited to the Liv-ex fine wine 50 index, Liv-ex fine wine 100 index, Liv-ex fine wine 500 Bourdeaux index, and the Liv-ex fine wine 1000 index. In addition, the BLS has a price index for “wine at home”. The CPI will be used to measure actual inflation. Survey data or TIPS breakeven data will be used to determine expected inflation.
The goal is to determine which factors compose the nominal returns associated with investments in real estate. Since it is known that asset returns may be a function of inflation, both anticipated and unanticipated, the salient question to ask is what other factors affect asset returns.

The Added Variable Regression Methodology (AVRM) will be employed in an attempt to answer this question. AVRM has several advantages over previous methodologies used to assess the hedgeability of various asset returns. Ordinary inflation hedgeability does not account for the real opportunity costs of risks, which vary across assets. The use of CAPM could overcome this drawback, assuming that it is without flaws. The validity of CAPM, however, has been challenged by Roll, Bhandari, Chan, Hamao and Lankonishok, Hansen and Jagannathan and Fama and French, to name a few, rendering the ordinary hedgeability method questionable.

Fisherian inflation hedgeability as discussed in Bodie, Nelson, and Fama and Schwert, assesses the correlation between the movement of an asset’s returns and movements in the inflation rate. The closer the covariance divided by the variance of the market is to one, the better the inflation hedge. Fisherian inflation hedgeability differs from ordinary hedgeability in that an asset that appreciates rapidly and consistently over a long time horizon due to factors other than inflation, such as stocks, are inflation hedges in the ordinary sense, but not the Fisherian sense.

AVRM overcomes the difficulties associated with both methods by segregating the systematic components of return into inflation and non-inflation related rates. The inflation rate is further broken down into its anticipated and unanticipated components. The remaining non-inflation related systematic variables reflect only the real rates of return without expected and unexpected inflation. These are the variables of interest.

The AVRM can be represented by the equation:

(1)
Rit = a.0j + a.1j[it - it] + a.2it + o1jSC1t + ... + ok-2jSCkt + Vit

where:

Rit = Return;
it - it = Unanticipated inflation;
it = Anticipated inflation;
SC1i = Various real components without inflation effects;
a. ij and oij = Standard regression coefficients; and
Vit = Error term.
To derive this equation, the following multi-factor regression model is used, since past research has shown that the (Rit) is a function of more than one variable:

(2)

where:

Rtj = 13j0 + Bj1F1t + ... + 13jkF1t + ejt

Fjt = The jth real systematic component factor of Rjt;
13jt = Standard regression coefficients; and
eit = Error term.

To determine Fit, SC*it is used as an estimate. SC*it

is found by employing a principle

components factor analysis and is defined as:

(3)

where:

rit = Real rate of return;
ijt = Inflation rate; and SC*it = Nominal rate of return.

SCi*t

= rit + ijt

The number of SCi*t ’s is determined by the minimum acceptable eigenvalue generated for each factor score. Once the SCj*t ’s have been calculated, they are then regressed against unanticipated and anticipated inflation as represented by the following equation:

SCj*t = <P0t + <P1t[it - it] + <P2jit + wit. (4)

The residuals from this equation will be termed SCjt, and can be interpreted as the real component of the rate-of-return without the effects of unanticipated and anticipated inflation. Replacing Fjt in Equation (2) with SCj*t , yields:
Rit = o0j + o1jSC1*t + ... + okjrkt + eit. (5) Substituting Equation (3) into Equation (5), yields:
(6)
Rjt = a.0j + a.1jit + o1jrit + ... + okjrkt + eit
if it = [it - it] + it, then

Rjt = a.0j + a.1j([it - it] + it) + o1jrit + ... + okjrkt + eit. (7)
As previously mentioned, SCjt is the residual from Equation (4). This term is the same as rit in Equation (7). Thus, making the substitution and distributing a.1j to both terms in Equation (7), yields Equation (1), the final equation which will be used in the analysis.5 The advantage of this AVRM equation is not only that unanticipated inflation, anticipated inflation and other real systematic components are separated, but more importantly, that there is no longer any significant multicollinearity among the variables. Furthermore, AVRM does not require a risk adjustment to assess an asset's inflation hedgeability.

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