CAMILO PRADO ROMÁN, JOSÉ LUIS COCA PÉREZ, MIGUEL PRADO ROMÁN

GOLD NUMISMATIC ASSETS VALUATION: BULLION AND COMMEMORATIVE COIN CASE

Предлагается методика оценки золотых нумизматических активов на основе модели множественной линейной регрессии. Эффективность методики продемонстрирована на примере анализа активов, выпущенных Испанией, США, Великобританией и Францией в период с 1900 до 2007 г. В результате (приблизительно в 50 % случаев) удалось объяснить принципы формирования цены на данные финансовые активы.

The purpose of this research is to explain and know determinant factors in gold numismatic assets price formation. For it, we will use models of multiple linear regression. Research sample is composed by gold numismatic assets (commemorative and bullion coins). Those assets have been issued by Spain, USA, Great Britain and France from 1900 to 2007. The research period is to 2003–2008. With these models we will be able to explain around of 50 %, of the price formation of these not financial assets.

1. Introduction

This work is justified by the importance of the international numismatic market research as investment activity, by conducting an analysis of the determinants in the valuation of U.S. and European assets in gold

coin issued between 1900–2007, for the period 2003–2008. The study of collecting was focused on the study of the collection. Collectible Tangible Assets are those that directly are not related to the evolution of the Financial Market. Numismatic Assets belongs to Collectible Tangible Assets. These assets have been studying in USA since the eighties (Berman & Schulman, 1986; Brown 2005; Dickie et al., 1994; Lombra, 2003; Salomon Jr. & Lennox, 1984), although Sharpe had talked about his virtues in 1963. Important researches were made in Spain in the nineties (Coca 1998, 2001), and actually (Prado et al., 2007; Prado, 2009).

However, the rigorous approach of the coin dates back to 1920 when Borghesi established canons of discipline coins from a scientific standpoint, what could be interpreted as a starting point. It wasn't, and there are few studies of numismatics as asset investment, although studies of Berman and Schulman (1986); Dickie et al (1994); Lombra (2004); Brown (2005) constitute a stimulus for numismatic research, because this brings information and therefore more transparent to international numismatic market, by classifying and then determining the factors that influence the valuation of assets in gold coin, and comparing the U.S. market with the European market, represented by Spain, France and Britain. It's estimated that one third of U.S. and Europe people "collects something, and that approximately 30 % of the world population is defined as" collector ". Empirical studies carried out by numismatic companies consider it real. In Spain 20 % of the population is considered "collector" (Blanco, 2009).

We could therefore say that the market for goods collection serves as a link between bidders' investors/collectors and demanding collectors / investors. Its features would be: global, consolidated, mature, open and liquid market. As additional data we demonstrate that sales split up between galleries and auction houses by an international point of view (about 52 % and 48 % respectively) (McAndrew, 2008). This market had a turnover of 43,3 billion € in 2006, with 32,1 million € of transactions in 2006. Special mention must be made on the goods market worldwide collection, where United States holds 46 % of the share, followed by Britain with 27 % and France with 6,4 %. In this decade China, India and Russia represent new markets, being the first one the country with the highest growth trajectory, reaching a share of 5 % (2003–2006), going ahead to Germany (2,3 %) and Switzerland, and ranking the fourth place worldwide quota. In another order in the European art market, it's estimated that the number of direct and indirect job exceeded 220,500 units, also playing a significant role in promoting cultural tourism.

The main objective of this analysis is to explain the relationship between the price of gold and a number of variables: issuing country, numismatic asset type, face value, purity of gold, gold weight, scarcity, measured by circulation and quality of the piece. This will serve to deepen and explain the formation of asset price numismatic gold and thus we know the determinants of the valuation of gold coins. Therefore, we are going to build a regression model prediction. Other objectives are to conduct a study of the current state of asset numismatic valuation, especially numismatic gold assets.

2. Investment in collectible tangible asset

Investments in non-financial assets consist of all those assets, whose performance is not directly related to the evolution of financial markets, understanding as financial markets money markets, fixed income and equities. These investments will have a non traditional management, a low correlation with traditional asset management and high Sharpe ratio, leading to high returns and low volatility (BME et al., 2007). As their main aim they try to reduce the correlation between different financial markets. If we introduce an investment portfolio will have the functions of risk diversification and to obtain returns in absolute terms.

The specific characteristics of a good library collection or assets are: 1) tangibility; 2) Value-shelter; 3) Universality of markets; 4) Accessibility; 5) Revaluation; 6) Pension savings (Coca, 1998, 2001). Apart from these six common characteristics, should include collecting and profitability of enjoyment, since these collected goods provide a return other (different) than economic, which is difficult to assess and is the collector himself best able to assess it. From the standpoint of investment, asset collection, like any other asset, have the profitability like mean features, risk and liquidity. This one is the main problem of these assets. Although there are numerous avenues for marketing, conversion is not immediate cash, and will depend on the status of its local market at the time of sale. Besides these three are two more that are used as constraints when it comes to investing: time horizon and product tax. The time horizon of investment in tangible collection assets is mainly medium to long term (Salomon Jr. & Lennox, 1984; Berman & Schulman, 1986; Coca, 1998, 2001; Mei & Moses, 2002; Lombra, 2003; Lopez & Hurtado, 2008).

The international numismatic market is an active and well organized market, claim supported by the analysis of national and international catalogs of auction houses, associations and studies, such as Dickie et al. (1994), Brown (2005), with the latter, who used data of American Numismatic Association, determines that the numismatic market has a turnover, excluding silver and gold bullions, exceeding $ 40 billion. In the same vein and for the U.S. market, it was estimated that annual sales in a market as specific as the numismatic market historical U.S. currency, are around $ 5 billion (Siconolfi, 1990; Dickie et al., 1994 & the Coin World Inc., 2003).

Numismatic assets consist of historical coins, which are those that have been or are in circulation, such as the Roman denarius, the peseta, the U.S. dollar, etc... Commemorative coins, that a Government issued

to commemorate an event, minted in precious metals and short runs; and bullions coins, those coins minted in precious metals (gold, silver, platinum, and palladium) whose price is set by the coinage metal, plus a premium between 3 % and 6 % on the price of them.

3. Sample description and methodology

The variables used for the determinants (factors) analysis in the valuation of numismatic assets gold are of two types, independent and dependent variables. The dependent variable, an endogenous variable, has to be explained, and the independent variables are those that explain the dependent variable. These are:

Dependent Variable: Market Value (Price): market worth is an estimate of the sale price. Market value converted to € of different numismatic assets. The conversion is performed at first day of September previous each of the selected catalogs.

The independent variables were chosen from a references review which includes features that greatly influence the market value of a numismatic asset, these are: Issuing Country (country): It indicates the issuing country of different numismatic gold assets. We have chosen the United States (U.S. market), Spain, Britain and France (representative on the European market). The type of numismatic asset: commemorative and bullion coins. Face Value: The face value of each asset in Euro coin. Gold Purity: It indicates the purity of coinage metal, gold. Weight in Ounces: The weight in ounce of gold, which keeps active numismatic. Shortage, a latent variable, is measured by the antiquity and the circulation of a numismatic active. Logically, being equal things, than older the numismatic asset, as lesser available in the market and also their conservation will be more difficult in time. Old: Difference between the year of issuance of the numismatic asset and the year of publication of numismatic catalog, Standard Catalogue of World Coin. Print run: The number of numismatic assets issued by a country. The circulation is closely related to the availability of this market, in general, lower (higher) spin, higher (lower) value. Quality: The quality of each numismatic asset. It has a direct effect on market value, generally higher quality and higher price. The main difficulty encountered in this area is the standardization in different countries that's excessively qualitative. Revaluation: This variable indicates a revaluation, both positive and negative, of a gold numismatic active. Calculated annually for the entire sample, by means of the expression:

The hypothesis, compared with our model, refers to each of the variables selected for the study, i.e. the explanatory variables. We want to show if they are determining factors in the numismatic value, identify their influence and in which group.

We want to demonstrate that the selected variables are determining factors in the valuation of gold coins and their degree of influence. The hypotheses we want to contrast with our model are:

Hypothesis 1: The issuing country, a decisive factor in the valuation of assets in gold coin.
Hypothesis 2: The type of numismatic asset, a decisive factor in the valuation of assets in gold coin.
Hypothesis 3: The face value, a decisive factor in the valuation of assets in gold coin.
Hypothesis 4: The weight of gold, a decisive factor in the valuation of assets in gold coin.
Hypothesis 5: The purity of gold, a determinant factor in the valuation of assets in gold coin.
Hypothesis 6: Antiquity, a determinant factor in the valuation of assets in gold coin.
Hypothesis 7: The circulation, a decisive factor in the valuation of assets in gold coin.
Hypothesis 8: Quality, a determinant factor in the valuation of assets in gold coin.
Hypothesis 9: The revaluation is a factor in the valuation of assets in gold coin.

The sample used for the investigation consists of gold commemorative and bullion coins issued by the U.S., Spain, Britain and France from 1900 to 2007. Sample between 2003 and 2008 consists of 2575 numismatic assets for each of the years from their issuance, divided as follows: U.S. 1479 active numismatic gold coin, Europe 1096, corresponding to 607 from France, 407 from Britain and 82 from Spain. We conducted our study for 2003–2008, meaning that it is an extended period.

The catalog used is the Standard Catalogue of World Coin. This catalog is published in the U.S. and is accepted by collectors and numismatic experts. The years selected for the study were 2003, 2004, 2005, 2006, 2007 & 2008, for the four sample countries, Spain, France, Britain and the United States. The prices of the various numismatic assets are annual and correspond to different years of publication of the catalog.

The selected methodology is used to explain the influence of X variables on Y variables, determining the relationship between variables. We build a multiple linear regression model that will help us to predict. The regression analysis is statistical procedures used to fit (adjust) equations to data. Graphically, lines, curves or planes comply with the data. To perform this analysis we used a Multiple Linear Regression.

The usefulness of regression models in the valuation of assets of collection is limited because although these regression models are clearly superior to other methods such as appraisal and valuation methods based on the capitalization or in the comparison, the explanatory power in the field of Numismatics is limited because there are some aspects difficult to quantify. However, the methodology of the decline is the most powerful in addressing the development of rigorous standards in this field.

The interdependence between the explanatory variables is difficult to establish empirically the contribution of these variables to the observed variation in the value of a coin. The problem arises when selecting the ex-

planatory variables in multiple linear regression analysis. Some variables provide redundant information, and therefore its calculation is dispensable. Therefore, the use of regression analysis in the valuation of currencies should take into account the problem of selection of independent variables under two conditions: to increase the coefficient of determination and reduce the correlation between explanatory variables. In our case the variables are not highly correlated with each other. We use STATA 10 statistic programme.

4. Empirical research

To perform an empirical analysis, numismatic assets as investment assets can't be studied as a joint, but it must be analyzed in an individual way. We performed the analysis for the following group: All those numismatic gold assets, compound bullions and commemorative coin issued by the U.S., Spain, Britain and France from 1900 to 2007 for the period 2003–2008. The Model used for the group:

$$Log(price_i) = \beta_0 + \beta_1(revn_{1,i}) + \beta_2(country_{2,i}) + \beta_3(\tan_{3,i}) + \beta_4(vf_{4,i}) + \beta_5(puoro_{5,i}) +$$

$$+ \beta_6(peoz_{6,i}) + \beta_7(ant_{7,i}) + \beta_8(tir_{8,i}) + \beta_9(cal_{9,i}) + u_i$$

Figure 1. Multiple Linear Regression Model

Results for Group: commemorative coins and gold bullions issued by the U.S., Britain, France and Spain from 1900 to 2007. We conclude that the issuing country variables, asset class numismatic, face value, purity of gold, gold weight, circulation, age and quality are significant and influence the gold numismatic asset price (see table below). Only revaluation is not influence variable in the gold numismatic asset price. As the weight in ounces the most influential variable in the asset price numismatic gold.

T a b l e 1

Gold commemorative and bullion variables, influence on the price

Variable \ Year	Influence				
	2004	2005	2006	2007	2008
Country	+	+	+	+	+
Type asset	–	–	–	–	–
Face value	+	+	+	+	+
Pure gold	–	–	–	–	–
Oz. Weight cirkulation	+	+	+	+	+
Antiquity	+	+	+	+	+
Quality	–	–	–	–	–
Revaluation	+	–			

These variables explain about 50 %, being smaller of 45,17 % and the greater one of 51,76 %, the price of an asset numismatic gold. (See table below). Also note that the determination coefficient increased from 2004 to 2008, has been increasing.

T a b l e 2

Comparative R^2 2004–2008 group

Year	R-squared, %
2004	45,17
2005	46,24
2006	46,75
2007	49,01
2008	51,76

5. Conclusion, limitations and future research

We have developed a thorough analysis of the determinants of numismatic gold assets for the group. The survey is annual and study period is from 2003 to 2008.

The decisive factors in the numismatic value for Group: all those numismatic gold assets, composing by bullions and commemorative coins issued by the U.S., Spain, Britain and France from 1900 to 2007 for the period 2003–2008, are: (a) The country of issuance, (b) Type of numismatic active, (c) The Face Value, (d) Purity of gold, (e) weight in ounces, (f) age, (g) circulation and (h) Quality. Regarding the explanation of these variables in the valuation of gold coins we emphasize that explain about 50 % for the years studied.

As limitations we point out that the four study countries represent over 80 % share in the goods market worldwide collection. It would be necessary to include any country in Asia (eg. China, which today represent 5 %) to have a global overview of this market. Finally, we could increase the study of coins bullions to other precious metals.

As future research, following conclusions we reached in this paper, we propose new frameworks of such assets, to reduce volatility of investment portfolio or increasing performance of these portfolios. We also propose a review of policy issues of European currencies.

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Камило Прадо Роман – Ph.D., доцент факультета социальных наук и права университета им. Короля Хуана Карлоса (Мадрид). camilo.prado.roman@urjc.es.

Хосе Луис Кока Перез – Ph.D., доцент факультета бизнеса и туризма университета Экстремадура. jlcocap@hotmail.com.

Мигэль Прадо Роман – ассистент факультета социальных наук и права университета им. Короля Хуана Карлоса (Мадрид). miguel.prado@urjc.es.