

# Testing Germán Bernácer origins of interest hypothesis.

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## **Abstract**

Germán Bernácer, a Spanish economist of the early 20th century, proposed in his 1925 book *Interés del capital. El problema de sus orígenes* that the interest rate's origin is external to the regular functioning of the economic system. He attributed it to the income generated by "income goods." This study examines the plausibility of Bernácer's hypothesis using up-to-date data from the Spanish economy.

**Keywords:** Germán Bernácer, interest rate, origin, rent, income.

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## Introduction

Germán Bernácer (1883-1965), born in Alicante, is widely acknowledged as one of the most prominent Spanish economists in history (Velarde-Fuertes, 1984). Embarking on a research career in Alicante, a peripheral location in a peripheral country at the time, presented its challenges. It was far removed from the epicenters where influential economic theories flourished, such as the Austrian School and the dominant Anglo-Saxon economic science. Nevertheless, Bernácer's unwavering passion for theoretical economics made him a remarkable figure. His ideas not only coexisted but also intersected with those of renowned economists of his era, including Wicksell, Schumpeter, and Keynes (Perles & Sevilla, 2023).

Bernácer's intellectual development unfolded amidst a tumultuous half-century marked by significant events. This era encompassed the devastating Spanish Flu pandemic in 1918, the economic crisis of 1929, which subsequently triggered the Great Depression of the 1930s, and the upheavals of two World Wars. The parallels between the Crisis of 1929 and the 2008 Financial and Global Economic Crisis, as well as the resemblances between the Spanish Flu and the recent COVID-19 pandemic, are strikingly evident. These resemblances highlight the enduring relevance of Bernácer's insights, showcasing the profound connection between the world he experienced and our present reality.

In this context, even taking into account all the progress made and the great differences that marked the social and economic reality of both periods, it is legitimate to wonder about the degree of ageing of Bernácer's ideas, and whether there is in his work any teaching or useful element applicable to the current situation.

Bernácer was an economist bridging the gap between classical tradition and modern macroeconomics. Like classics, Bernácer was a faithful defender of market freedom, believed in the natural laws of the economy and had reminiscences of the Ricardian theory of labor value and the Law of differential rent (Perles & Sevilla, 2023).

However, it would be incorrect to label Bernácer as a classical economist. He diverged from classical theories by disregarding the distinction between value and price, a source of confusion for classical economists. Instead, he employed a comprehensive understanding of supply and demand curves to determine prices, wages, and interest rates. He also recognized the significance of marginal analysis, as introduced by Jevons, in this framework. Nevertheless, Bernácer's most significant departure from classical economics was his outright rejection of Say's Law, a fundamental principle underlying the classical notion of automatic equilibrium.

Economics as a science as experienced huge theoretical and methodological advances of all kinds. The existence of large databases, Big Data and the possibilities offered by the computing power facilitated by the use of computers have taken economic science to

heights unimaginable for these pioneering economists. However, despite these advances, today's economists continue to make explanations and predictions about economic events (in many cases, about the same problems or phenomena that those same precursors as Bernácer addressed) that stubborn reality constantly refutes. The most recent and palpable example of this fact is, without a doubt, the last Global Economic and Financial Crisis of 2018, which was neither anticipated theoretically nor prevented in practice (indeed, it was surely aggravated) by any corrective measure proposed ex-ante by economists.

For this reason, it is always a stimulating exercise to revisit the ideas of the classics and evaluate them in light of the data and tools currently available to economists. This is precisely what is done in the present article. This paper aims to assess the plausibility of Bernácer's hypothesis regarding the exogenous origin of the interest rate using current data for the Spanish economy. To achieve this, the study employs time series analysis techniques and examines the evolution of the interest rate, agricultural land prices, and urban real estate prices from 1983 to the present. To the authors' knowledge, this is the first time that an empirical test of this hypothesis has been attempted, which is the main novelty of this article.

The structure of the article is as follows. In the following section we review the monetary thought of Germán Bernácer and describe his hypothesis on the exogenous origin of the interest rate. The third section describes the methodology. In a fourth section the data are explained and the econometric analysis is carried out. Finally, the main conclusions are presented.

## **Literature review.**

### ***The Bernácer's monetary thinking***

Germán Bernácer establishes his hypothesis on the origin of the interest rate in his 1925 work "El Interés del Capital: el problema de sus orígenes" (The Interest of Capital: the problem of its origins).

Halfway between his seminal work of 1916, *Society and Happiness, A Social Mechanics Essay* (Sociedad y Felicidad. Ensayo de Mecánica Social) and his definitive work of 1955, *A Free Economy Without Crisis and Unemployment* (Una economía libre sin crisis y sin paro), in this book written in 1925 Bernácer develops a novel approach to the origin and determination of interest, outside the system of production. This theoretical construction would later be complemented in his 1945 work, *The Functional Doctrine of Money* (La doctrina funcional del dinero) (Bernácer, 1945; Martínez-García & Martínez-García, 2009).

Bernácer, like his predecessors and as understood today, viewed the financial market as the counterpart to the process of production and consumption in the market for goods and services, which he referred to as the ordinary market (Villacís, 2012; Villacís, 2021). Just as economists do now, he clearly distinguished between the real and financial economy. However, Bernácer's ideas held certain peculiarities when compared to his contemporaries.

In his comprehensive statement from 1955, it becomes apparent that Bernácer's distinctive perspective rested on the belief that the production and consumption processes

inherent in the real economy generate a national income or gross income that can be distributed into three parts. The first part is consumed, circulating back into the production-consumption cycle characteristic of the real economy. The second part is invested in real capital, denoting productive investments made by entrepreneurs, which similarly reverts to the real economy as an augmentation or preservation of productive capacity. Lastly, Bernácer conceptualized a third part as "saving which is neither consumed nor capitalized" (Bernácer, 1955:88) and which forms a fund of "availabilities" which "always exists floating in the market and constitutes the basis of the financial market" (Bernácer, 1955:88).

The "availabilities," which neither undergo consumption nor capitalization, along with the newly created money by monetary authorities, embody the true innovation and distinctive aspect of Bernácer's ideas. This sets him apart from Keynes, who recognized only two fractions of income, as anything not consumed was considered as savings and subsequently capitalized. Additionally, this third part represents a progression in Bernácer's thinking, as in 1925 he, like Keynes, acknowledged two portions of income: one allocated to consumption and the other saved.

In his own words, *"we must distinguish within the money fund two different portions: that which revolves within the consumption-production cycle, and that which, subtracted from that cycle by savings, forms a separate mass of money apt to be used for any rent-seeking purpose, among others, capitalization itself, industrial or productive employment (...) as availability, only that part of savings subsists precisely which preserves its potential form, being used only in speculations, in land exchanges, for rental values, in simple changes of domains of things, which do not involve production or consumption"* (Bernácer, 1925:80-81). Or, as he points out further on, *"with circulating money we can form at any moment two perfectly defined and distinct masses: one is that of money destined for the purchase of products of consumption or use; the other, that of money which has been the object of an act of saving and constitutes an accumulation which is not intended for the time being to be used for expenditure. The first forms the production-consumption fund, since it circulates from consumers to producers, and vice versa, feeding production and maintaining the price of current products. The second forms the speculative fund which demands the articles of income feeds speculation satisfies requests for loans, and contributes to the formation of new capital required by industry; this speculative or available fund is what fixes and maintains the price of income values and therefore the interest of money in its various uses"* (Bernácer, 1925:122-123).

These "availabilities" are at the core of Bernácer's explanation of economic imbalances, boom and bust cycles, and the existence of forced unemployment. Thus, while the first two fractions of income (that consumed and that reinvested in productive capacity) *"flow continuously from the activity of labour to satisfy the needs of individuals and industry"* (Bernácer, 1955:78); the third part is diverted to the financial market where it *"traffics in accumulated wealth or representative signs of wealth that do not come from production or, at least, from current production"* (Bernácer, 1955:78).

Therefore, it is this portion of income, which is detracted from the productive process to speculate with goods that *"produce an income without work"* or *"signs of accumulated wealth"*, which prevents long-term adjustment in the real economy and the existence of

involuntary unemployment. This situation was conceived and admitted by Keynes as "equilibrium with forced unemployment". But for Bernácer it was a situation that "*is repugnant to common sense because the existence of unemployment itself is the most pronounced symptom of disequilibrium*" (Bernácer, 1955:157).

In their own words "*the scarcity of financial funds, of availabilities, arises from the fact that savings are distracted from their natural use and are partly diverted in the rent-seeking occupation, in such a way that a sufficient scarcity of resources is maintained in the productive applications (...) in this way it happens that the removal from the product market of a part of the monetary funds which have been born from it and which have given value to the product, prevents the production from being repurchased for its remunerative price, and from there is engendered the usual state of depression of the market, which is the cause of overproduction, unemployment, depression of wages, misery and the most acute forms of the social problem*" (Bernácer, 1925:194-195).

In Bernácer's thinking, the crucial element in the financial market that triggers imbalances is interest, since the higher the interest rate, the greater the demand for "rents" and vice versa. Specifically, Bernácer considers that in this market the price "*of the things that provide an income and, therefore, the interest rate or rates, one of the most fundamental and obscure problems of economic mechanics even today, are fixed*" (Bernácer, 1955:167). The existing interconnection between the financial market and the real economy, through the interest rate and the competition between productive and speculative investments, is explained by pointing out that "*the installation of fixed capital determines the scarcity of financial capital, which depresses the demand and price of securities and farms and raises the interest rate (...) on the other hand, savings do not have the effect of increasing the interest rate (...). on the contrary, savings not followed by an investment of the money that forms it increases the available fund, which contributes to sustain the quotations of income goods and to keep the interest rate low, which is favourable for production, but has the serious disadvantage that it subtracts money from the productive process (...)*" (Bernácer, 1955:181-182).

The competition between the real and financial economy, mediated by interest rates, operates in both the upward and downward phases of the economic cycle. He emphasizes that money is not limitless. Towards the end of an upward phase, a scarcity of funds leads to an increase in the interest rate. This favours investments in the speculative market while discouraging productive investments, resulting in unsold surplus production that triggers the downturn. On the other hand, even during the lowest point of the cycle, despite the interest rate being low, it typically exceeds the profitability of productive investments, which may be zero or negative. This acts as a hindrance to recovery, which only transpires when certain phenomena (such as wars, poor harvests, or calamities) cause prices to rise. The subsequent increase in prices restores the profitability of productive investments, stimulating their revival and initiating a new phase of growth.

In this context, Bernácer suggested that the State could promote demand recovery through fiscal policy. This entails increasing spending and investment, which can contribute to the recovery of prices and the profitability of productive investments. Additionally, investments stemming from technological disruptions, such as railroads, electricity, and internal combustion engines, can also foster economic revival. However, Bernácer

expressed skepticism about the effectiveness of monetary policy in reactivating a depressed economic cycle. He believes that supplying funds at low interest rates is futile and may only inflate security prices without stimulating the productive economy. According to Bernacer, the key to stimulating production lies in demand, but those who possess the needs for this demand have lost the means to exercise it effectively (Bernacer, 1955:187). This idea aligns him more closely with Keynes than with the classical economists.

However, Bernácer's quest for a comprehensive understanding of the interest rate extends beyond its role in economic cycles. In his 1925 work, he goes further to explore the fundamental origin of the interest rate, driven by a deep desire to unravel the phenomenon's essence.

### ***The origin of capital***

In his 1925 book, *Interest on capital. The problem of its origins* (Interés del capital. El problema de sus orígenes), Bernácer tries to justify, ultimately, the existence of an interest rate. According to him, this was a problem to which economists had been turning for a century and a half with unsatisfactory explanations and Bernácer approaches the question of interest for practical and moral reasons.

After examining the explanations in force at the time, which attributed the interest rate an endogenous origin to the monetary process, Bernácer concludes that all of them are unsatisfactory and give the origin of interest an exogenous character. Thus, he says, "*interest, then, is a phenomenon that comes from outside the industry; it is not an autochthonous fact*" (Bernácer, 1955:218).

In his 1925 work, Bernácer examines two explanations for the interest rate: the refined theory of saving hardship by Böhm-Bawerk on the supply side, and the productivist theory of capital on the demand side. Thirty years later, he introduces two additional explanations: Keynes' liquidity preference on the supply side and Schumpeter's technological progress and creation of temporary monopolies on the demand side. Despite considering all these explanations, including the original and added ones, Bernácer finds them unsatisfactory.

From a supply-side perspective the theory of the hardship of saving seeks to justify the existence of an interest rate by highlighting the sacrifice made by economic agents who forego present consumption for future consumption. In this context, the interest rate serves as a reward for their patience. For its part, the theory of liquidity preference establishes that money is the most liquid asset that exists, it can be exchanged at any time for another good or service and is therefore the asset preferred by economic agents. The interest rate is justified here by the fact of giving up this liquid money. But, according to Bernácer, these theories could justify a lack of supply of capital and the consequent rise in market interest rates. But in no way would they justify the very existence of interest.

From a demand side of the capital, the prevailing theories justifying the payment of interest were the productivity of capital as a productive factor and the existence of temporary monopolies generated by technical progress (Schumpeter). However, Bernácer said that: "*Neither of capital in general nor of some special forms of capital, for example, of natural capitals (cultivation of the soil, cattle breeding, etc.), in which nature*

*collaborates with the man (theory sustained by the American Henry George), nor of the special advantages of the new capitals (Schumpeter, F. Baños), nor of the prolongation of the period of production that the use of capital allows (Hayek, Mises, etc.), nor of the various subtleties invented to reconcile the productivist theory of interest with the theory of value, is sufficient reason to accept the existence of a surplus, causes of interest" (Bernácer, 1955:215).*

Consequently, if interest exists (as it does), and it is neither generated nor justified within the productive system, its origin must be sought outside it. Bernácer's explanation begins by considering the individual process of saving and the social function of capitalization as an intergenerational process. What is saved by one generation is invested and capitalized, generating benefits and surpluses in the long term, the usefulness of which is extended to subsequent generations. When at the end of his stage or period of work, the original saver claims his right to consume the money saved, it is the financial system that allows him to enjoy the result of his past effort, channelling towards him a new surplus and savings generated by the present generation, since *"what they do, then, is to deliver part of their surplus income in exchange for the capital in good use that they received"* (Bernácer, 1955:223). In this mechanism, interest has no place, since *"saving is a useful and convenient act, whether or not a premium is paid for the use of money"* (Bernácer, 1955:223).

After failing to find its origin in savings, he then examines the process of financial speculation. But neither does he find there the origin or justification of interest, since he considers that *"interest, as a result of speculation, just as a result of production, is a mere confusion of cause and effect"* (Bernácer, 1955:226).

In his final analysis, Bernácer identifies the origin of interest in the investment of money in income-generating assets, which he refers to as *"income-producing goods"* (bienes de renta). In his definitive work of 1955, he asserts that the existence of capital interest can only be explained if there is a means by which capital can be invested, resulting in a special profit unrelated to labor or any real factor of production (Bernácer, 1955:226). Furthermore, he explains that if someone with liquid capital uses it to acquire assets such as farmland, rental properties, securities, or any other income-yielding asset, they will receive rent from that asset. By selling the asset at their convenience, they can recover their liquid capital, potentially with a gain or loss. However, in the long run, they can reasonably expect to preserve their capital and earn a profit, which represents a gain without penalty (Bernácer, 1955:226).

Originating in this way, interest is generalized to the whole economic system since no one will be willing to lend, invest or speculate with any money unless in exchange for a remuneration (interest) equal to or higher than that which he would obtain in this use. Saving thus loses its original social function and is *"converted into the object of a particular speculation"* (Bernácer, 1955:227).

The idea was considered early on by Bernácer, since it appeared in his original work of 1916, and was reproduced in 1925 as follows: *"wealth lent for the use of others accrues an interest or benefit in favour of its owner, equivalent to that which he would obtain by using it to buy land: "(...) the land that produces income has for the owner a value superior to that of any other merchandise, since it allows the acquisition of wealth without*

*spending work in its production, which does not occur originally with any of the things that can be acquired in exchange (...)" (Bernácer, 1925:90). And in 1925, the idea matured in the following terms: "And it is precisely from this fact that allows the holders of savings to procure a perpetual income that interest is engendered since because of it money is neither lent nor yielded to industry but employing the equivalent income (...) farms are considered as the most healthy goods because, besides giving an interest, their value does not diminish; on the contrary, it usually increases, with which the owner finds himself, apart from the income, with a sometimes very substantial profit" (Bernácer, 1925:114).*

Bernácer himself recognized that this idea made him a successor of the French physiocrats, especially Turgot. However, the main difference between the physiocrats and Bernácer is that, while the former only recognized agricultural land as a rent-generating good, susceptible to originating interest; Bernácer, a century and a half later, generalized the idea to all goods that generate rent and are saleable, *"such as agricultural or urban land, mines, forests, hunting grounds, private fisheries and all fixed-income securities"*. (Bernácer, 1925:120).

Moreover, as was logical for a researcher who developed his work in a period of high price instability, Bernácer was fully aware that the relevant interest rate considered by economic agents is what we now call the real interest rate. In other words, the interest rate discounted for inflation (Bernácer, 1925:159).

Having identified the origin of interest, and having attributed to its existence the main obstacle to achieving economic equilibrium, Bernácer's solution to solve the economic problems was neither nationalization nor the expropriation of these lands and rented goods from their owners, since he considered this to be unjust and ineffective, but the introduction of limits to the right to private property, preventing their sale on the free market and giving the State the role of monopsonist (the only potential buyer of these goods). In other words, his solution consisted in eliminating the fixed-income market, since he understood that this was the only way to avoid speculation with these goods, a real impediment for financial capital to flow back into the real economy to promote production, consumption and employment. Again, in his own words, *"if the suppression were to affect at the same time the sectors of shares, bonds and estates, since the available savings would then have no other possibility of investment than new loans, a relatively limited sector, there would be an increasing fall in the interest rate, since the limiting ceiling would cease to exist, of the fall in the fixed income segment; interest would fall without limit until it was practically at zero"* (Bernácer, 1955:321).

Bernácer considered the elimination of the fixed-income market as the most favorable course of action, expressing skepticism towards other suggested measures aimed at reducing or eliminating the interest rate. Additionally, he proposed several complementary actions to enhance the economic situation. These included minimizing the use of cash and promoting the use of bank accounts to facilitate monetary and economic control by monitoring balances and their allocation among various agents. Bernácer advocated for injecting new money to finance the working capital of companies and industries. He also emphasized the importance of dismantling fixed exchange systems, particularly the Gold Standard, which exacerbated and transmitted crises across



nations. Lastly, Bernácer championed the removal of trade barriers and the establishment of economic integration areas, highlighting that such integration did not necessarily require political integration.

Therefore, Bernácer's thinking can be summarized as that the interest rate represents an obstacle to productive efficiency, and insofar as it imposes a minimum limit on the profitability of productive uses. Therefore, as a solution, *"the disappearance of interest - meaning the spontaneous disappearance due to the suppression of the cause that generates it, not the legal prohibition - does not involve any harmful consequence"* (Bernácer, 1925:210). This interest has its origin in the existence of fixed income-producing goods susceptible to commercialization. The elimination of the latter market would solve the problems, since *"it is enough to prevent the onerous transferability of these goods, which is perfectly feasible, for the profit of capital to be extirpated at the root"* (Bernácer, 1925:212). With the elimination of interest, inefficiencies and fluctuations or economic cycles would also disappear.

### ***The current context***

How has the Bernácer thinking aged over time and what lessons can we draw from his research?

These questions are not easy to answer, since almost a hundred years of evolution separate the two worlds, with abysmal differences of all kinds. Undoubtedly, the main difference between the two periods is the degree of economic globalization achieved during these years (Perles & Sevilla, 2023). Although the globalization of the economy was not a new phenomenon in Bernácer's time, since the embers of the vast colonial empires were still smouldering and the conquests of new territories were culminating, the existence of regulations, monopolies and barriers of all kinds prevented the true advantages derived from it from being exploited. And it was precisely in this lack of economic freedoms that we can find part of the causes of the wars that devastated Europe at the beginning of the century.

A second important difference, related to the previous one, and also glimpsed in his time by Bernácer, is represented by the consolidation of economic integration processes and the emergence of various trade blocs (NAFTA, ASEAN, etc.). In the European context, integration crystallized in the implementation of the current European Union. In the latter case, as Bernácer had anticipated, after a turbulent first half of the 20th century, including two world wars, the launch of the Coal and Steel Economic Community in 1951 and the European Economic Community in 1957 inaugurated the greatest period of prosperity and peace the continent had ever known.

A third difference concerning Bernácer's time is to be found in the development of all kinds of technologies, especially information and communication technologies. The Internet, the true disruption of our time, has brought about a new industrial revolution which, together with financial deregulation and the interconnection of markets, has led to a development of financial markets that would dazzle our author. The reader can imagine how perplexed Bernácer - who held financial speculation, the source of all evil, in such low esteem - would be to observe what the financial markets have become today: a colossal global casino.

Ultimately, we would have disparities caused by the considerable advances in economic science itself with new tools and databases. However, as we saw at the beginning, in addition to the differences, there are also some similarities. Specifically, economic crises continue to be recurrent today, as they were in Bernácer's time. Likewise, the COVID-19 appeared at the end of 2019 has been no recent parallel, except for the Spanish Flu pandemic of 1918, also contemporary to Bernácer. Apart from crises and pandemics, there are also similarities between Bernácer's times and the present in the most relevant economic problems that attract the attention of economists. The most important of these are unemployment and its persistence and inflation.

Therefore, there are similarities and discrepancies between the two periods. For this reason it is worth evaluating the adaptation of Bernácer's ideas to the current era.

## Methodology

One potential strategy for testing the relationship hypothesized by Bernácer in 1925 between the interest rate and its origin in income from exogenous wealth goods is to model the relationship as follows

$$interest = f(rent)$$

where *rent* is the explanatory variable and the interest *rate* the variable to be explained.

The simplest formulation of this possible relationship would be the estimation of a linear model of the type

$$interest = \alpha + \beta rent + \mu$$

being  $\mu$  an i.i.d. white noise. Rejecting the hypothesis  $H_0: \beta = 0$  versus  $H_1: \beta \neq 0$  would suggest that Bernácer's theory could be plausible.

However, the above model is excessively simple, since it would serve to assess the relationship in a static context or, as the case may be, only in the long term. Therefore, in this paper, time series analysis techniques are used to explore the relationship between the involved variables. Specifically, Autoregressive Distributed Lag Models (ARDL) that allows modelling the dynamics of the long-term and short-term relationship and Granger non-causality testing procedure advocated by Toda and Yamamoto (1995) is used.

According to Saayman & Saayman (2015) an ARDL model takes the following form:

$$y_t = \alpha_0 + \sum_{i=1}^p \alpha_i y_{t-i} + \sum_{j=0}^n \beta_j x_{t-j} + \mu_t \text{ Equation 1}$$

Where  $y_t$  is the dependent variable,  $x_t$  a vector of independent variables and  $\mu_t$  is an i.i.d. white noise error term.

This model allows for dynamic regressors for both static and fixed ones when explanatory variable. To determine lag lengths, common selection procedures are available and since an ARDL model can be estimated via least squares regression, standard information criteria (AIC, BIC, etc.) may be used for model selection.

The bound test of Pesaran, Shin and Smith (2001) is based on an ARDL specification with an error correction component of the following form:

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta y_{t-1} + \sum_{j=0}^n \beta_j \Delta x_{t-j} + \rho z_{t-1} + \mu_t \quad \text{Equation 2}$$

where  $z_t$  is a (kx1)-vector of all the variables in the model and  $\rho$  a (1xk)-vector of coefficients. Testing for the existence of level relationships is then simply a test of

$$\rho_1 = \rho_2 = \dots = \rho_k = 0$$

The test statistic based on equation 2 has a different distribution under the null hypothesis (of no level relationships), depending on whether the regressors are all I(0) or all I(1). Furthermore, in both cases the distribution is non-standard. Pesaran, Shin and Smith provide critical values for the cases where all regressors are I(0) and the cases where all regressors are I(1) and suggest using these critical values as bounds for the more typical cases where the regressors are a mixture of I(0) and I(1).

For the ARDL estimations interest rate would be taken in log-levels but rent is considered in first difference of the natural logarithm.

On the other hand, the Toda and Yamamoto (1995) procedure is based on an augmented vector autoregression (VAR) model in the levels of the data. After determining the optimal lags, some extra lags into each of the equations are included to conduct an inference asymptotic analysis performing a standard Wald test on the first p lags (not the extra lags). The Wald test statistics will be asymptotically chi-square distributed with p degrees of freedom, under the null hypothesis. So, rejection of the null hypothesis will imply a rejection of Granger non-causality.

This procedure has several advantages. First, it is useful when a mix of I(0) or I(1) or other possible combinations of series are found. Second, the procedure can be applied when all variables are I(1) regardless of whether they are cointegrated or not. Third, normality is not required because the whole procedure relies on asymptotic properties. Finally, structural breaks can be accommodated by using dummy variables such as exogenous regressors.

It should be borne in mind that the procedure described serves to establish the predictive capacity of both variables, but it does not detect true causality.

## **Data and results.**

### ***Farmland rent as the origin of interest?***

In this section, one of Bernácer's basic ideas, that the origin of interest lies in land rent, is examined empirically. Specifically, we analyze whether, for the recent evolution of Spain, farmland rent determines the evolution of the interest rate or vice versa. For this purpose, the procedure described above is used.

Land rent is approximated from the variable "land prices" available in the "Encuesta de los Precios de la Tierra" published by the Spanish Ministry of Agriculture, Fisheries and Food<sup>1</sup>. The variable considered is the natural logarithm of the real (constant prices) of the price of farmland. On the other hand, the real interest rate for the Spanish economy is constructed from the long-term interest rate for Spain (obtained from the OECD) from

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<sup>1</sup> <https://www.mapa.gob.es/es/estadistica/temas/estadisticas-agrarias/economia/encuesta-precios-tierra/>

which inflation is subtracted. The period of analysis is 1983-2021 and Figure 1 shows the evolution of both variables.

According to the ADF test with only a constant included, the natural logarithm of the land price variable appears to be stationary (test statistic:  $\tau_c(1) = -3.2201$ , asymptotic p-value 0.01888) for the period analyzed. However, the real interest rate (test statistic:  $\tau_c(1) = -1.14836$ , asymptotic p-value 0.6987) seems to be integrated of order 1  $I(1)$ . Therefore, an extra-lag is used for the described procedure. On the other hand, the optimum number of lags in the VAR according to most of the criteria in use is set at 2.

Figure 1: Real farmland price (in natural logs) and real interest rate (yearly data 1983-2021).



The estimated VAR is shown in Table 1 and the corresponding Wald causality test is displayed in Table 2. The results obtained point to the fact that with the data in hand, the direction of causality would go from the interest rate determining land prices or rent, and not vice versa. Thus, the result with current data would not, in principle, support Bernácer's theory for the case of farmland.

In light of this result, it is necessary to search for other incomes or rents as a possible origin of the interest rate.

Table 2: Estimated VAR for the natural log or real farmland price and real interest rate.

	Coef.	Std.Err.	z	P> z
LogrealPrice				
LogrealPrice				
L1.	1.59063	.1707902	9.31	0.000
L2.	-.8795371	.2752789	-3.20	0.001
Realinterest				
L1.	-.0041635	.004049	-1.03	0.304
L2.	-.0062121	.0046197	-1.34	0.179
L3lLogRealPrice	.0744346	.1555807	0.48	0.632
L3Realinterest	-.000568	.0047486	-0.12	0.905
_cons	1.995.46	.5560224	3.59	0.000
Realinterest				
LogrealPrice				
L1.	-1.464972	7.530427	-0.19	0.846
L2.	5.282135	12.13751	0.44	0.663
Realinterest				
L1.	.5476276	.1785268	3.07	0.002
L2.	.3074701	.2036895	1.51	0.131
L3lLogRealPrice	-1.572371	.6859818	-0.23	0.819
L3Realinterest	.2153443	.2093746	1.03	0.304
_cons	-21.02357	24.51597	-0.86	0.391

Table 2: Granger causality Wald tests.

Equation	Excluded	chi2	df	Prob>chi2
LogrealPrice	Realinterest	61.808	2	0.045
LogrealPrice	ALL	61.808	2	0.045
Realinterest	LogrealPrice	.56629	2	0.753
Realinterest	ALL	.56629	2	0.753

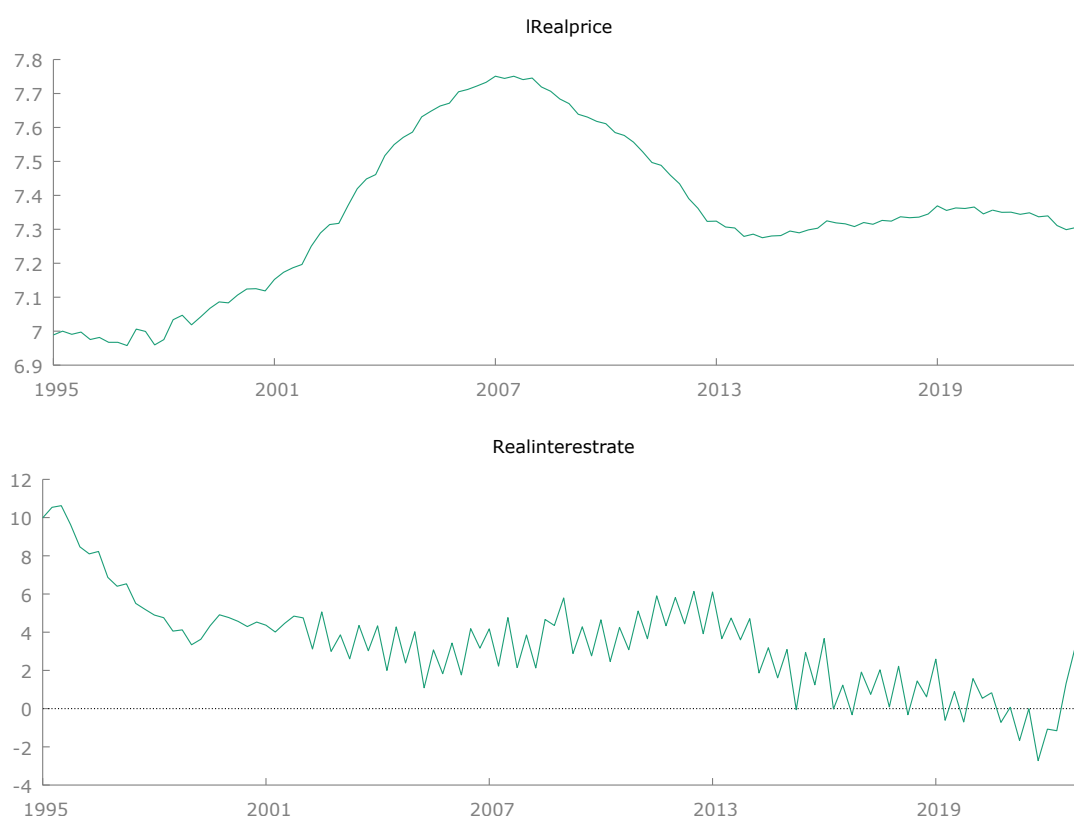
Having ruled out the possibility of causality from land rent to interest rate it is not worth exploring the possible dynamics of the relationship in the ARDL model for this case.

### ***Urban real estate rents as the origin of interest?***

As a more plausible alternative in the current economic environment, in which agriculture has a very reduced weight in the Spanish economy, the origin of income from urban real estate is tested.

Urban rent is approximated from the variable “urban prices” (valor tasado medio de la Vivienda libre in Eur/m<sup>2</sup>) provided by the Spanish Ministry of Transport, Mobility and Urban Agenda<sup>2</sup>. The variable considered is the natural logarithm of the real (constant prices) of the price of farmland. On the other hand, the real interest rate for the Spanish economy is constructed from the long-term interest rate for Spain (obtained from the OECD) from which inflation is subtracted. The period of analysis is 1995-2022 but the data are provided on a quarterly basis. Figure 2 shows the evolution of both variables.

Figure 2: Real urban prices (in natural logs) and real interest rate (Q1 1995-Q4 2022).



According to the ADF test with only a constant included, the natural logarithm of the urban price variable appears to be stationary (test statistic:  $\tau_c(1) = -39123$ , asymptotic p-value 0.001953) for the period analyzed. Likewise, the real interest rate (test statistic:

<sup>2</sup> <https://apps.fomento.gob.es/BoletinOnline2/?nivel=2&orden=35000000>

$\tau_c(1) = -3.15529$ , asymptotic p-value 0.02275) seems to be integrated of order 0  $I(0)$ . However, the KPSS test of stationarity reject the null hypothesis of stationarity for the real interest series (KPSS test 1.50633 p-value  $<.01$ ). Therefore, as in the case of the farmland rent an extra-lag is used for the described procedure.

On the other hand, the optimum number of lags in the VAR according to most of the criteria in use is set at 8.

The estimated VAR is shown in Table 3 and the corresponding Wald causality test is displayed in Table 4. The results obtained point to the fact that, with the data in hand and fixing the level of statistical significance at 10%, a two-way causality between the interest rate and urban prices or rent would be plausible. Thus, the result with current data would not reject Bernácer's idea for the case of urban rents.

Table 3: Estimated VAR for the natural log or real urban price and real interest rate.

	Coef.	Std.Err.	z	P> z
lRealprice				
lRealprice				
L1.	1.304945	.0993077	13.14	0.000
L2.	-.5915328	.1677634	-3.53	0.000
L3.	.4102285	.1767884	2.32	0.020
L4.	.5282439	.1769775	2.98	0.003
L5.	-.8301008	.1599139	-5.19	0.000
L6.	.358574	.1651826	2.17	0.030
L7.	-.1419273	.1684226	-0.84	0.399
L8.	-.1347439	.166917	-0.81	0.420
Realinterestrte				
L1.	-.0014207	.0016633	-0.85	0.393
L2.	.0015114	.0019368	0.78	0.435
L3.	-.0001472	.0018808	-0.08	0.938
L4.	-.0006349	.0019415	-0.33	0.744
L5.	-.0003313	.0020214	-0.16	0.870
L6.	.0035412	.0019175	1.85	0.065
L7.	.0006211	.0019128	0.32	0.745
L8.	-.0007592	.0018378	-0.41	0.680
L9Realinterest	-.0015103	.0016101	-0.94	0.348
L9lrealprices	.0738711	.0980775	0.75	0.451
_cons	.1631551	.0497436	3.28	0.001
Realinterestrte				
lRealprice				
L1.	-16.5484	6.517092	-2.54	0.011
L2.	4.025193	11.00951	0.37	0.715
L3.	13.8079	11.60178	1.19	0.234

L4.	-.0521905	11.61419	-0.00	0.996
L5.	3.458871	10.49438	0.33	0.742
L6.	20.62457	10.84015	1.90	0.057
L7.	-37.35586	11.05277	-3.38	0.001
L8.	16.76549	10.95396	1.53	0.126
Realinterestrates				
L1.	.7482822	.1091544	6.86	0.000
L2.	.2465221	.1271018	1.94	0.052
L3.	-.3253	.1234268	-2.64	0.008
L4.	.259899	.1274097	2.04	0.041
L5.	-.0132175	.1326552	-0.10	0.921
L6.	-.0832951	.1258365	-0.66	0.508
L7.	-.073527	.1255247	-0.59	0.558
L8.	.3585069	.1206031	2.97	0.003
L9Realinterest	-.1801812	.1056608	-1.71	0.088
L9lrealprices	-4.90747	6.436359	-0.76	0.446
_cons	1.455631	3.264433	0.45	0.656

Table 4: Granger causality Wald tests.

Equation	Excluded	chi2	df	Prob>chi2
lRealprice	Realinterestrates	14.493	8	0.070
lRealprice	ALL	14.493	8	0.070
Realinterestrates	lRealprice	28.543	8	0.000
Realinterestrates	ALL	28.543	8	0.000

If the ARDL model is estimated in the original version (with the price variable in log difference) the Bound test does not detect a cointegration relationship between the urban income and interest rate variables. However, if both variables are taken in levels (income in log-levels) the result at 10% statistical significance is inconclusive ( $F = 4.557$ , between  $I(0)=4.031$  and  $I(1)=4.818$  limits). The ARDL model estimated with error correction term is reflected in Table 5. The ADJ term suggest a quarterly mismatch correction of approximately 10%.



Table 4: ARDL model with error correction term estimation.

D.

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
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ADJ

Realinterestrates

L1.	-.1036558	.039491	-2.62	0.010	-.1820245	-.0252872
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LR

lRealprice

L1.	2.497444	4.378063	0.57	0.570	-6.190679	11.18557
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SR

Realinterestrates

LD.	-.2284861	.1079969	-2.12	0.037	-.4428024	-.0141699
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L2D.	.1388651	.1095434	1.27	0.208	-.0785202	.3562505
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L3D.	-.2653726	.1146316	-2.32	0.023	-.4928553	-.0378899
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L4D.	.2067917	.1118014	1.85	0.067	-.0150746	.4286579
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lRealprice

D1.	5.825354	4.584628	1.27	0.207	-3.272691	14.9234
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LD.	-9.712158	4.499149	-2.16	0.033	-18.64057	-.7837436
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_cons	-1.624943	3.106411	-0.52	0.602	-7.789514	4.539629
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## Conclusion

In his 1925 work titled "The Origin of Interest: The Problem of Its Origins," Spanish economist Germán Bernácer proposes the hypothesis that the interest rate's origin lies outside the economy. He specifically asserts that the interest rate originates from the income generated by "income goods," which refer to goods capable of generating income without labor.

This article has tried to determine the plausibility of this hypothesis by testing it with current data from the Spanish economy. The analysis carried out does not serve to confirm Bernácer's hypothesis on the origin of interest, but it does point to the fact that it is possible to rule out the idea that agricultural land rent could be the origin of the interest rate. This would be practically impossible in a developed economy such as the Spanish one. Conversely, the possibility that the origin of the interest could be the rent of urban real estate cannot be completely ruled out.

This work has limitations. Firstly, the analyzed relationship is not a true causality as sought by Bernácer. Instead, it is a causality in the Granger sense, based on the predictive capacity of the time series. Secondly, the data used only considers agricultural land and urban real estate as potential sources of interest rate, omitting other relevant assets for

hypothesis testing. Additionally, the time gap between Bernácer's era and the present analysis is a constraint. Bernácer conducted his work during a predominantly agrarian Spain, which differs greatly from the current context. It is conceivable that he would have made adaptations to his theory if he had knowledge of a different Spain. Thus, this analysis tests the original version of his theory.

Future research should address these limitations by replicating the analysis using improved causal analysis techniques. This would involve incorporating a larger number of variables that encompass all income-generating assets and utilizing longitudinal data. These enhancements would enable testing the hypothesis across a broader range of countries at various stages or degrees of development.

In any case, the work conducted represents a significant advancement compared to the existing literature on the subject.

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