Dispute of the Bernanke-Blanchard macroeconomic model for the COVID-19 crisis: Austrian Economics insights *

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ABSTRACT

This is a heterodox review of mainstream Macroeconomics, given its preference for more predictive than realistic models, which have lost credibility in the face of crises. Attention is focused on the recent Bernanke-Blanchard macroeconomic model used to manage the COVID-19 crisis and beyond. This review examines its theoretical foundations and applies them to the Eurozone area, with a special focus on the Spanish case. For this critical-hermeneutic and historical-comparative analysis, this study draws on the theoretical and methodological frameworks of Austrian Economics and Neo-Institutional Economics (both schools observe the principles of realism and the non-neutrality of money). The results reveal the weakness of the model as it does not take into consideration the management of previous crises, such as the Great Recession and its problem of credit expansion without real savings, further intensified by the non-conventional measures of the central bank; currently, the scenario is worsening in terms of expansive fiscal policies. There is a corollary to the macroeconomic crisis, due to the lack of common foundations and excessive casuistry.

Keywords: Macroeconomics; Bernanke-Blanchard model; Austrian Economics; crisis.
JEL Codes: B5, C4, C8, E2.

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I. Introduction: *What the pandemic took away*

The inflationary process after the COVID-19 pandemic has been somewhat unexpected for mainstream or orthodox economic thought, which, after globalisation, has been inspired by the *MIT Boys* or neo-Keynesians (Sánchez-Bayón, 2020; Sánchez-Bayón et al., 2023). As Paul Krugman recognised, economists quickly divided between supporters and detractors of its transitory nature (although from the heterodox synthesis, the effects of credit expansions without a basis in savings were clear, Alonso et al., 2023a-b).

Among the most relevant voices on the current scene, Ben Shalom Bernanke and Olivier Blanchard (2023) developed a model with the aim of providing an explanation for the phenomenon, attracting notable attention from both academics and policymakers. These two renowned economists even coordinated an international research project focused on studying this phenomenon across the world's major economic regions. Among the different documents that apply the Bernanke-Blanchard model, both the Bank of Spain and the European Central Bank prepared excellent documents. They offer an opportunity to evaluate whether the mainstream support for any structural characteristics explain the particular results obtained in the application of the model in these cases. In fact, this is the main motivation for this work. After introducing the Bernanke-Blanchard model and its application to the Spanish case, the results obtained by other applied studies are analysed, questioning the coherence between them. The objective is to evaluate the connection of the authors' conclusions with certain structural characteristics of the Spanish economy. Given that a significant divergence can be observed between Spain and a good part of the Eurozone in the price and wage equations, as well as a significant convergence in the case of the expectations equations (for this reason, the focus will be on the first two equations). To understand the possibilities of this study, it is essential to establish a connection and initiate communication with the heterodox mainstream economic theory (Boettke et al., 2016): Austrian Economics (Sánchez-Bayón, 2023, 2024). In particular, we aim to employ Austrian Economics to highlight the model's weaknesses and thus its limited explanatory power.

II. Analysis of the Bernanke-Blanchard model: Overview

Bernanke and Blanchard first presented the model at a recent inflation conference held at the Hutchins Center for Fiscal and Monetary Policy at the Brookings Institution on May 23rd, 2023 (Bernanke & Blanchard, 2023). The COVID-19 pandemic represented an unprecedented macroeconomic shock in the United States, and the federal government attempted to respond with several aid packages. One of these packages was the *American Rescue Plan* undertaken by the Biden administration. Bernanke and Blanchard (2023) note that by overheating labour markets and thereby causing output to exceed the economy's potential output, expansionary fiscal policies may be the main drivers of inflation, according to conventional economic theory (mainstream).

Bernanke and Blanchard believe that economists are divided into two camps in trying to explain recent inflation. On the one hand, some argue that the flattening of the Phillips curve and, consequently, the rigidity of the labour market would not significantly impact inflation (Bernanke & Blanchard, 2023). Inflation expectations are likely to remain anchored. On the other hand, some other economists warn about the possible underestimation of the slope of the Philips curve.

The latter's predictions would eventually come true, but Bernanke and Blanchard dispute this point of view. They recognise that between 2021 and 2022, there was a significant overheating of the labour market in the United States, but the evolution of nominal wages was quite stable during this period (Bernanke and Blanchard, 2023). Inflation expectations remained stable. According to these two economists, an initial shock in wage prices was the authentic initial trigger, later replaced by the overheating of the labour market, which is the main architect of the persistence of current inflation, as noted by Bernanke and Blanchard. (Bernanke and Blanchard, 2023).

Their model consists of four equations and four endogenous variables. Bernanke and Blanchard focused on the behaviour of salaries, prices, and inflation expectations in the short and long term. Labour market slack and price shocks are taken for granted (Bernanke and Blanchard, 2023). Next, we will examine the four equations of the model separately:

The first equation is the salary equation. Bernanke and Blanchard first assume that nominal wages depend on the expected price level and the degree of slack in the labour market. Furthermore, they include an additional component, the catch-up component, to take into account the possible recovery of previous inflation that the employee is able to negotiate (Bernanke and Blanchard, 2023). Therefore, it is assumed that the nominal salary depends on the expected price level for that quarter, the catch-up component and the tension in the labour market (in each quarter). The final salary equation is as follows (Bernanke and Blanchard, 2023):

$$w - w(-1) = [p^e - p(-1)] + \alpha[p(-1) - p^e(-1)] + \beta[x - \alpha x(-1)] + z_w \text{ (eq. 1)},$$

With the nominal wage w in each quarter, the expected price p^e for that quarter, the tightness of the labour market x, the notation $q(-n)$ for the variable q lagged n quarters, the shock term z_w which stands for all the other factors that affect wage determination, and a catch-up parameter α.

Second, the price level p is assumed to depend on the nominal wage w and a shock term z_p that captures the relative costs of non-labour inputs, changes in the profit margin, and other factors (Bernanke and Blanchard, 2023):

$$p - p{-}1 = w - w{-}1 + [zp - zp\,(-1)] \text{ (eq. 2)}.$$

Finally, the last two equations refer to inflation expectations, both in the short and long term. The short term is expressed as a weighted average of inflation in the last period and long-term inflation expectations, while the long term is the weighted average of actual inflation and long-term inflation expectations in the last period. The authors

assume that individuals continue to update their long-term inflation expectations on a period-by-period basis.

$$p_e - \mathrm{p}(-1) = \delta\pi^* + (1-\delta)[p(-1) - p(-2)] \text{ (eq. 3)},$$

With π^* as expected, long-run inflation.

$$\pi^* = \gamma\pi^*(-1)\ (1-\gamma)[p(-1) - p(-2)] \quad \text{(eq. 4)},$$

The degree of anchoring of short- and long-term inflation expectations is reflected in the parameters δ and γ. The closer they are to 1, the better anchored expectations will be, and the more persistent dynamic shocks will be. In fact, they also explain the persistence of macroeconomic shocks on inflation.

The authors point out the indeterminacy of inflation expectations and the inflation rate in the long-term steady state. In the words of Blanchard and Bernanke (2023, 9): "for any value of expected long-run inflation π^* assuming $x = 0$, the model solution implies that short-run inflation expectations, wage inflation, and price inflation all equal the arbitrarily chosen value of π^*. Put another way, the value of π^*, at any point in time, is determined by the history of inflation. An episode of higher inflation leads to higher steady-state inflation; the longer the episode, or the lower γ, the stronger the effect on steady-state inflation". In fact, deanchoring is interpreted as a decrease in the δ or γ coefficients and the said deanchoring is associated with more persistent inflation. In short, the model explains the evolution of four endogenous variables (long-term inflation expectations, short-term inflation expectations, wages, and prices) with the four equations.

III. Empirical illustration of the model: The Eurozone & Spanish case

Morteza Ghomi, Samuel Hurtado, and José Manuel Montero apply the Bernanke-Blanchard model in their 2024 paper (Ghomi et al., 2024), one of the occasional documents issued by the Bank of Spain, to analyse the situation in Spain. As stated in their introduction, this analysis was part of a Eurosystem project aimed at researching the causes of inflation in the Eurozone, employing an analytical and empirical framework (Ghomi *et al.*, 2024). First, they present the Blanchard-Bernanke theoretical model and then proceed with both the estimation of the regression equations and the calculation of the impulse response functions.

Ghomi et al. (2024) follow the empirical approach of Bernanke and Blanchard (2023) in their work, which involves estimating each equation separately using ordinary least squares. This approach imposes various restrictions on the relationships between endogenous variables, in line with the theoretical model. The main identification restriction refers to the salary equation, assuming a one-quarter delay in its reaction compared to the other variables. The inflation rate will be affected by wage growth, and consequently, inflation expectations will also respond diligently. Likewise, each equation includes four time periods in each variable, as well as a series of regressors that account

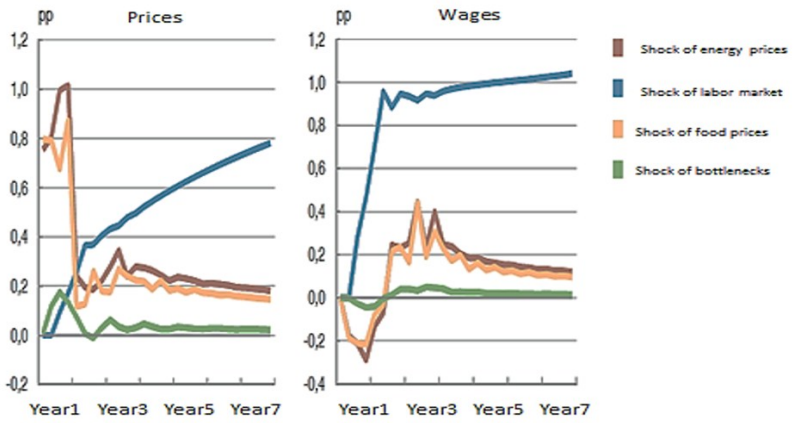
for the impact of a set of external shocks (Ghomi *et al.*, 2024). Finally, they impose a homogeneity constraint, which aligns with the long-term characteristics of the conceptual framework and suggests the presence of a long-term vertical Phillips curve.

A. Salary equation

Ghomi et al. (2024) and others obtain fairly illustrative results in the regression of the wage equation. In the first equation of the model, a strong wage inertia is observed when estimating the wage equation for the case of Spain, an effect that exceeds inflation expectations with statistical significance. This result differs from that of the Eurozone, where inflation expectations are much more relevant than wage inertia (Ghomi *et al.*, 2024). Furthermore, although the catch-up component has a higher weight in Spain than in the Eurozone, it is only in the latter case that it was found to be statistically significant. However, as they point out in the report, the lack of a dynamic effect cannot be inferred from the lack of statistical significance (Ghomi *et al.*, 2024). Another relevant phenomenon is the low sensitivity to labour market rigidity in Spain. The authors recognise that this could be a symptom of a flat salary Phillips curve in Spain (Ghomi *et al.*, 2024), especially if we take into account that this sensitivity is much greater in the Eurozone.

The impulse response function shows that, although wages take a while to react after a shock to labour rigidity, they eventually react with an increase in the positive shock scenario and grow by one percentage point on average, but at a slower rate – significantly slower if we compare it with the results of the impulse response for the Eurozone (Ghomi *et al.*, 2024). However, in light of these results for impulse responses, it should not be concluded that the Spanish wage formation mechanism is completely neutral in the face of labour market rigidity shocks. According to Ghomi et al. (2024), a permanent shock to labour market rigidity would imply an increase in inflation, as well as a smaller increase in wages.

Figure 1
Impulse response functions
Source: Ghomi et al. (2024)



Therefore, it can be observed that wage dynamics in Spain appear to be characterised by wage inflexibility, a slow impact of labour market tension, and a relatively high, but not statistically significant catch-up effect. In this section of the thesis, these particular aspects will be addressed and linked to certain structural characteristics of the Spanish economy, with an emphasis on the role of the collective bargaining mechanism. For this purpose, the analysis will begin in the years following the Great Recession.

A1. The original situation

Wage rigidity and temporary employment

In the years following the Great Recession in Spain, a significant disconnect emerged between wages and the state of the economy. In light of the report on wage adjustments in the face of shocks in Spain, the wage determination mechanism differed from the unemployment rate in 2011 (Cuadrado et al., 2011). The only ones affected by the labour market situation were the newly signed collective agreements. The revised agreements and the employment rate were barely correlated.

The 2008 salary formation survey collected valuable information on the way in which they executed the adjustment in the event of a macroeconomic shock (Izquierdo & Cuadrado, 2008). The 2011 report draws attention to the fact that numerous companies chose to dismiss a significant part of their employees on temporary contracts in a way that did not include reducing salaries.

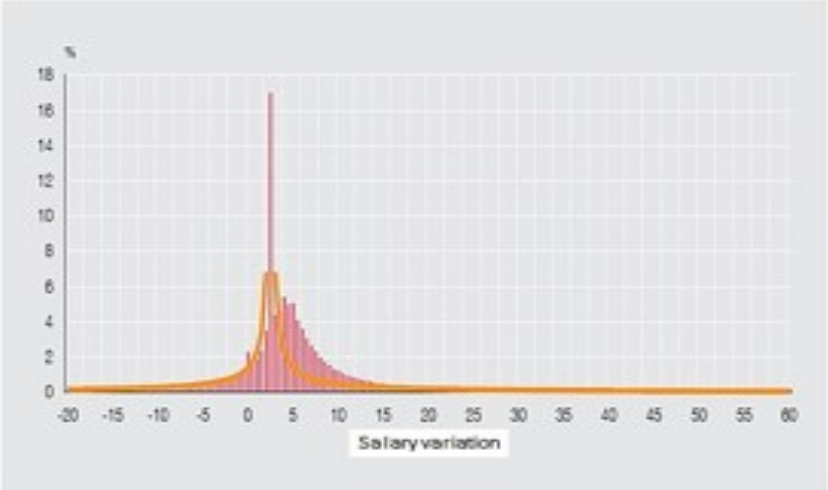
When asked about the way companies cut their costs, the different shocks led companies to opt for a reduction in temporary employment, according to the survey (Izquierdo & Cuadrado, 2008). In fact, this was the form of cost reduction for more than half of the companies surveyed, while salary reduction was used to a lesser extent (both in the stable and variable components). Likewise, the survey recognises that, compared to the rest of the European Union countries, laying off workers with temporary contracts is especially common in the Spanish economy as a method of cost reduction. The report highlights the greater prevalence of temporary employment, the high protection of permanent contracts, and the high degree of salary rigidity as the main reasons explaining this phenomenon (Izquierdo & Cuadrado, 2009).

As the survey indicates, the low correlation between salaries and the unemployment rate reflects another issue in the Spanish economy: the high temporary nature of employment. Toharia (2002) describes the characteristics of the original temporary contracts as follows. At first glance, what appeared to be a flexibilisation of entry was actually a flexibilisation of exit. A small group of workers who had remained with the company for a shorter period were mainly affected, as the cost of terminating their temporary contracts was almost zero, without the possibility of judicial review. Permanent contracts for employees with a longer career in the company had significantly higher termination costs. Therefore, this difference in termination costs was the main distinction between these two types of contracts (Toharia, 2002). Therefore, it can be concluded that the Spanish economy of those years was characterised by a clear preference for adjustment through temporary employment rather than through salaries.

A formal approximation of the degree of salary rigidity is outlined in the Salary Flexibility Project (Cuadrado *et al.*, 2011). Dickens and Goette (2006) describe the

methodology used to calculate this variable, which is based on the distribution of changes in individual wages compared to a theoretical distribution. The objective is to replicate the presence of total flexibility in the salary determination process. First, they assume a situation of full flexibility and a symmetrical distribution to create the notional distribution, in contrast to the observed distribution of wage changes.

Figure 2
Distribution of salary evolution in Spain (2008)
Source: Own elaboration (based on Cuadrado et al, 2011; Hernández de Cos, 2024).



In this situation of full flexibility, it is assumed that salary changes between two consecutive years are distributed symmetrically to create this theoretical distribution (Cuadrado *et al.*, 2011). The distribution of subsequent observed wage changes is calculated. Unlike the notional distribution, the presence of rigidities would give rise to a situation in which, in the event of a negative disturbance in productivity or a reduction in the company's demand, the wage variations of a greater number of workers would be concentrated around zero (known as "nominal rigidity") or around the expected value of inflation (known as "real rigidity"). According to the authors, the distribution of wage changes in Spain was effectively asymmetric, with fewer wage reductions than the notional distribution, and with wage increases being more frequent. If the rigidity of real wages is taken into account, the figure is even higher. Once the origin of salary inflexibility has been outlined, the background of the recovery effect and its relationship with the collective bargaining mechanism will be addressed.

Recovery effect and collective bargaining

To analyse the recovery effect, we must delve into the mechanism of collective bargaining. The right to collective bargaining is included in section 37.1 of the Constitution of Spain of 1978: "The law shall guarantee the right to collective labour bargaining between worker and employer representatives, as well as the binding force of the agreements" (Boletín Oficial del Estado, 1978).

Izquierdo et al. (2003) point out that the roots of collective bargaining in Spain lie in the principles of the Workers' Statute, approved in 1980, along with its subsequent modifications. This system is based on several pillars: negotiating legitimacy, automatic universal application, and the ultra-activity of agreements (Izquierdo *et al.*, 2003). Izquierdo et al. (2003) make the following clarifying observations. The electoral support received determines the legitimacy of the unions to participate in the negotiation more than the number of affiliated voters. Furthermore, the geographical and sectoral limits of the agreement determine the range of companies affected, their participation in the negotiation process being irrelevant. The management of concurrent conflicts between agreements of different scope severely restricts the possibility that agreements of lesser scope modify aspects that are already incorporated in agreements of greater scope. Ultimately, the overwhelming level of activity of the agreements suggests that they will continue indefinitely unless a new agreement is executed (Izquierdo *et al.*, 2003).

Many collective agreements included safeguard clauses. Bentolila et al. (2010) state that between 70 and 98 percent of collective agreements included these clauses. After the decline in the late 1990s, the proportion of contracts that included them remained fairly stable. According to the WDN (Wage Dynamics Network) survey, only three countries in the Eurozone had a similar level of indexation: Belgium, Finland, and Luxembourg.

In fact, at that time, a close relationship between salaries and inflation was observed, primarily due to the implementation of high salary indexation and the frequency of salary adjustments. Bentolila et al. (2010, p. 183) state: "According to WDN data, around 40 percent of Spanish companies respond that their salaries have an automatic link with past inflation and another 16 percent with expected inflation, percentages that are much lower in the rest of the euro area countries, with the exception of Belgium".

A.2. The current situation

After analysing the origins of the phenomena inferred from the results of Ghomi et al. (2024), it is useful to revisit recent years for comparative purposes. To guide this section, the words of Hernández de Cos (Governor of the Spanish Central Bank), delivered at a CUNEF conference on the current situation of the Spanish labour market, will serve as a reference.

Labour market rigidity

The Governor, Hernández de Cos, declared the following: “Despite the high unemployment rate, a certain tension in the labour market in our country has been observed in recent years. Specifically, the proportion of job offers that remain unfilled, known as the vacancy rate, has increased, and Spanish companies are experiencing difficulties in labour availability. Thus, according to the results of the latest Bank of Spain Survey on Business Activity (EBAE), 43% of the companies surveyed in the last quarter of last year declared a negative impact on their activity derived from the lack of availability of labour” (Hernández de Cos, 2024, p. 8).

However, Spain is the Eurozone economy with the least increase in nominal wages in recent years. One may question how it is possible that, with such a lack of labour availability at the moment, wages show such slow growth compared to the rest of the

Eurozone. According to the ECB's 2023 wage tracker, overall euro area wage growth for collective agreements signed in 2023 was 4.5%. If the countries are considered separately, Spain had the lowest wage growth in negotiated collective agreements (Górnicka *et al.*, 2024).

In fact, not all contracts are covered by collective agreements, so this measure should be considered with caution. However, it is significant that less than 40 percent of the employees included in the survey for Spain had their collective agreements renewed in 2023, while this figure rises to 49 percent if all employees in Spain are considered (Górnicka *et al.*, 2024). The issue of wage rigidity is once again associated with the Spanish collective bargaining mechanism. According to the ECB, the longer duration of collective agreements makes wage growth less sensitive to macroeconomic shocks, and therefore, the transmission takes longer to occur.

Temporary work

The Governor, Hernández de Cos, recognised: "The significant reduction, in the most recent period, of the temporary employment rate associated with the labour reform approved in 2021 stands out. This reform reduced the possibilities of entering into employment contracts of a temporary nature; at the same time, it expanded the possibilities of carrying it out through indefinite contract modalities" (Hernández de Cos, 2024). According to the Bank of Spain's 2023 annual report, the labour reform enacted at the end of 2021 aimed to improve job stability in the Spanish labour market by reducing the prevalence of temporary contracts. It ended with work and service contracts, which accounted for approximately 40 percent of temporary contracts. Likewise, the maximum duration of temporary contracts was restricted to 6 months, with the possibility of an extension to 12 months through collective bargaining (Banco de España, 2023). The reform also imposed stricter regulations on the consecutive use of temporary contracts, along with the duration of internship contracts. The latter were reduced from 24 to 12 months.

On the other hand, the report also compares the situation of the private sector compared to the public sector (Banco de España, 2023). The decline was especially pronounced in the private sector (from 23.2 to 13.2). Therefore, in the fourth quarter of 2023, data from the Labour Force Survey (EPA) indicated a ratio of 16.5%, which represents a decrease compared to the 25.4% observed at the end of 2021. The decrease in the employment rate Temporary employment has been especially significant in the private sector, with a decrease of more than 10 percentage points, to 13.2%. The 30 percent temporary employment rate in the public sector remains significantly higher than the European average, despite a decrease in recent years (Banco de España, 2023).

Safeguard and indexing clauses

Regarding indexation, Hernández de Cos said: "Contrary to the traditional behaviour observed in the Spanish economy in past decades, the degree of indexation of collective agreements to past inflation would have decreased significantly. The percentage of workers covered with safeguard clauses against inflation has risen only slightly, to around 25% in recent months, far from the coverage achieved in the past, and the degree

of protection of these clauses against inflationary deviation is now also lower than in the past, generally offering these clauses only partial compensation against higher inflation" (Hernández de Cos, 2024, p. 11).

Firstly, the analysis carried out did not find any agreement or measure that utilises underlying inflation as a reference for price progression, nor any other inflation measure that mitigates the impact of the energy component on price variations (Izquierdo & Herrera, 2022). This is particularly significant in the current situation, where the price movement is influenced by the robust economic recovery and the volatility of the latest energy prices, most of which are imported products that affect the Spanish economy.

Secondly, an examination of the safeguard clauses included in the collective agreements in force for 2022 reveals that just over 60% of the workers covered by these agreements have an annual reference (Izquierdo & Herrera, 2022). In contrast, 20% of employees affected by these provisions face a long-term citation. In this scenario, inflation fluctuations during the convention could affect salary adjustments.

Thirdly, the retroactive effect of the safeguard clauses is analysed. The available data indicates that just over 50% of the workers with active contracts in 2022 would be affected by safeguard clauses that do not have the aforementioned effect. In this way, the continuous increase in this percentage since 2009, when it stood at 20%, would be extended. For this particular group of workers, salary adjustments from previous years could not be driven by an eventual activation of clauses. Instead, it would only include updating wage rates for next year.

Finally, it is worth noting that in 2022, 75% of workers with current agreements that include a safeguard clause also have specific limits or thresholds included in that clause. The existence of these factors could significantly influence the degree to which unexpected inflationary events affect wage levels. Essentially, the wage revision established in the provisions does not always mean that the entire gap between observed inflation and the first negotiated wage increase (known as inflation surprise) is completely transferred to wages. Instead, this transfer is usually only partial (Izquierdo & Herrera, 2022).

A.3. Final considerations

In short, wage rigidity was previously associated with the fact that companies preferred to lay off employees on a temporary contract rather than reduce wages in the event of a macroeconomic shock. This can be seen in the distribution provided by the WDN survey, which reveals that the labour market situation had a small impact on wages. Furthermore, safeguard clauses tended to cover a significant proportion of employees, and therefore, there was a notable catch-up effect in wage determination. Today, the situation has changed significantly, and laying off temporary employees is no longer the preferred strategy, thanks to the measures implemented by the government. However, the rigidity of the labour market does not have a significant effect on wages, thanks to, among other factors, the extraordinary duration of collective agreements, but a translation could not be ruled out, as shown by the impulse response functions. Finally, safeguard clauses are less popular than before, which could explain the lesser importance of the catch-up effect.

B. Price equation

After addressing the wage equation, it is time to proceed with the price equation. The results for the Spanish economy from the price equation also indicate a large degree of inflation inertia (0.88), which exceeds the impact of wage growth (0.12) (Ghomi et al., 2024). Estimates for the United States of America (0.34 for inflation and 0.66 for wages) and for the European Economic and Monetary Union (0.69-0.31) indicate a significantly more pronounced impact of rising wages on inflation (Ghomi *et al.*, 2024). The authors conclude that wage growth is translated relatively slowly, but is more persistent once it is translated (Ghomi *et al.*, 2023).

In light of these results, it can be observed that the main phenomenon that can be inferred from the price equation results is inflationary inertia and price inflexibility. In this section, the question of price flexibility will be addressed, and two possible explanations will be proposed.

B.1 Price flexibility

The most important conclusion of Ghomi et al. (2024) when estimating the price equation of the Bernanke-Blanchard model for the case of Spain is that inflation has significantly higher inertia compared to the results for the Eurozone. This section will examine whether this conclusion is related to certain structural characteristics of the Spanish economy.

After reviewing the literature on price flexibility in Eurozone countries, two phenomena are observed: the relationship between the proportion of labour costs and the frequency of salary adjustments, and the correlation between salary flexibility and price flexibility. On the other hand, it is pertinent to note that we are abstracting from monetary conditions, as the objective is to link wage adjustments with price adjustments. In the following section, we will analyse each of the two phenomena in depth.

Labour costs and the frequency of salary adjustments

Álvarez and Hernando (2005) acknowledge in their cited report, "Pricing Behavior in Spain: Evidence from Survey Data", that the cost structure significantly determines the frequency of price adjustments. They state that "The cost structure of a company affects the frequency of price changes. Specifically, prices are more flexible the lower the proportion of labour costs" (Álvarez & Hernando, 2005, p. 34). All cost variables exhibit the expected direction and show a high level of statistical significance. While the coefficient on the labour share is negative, the coefficients on the share of energy, non-energy intermediate items, and subcontracting are positive.

Druant et al. (2009) share this view. In fact, a multivariate analysis of the determinants of price and wage rigidity confirms the association between more frequent price adjustments and a lower share of labour costs in total costs (Druant *et al.*, 2009). The authors caution that, compared to wage adjustments, the frequency of price adjustments presents a significant intersectoral disparity. Furthermore, they observe a more significant variation between countries for wage changes than for price

adjustments. Druant et al. (2009) also attach special importance to the "institutional framework", specific to the country in question.

However, in a study also based on the WDN survey, Bertola et al. (2010) argue that the pass-through from wages to prices is particularly strong in firms with high labour participation, confirming previous evidence that prices are more rigid in sectors typically characterised by a high incidence of labour costs. To resolve this apparent contradiction, it must be noted that price rigidity is considered as the frequency of price adjustments, despite the fact that strong price variation occurs in each adjustment, as shown in the work of Bertola et al. (2010).

One of the possible reasons outlined by Bertola et al. (2010) is the production technique. Their results show that with higher labour costs, price adjustment after a cost shock is less likely. Specifically, they quantify this effect as a 10 percentage point increase in the proportion of labour costs, which leads to a 1 percentage point increase in the occurrence of the price adjustment (Bertola *et al.*, 2010). Firms that rely less on labour inputs may experience a smaller impact from changes in intermediate costs, resulting in lower sensitivity of their marginal costs and a reduced need to adjust prices in response to this cost shock. Although these authors conceive of the labour quota as the proportion of labour costs in total costs, this quota can be affected by increases in labour costs, and such increases have been observed in the Spanish context. Labour costs have increased in recent years, as described below.

Firstly, the Council of Ministers approved the Royal Decree, which promulgated an increase in the interprofessional minimum wage up to 1,080 euros in 14 instalments (La Moncloa, 2022). The minimum wage increased by 8 percent, representing a 47 percent increase over the last five years. The Government declared its intention to pursue two objectives: to reach 60 percent of the average salary in compliance with European Social Law and to guarantee the purchasing power of salaries to face the extraordinary rise in prices. Spain is now one of the countries with the highest minimum wage compared to its GDP per capita.

Secondly, the Government increased the maximum contribution base by 5 percent to 4,750 euros, as part of the pension reform approved in the last legislature. It is the maximum salary on which the contribution rates are applied to determine the amount paid to Social Security to ensure the sustainability of the pension system. Increasing the quantity increases the system's revenue.

Third, the Intergenerational Equity Mechanism represents a 0.6% increase in the Social Security contribution imposed on both companies and workers. More precisely, the company is responsible for paying 0.5% of the amount, while the worker is responsible for paying 0.1% (Pérez, 2021). The MEI can serve as a basis for contributions in common scenarios. Consequently, it will impact all workers who have high or similar levels in all Social Security systems. The objective of this increase is to mitigate the expected decrease in income and, consequently, the ability to finance pensions, caused by the growing number of retirees and the continued decline in the number of contributors.

Therefore, although this government-imposed increase in labour costs does not directly affect the labour cost ratio, it may have an indirect impact on it, which may have

led to price inflexibility in terms of reflecting wage increases. However, it must be recognised that this impact appears to be quite modest in light of the studies analysed.

Salary flexibility and price flexibility

The second relevant phenomenon revealed the correlation between salary flexibility and price flexibility when price flexibility and inflationary inertia are studied, both in the Eurozone and in the Spanish context. Druant et al. (2009) provide several explanations for the relationship between wage flexibility and price flexibility. Among them, we can observe the connection between the dates on which they decide to modify prices and wages, their adjustment strategies in the face of a permanent and unexpected increase in wages, or the fact that companies with a high proportion of labour costs report price adjustments less frequently.

Furthermore, another study by Solórzano et al. (2020) evaluates the relationship between salary flexibility and price flexibility. They interpret the flexibility of wage and price adjustment as the proportion of goods and employees that receive a price or wage change (Solórzano *et al.*, 2020). The primary objective of Solórzano et al. (2020) is to assess the impact of wage adjustment frequency on price changes. To do this, they use an instrumental variable at the industry level. Their main conclusion is that industries that regularly update their salaries are also those that adjust prices most frequently. Therefore, wage flexibility affects price flexibility. Moreover, given that wages are known to be more resistant to downward changes compared to prices, the quantitative and qualitative findings also hold when examining the impact of the frequency of wage increases in relation to the frequency of price increases.

B.2. Final considerations

In short, regarding the results obtained in the price equation for Spain, the extraordinary inflationary inertia and the slow transition from wage inflation to price inflation are the most notable results. After reviewing the literature, two possible explanations have been proposed. On the one hand, the effects based on the relation that higher labour costs are associated with price inflexibility, however, seem to have a rather limited impact. On the other hand, the relationship between wage rigidity and price rigidity seems to be more important. Although this link is certainly multifactorial, as the cited works demonstrate, it can be concluded that the greater inflationary inertia exhibited in the Spanish context can be explained in part by the wage rigidity the explanation of which was analysed in the previous section. However, the identification of the qualitative channels that link wage rigidity with price rigidity is left for future research.

IV. Discussion: Austrian Economics insights into the Bernanke-Blanchard model

In the following, we will assess the 2023 Bernanke and Blanchard model more closely from the perspective of Austrian Economics. From this perspective, Bernanke and

Blanchard's model has significant weaknesses. Our first point of criticism relates to the methodological foundation of the model. Austrian Economics emphasises methodological individualism and a subjectivist approach (Menger, 1871 & 1883; Hayek, 1943a & 2010; Mises, 1949; Sánchez-Bayón, 2022 & 2023). Social phenomena are to be explained by the actions of individuals. However, the Bernanke-Blanchard model aggregates these individual actions into highly aggregated macroeconomic variables. This simplifies and possibly distorts the complexity of economic processes. From the perspective of Austrian Economics, the focus on aggregated variables such as general inflation rates and general consumption patterns results in a complete neglect of the complexity and heterogeneity of individual choices and actions. In particular, the nuanced and varied reactions of entrepreneurs, companies, and consumers to external shocks, such as pandemic-related disruptions and political measures, are virtually ignored.

The proponents of Austrian Economics highlight the importance of the capital structure and the intertemporal nature of production for the growth of economies and their adaptation to external influences (Menger, 1871; Böhm-Bawerk, 1930; Hayek, 1931; Mises, 1949). Austrian Economics assumes that capital goods are not homogeneous and differ in terms of their specificity and their role in the various phases of the production process. According to Austrian Economics, disturbances in the capital structure, often resulting from inappropriate monetary policy (such as artificially low interest rates), lead to misallocations. These eventually require corrections and contribute to economic cycles. The intertemporal nature of production is evident in the fact that production processes require time. Current economic conditions have led to the present. This means that resource utilisation must be considered over time. As we have seen above, the Bernanke-Blanchard model attributes considerable inflationary pressure to supply disruptions and demand stimulation. Comparing the Bernanke-Blanchard model with the relevant findings of Austrian Economics reveals that the model fails to adequately account for how these factors interact with the economy's deeper, time-bound capital structure. For example, the disruption of global supply chains has different effects on the production process and capital structure, depending on the stage of production. However, this is not taken into account in the Bernanke-Blanchard model.

From the perspective of Austrian Economics, money and credit are considered to be endogenous to the economic system (Mises, 1949; Hayek, 1931; Rothbard, 1963; Kirzner, 1973; Huerta de Soto, 2006; Garrison, 2001). Central bank policy can therefore lead to distortions by artificially lowering interest rates and expanding credit. These distortions can, in turn, lead to unsustainable booms and subsequent busts. Bernanke and Blanchard's model examines the role of demand stimulus (including fiscal and monetary measures) on inflation. The model does not adequately consider how those stimulus measures lead to distortions in the real economy by incentivising the misallocation of resources. In the view of Austrian Economics, these interventions disrupt natural market adjustments and lead to longer-term economic distortions that extend beyond short-term inflation and are not accounted for in the model.

The Austrian School of Economics values the role of entrepreneurship in managing and correcting market inefficiencies through a decentralised process of discovery

(Hayek, 1988 & 2002). In contrast, the Bernanke-Blanchard model is based on equilibrium considerations and, as we have already shown above, thus neglects the dynamic entrepreneurial processes. The model therefore largely overlooks how individual entrepreneurs respond to external shocks by innovating and adapting their production processes, and how these measures affect prices and economic coordination.

Another point of criticism concerns the assumptions that the model makes about the existence of knowledge, its use, and the formation of expectations among economic actors. According to Austrian Economics, knowledge is scattered and necessarily subjective (Hayek, 1945). Thus, expectations are formed subjectively and therefore vary from individual to individual. However, Bernanke and Blanchard use inflation expectations as a key factor in explaining the inflation process in their model. According to Austrian Economics, such expectations cannot be adequately captured at an aggregated level and therefore cannot be forecast. Therefore, the model does not adequately reflect this complexity.

All in all, the Bernanke-Blanchard model has considerable weaknesses from the perspective of Austrian Economics, as it uses aggregated variables and assumes equilibrium considerations. As a result, it cannot adequately reflect the complexity and heterogeneity of individual actions, the nuanced structure of capital, and the endogenous nature of money and credit. From the perspective of Austrian Economics, the model neglects the deeper, structural problems and dynamic processes that drive economic phenomena.

Given these insights, the Bernanke-Blachard model has obvious shortcomings and is not suitable to grasp the complex characteristics of the Spanish economy, in particular the duality of the Spanish labour market, the non-neutrality of money resulting from interventions by the European Central Bank and the use of budgets by the Government of Spain, the complex governmental interventions and so on (Alonso et al, 2023a-b; García-Vaquero et al, 2024). In other words, the model comes from Friedman's approach (so-called *F-twist*) for preferring simpler and more mathematical models than realistic and complex analysis (Friedman, 1953; Samuelson, 1963; Wong, 1973; Sánchez-Bayón et al, 2023), with problems on falsifiability (Popper, 1934 & 1975) and *mathiness* (Romer, 2015). Therefore, it is challenging to verify the economic principles due to the high level of public interventionism in the Spanish economy (Alonso et al., 2023a-b).

V. Conclusions and corollary: Macroeconomic crisis or macroeconomy in crisis?

Throughout this work, we have tried to delve deeper into the Bernanke-Blanchard model and assess its application to the Spanish case (in contrast to the rest of the Eurozone), following the work of other researchers. An attempt has been made to understand and explain the mainstream approaches to develop a heterodox critique in this regard, since they suffer from the aforementioned Friedman or F-twist error. Returning to the results of the application of the Bernanke-Blanchard model with some structural characteristics of the Spanish economy, in contrast to the Eurozone, we can conclude the following:

First, wage rigidity was previously associated with companies' preference for laying off employees on temporary contracts rather than reducing wages in the event of a macroeconomic shock. This can be seen in the distribution provided by the WDN survey, indicating that the labour market situation had a minimal impact on wages. Furthermore, safeguard clauses tended to cover a significant proportion of employees, and therefore, there was a notable catch-up effect in wage determination. Today, the situation has changed significantly, and laying off temporary employees is no longer the preferred strategy, thanks to the measures implemented by the government. However, the rigidity of the labour market does not have a significant effect on wages, thanks, among other factors, to the extraordinary duration of collective agreements, but a translation could not be ruled out, as shown by the impulse response functions. Finally, safeguard clauses are less popular than before, which could explain the lower importance of the catch-up effect.

Secondly, two main phenomena were identified that could explain the significant inflationary inertia Spain has experienced. On the one hand, Druant et al. (2009), Bertola et al. (2010), and Álvarez and Hernando (2005) provide significant evidence on the relationship between increased labour costs and price inflexibility. However, the effect appears to be quite limited (one percent for every ten percent increase in labour force participation, according to Bertola et al. (2010)). On the other hand, what seems more relevant is the connection between wage rigidity and price rigidity, as demonstrated by Solórzano and Huw (2020). There are multiple potential channels (such as the connection between when companies decide to change prices and wages, as noted by Druant et al., 2009), and therefore, there is room for future research on this issue.

Finally, drawing on the findings of Austrian Economics, we were able to show that Bernanke and Blanchard's model has numerous weaknesses. It not only neglects the complex adaptive reactions of individuals, entrepreneurs, and companies to external shocks but also overlooks the findings of Austrian Economics regarding the utilisation of knowledge, capital structure, and the temporal spheres of the production structure.

Bernanke and Blanchard (2023) designed an ingenious model that provides a fairly accurate framework for analysing the current inflationary process but contradicts some of the previous views of a significant number of economists (including themselves), suggesting more of an exercise in cognitive dissonance (playing with the ceteris paribus clause). This thesis constitutes an effort to link the conclusions of its application to some structural issues that still persist, opening the door to possible policy formulation (thereby, under the biases of normative economics and its naturalistic fallacy, as well as the violation of Hume's law).

The assessment of the Bernanke-Blanchard model has served to illustrate the deep crisis in which conventional Macroeconomics finds itself, led since the 2000s by the neo-Keynesians (or saltwater schools). This school is characterised by its fixation on intervention to correct market failures (without taking into account state and mixed failures, Sánchez-Bayón et al, 2023), and its conviction of having domesticated inflation and economic cycles, under the denomination of the so-called Great Moderation or goldilocks economy ("not too cold, not too hot"). In reality, none of this has been real, since it has been articulated from assumptions contrary to traditional economic

principles (prior to the Keynesian deviation, which confused Macroeconomics and Economic Policy with numbers), relegating positive economics in favour of normative and econometrics, in addition to abuse of the ceteris paribus clause and the Friedmanian error or F-twist (Sánchez-Bayón et al, 2023). One of the last to recognise the crisis of Macroeconomics, as a specialist in the subject and winner of the Nobel Prize in Economics, has been Romer, who has criticised the drift of mainstream models and the *mathiness* (Romer, 2015).

For future research, the in-depth approach to the issue from the heterodox synthesis is postponed, along with its corresponding empirical illustrations, which demonstrate (rather than merely show) the connections between theory and practice, utilising specific quantitative instruments if this facilitates dialogue with other economic schools.

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