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The Essential Role of Conventional Beliefs in Economics: Keynesian Unemployment Despite Price Flexibility

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THE ESSENTIAL ROLE OF CONVENTIONAL BELIEFS IN ECONOMICS: KEYNESIAN UNEMPLOYMENT DESPITE PRICE FLEXIBILITY

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ABSTRACT

This article investigates whether an economy with perfectly flexible prices and wages can experience persistent unemployment, challenging classical and neoclassical views that markets clear efficiently through price adjustments. Adopting a strictly neoclassical framework, but differing from other contributions, the article explores how conventional beliefs shape macroeconomic outcomes. It demonstrates that a recessionary shock can lead to prolonged unemployment when agents adhere to a Keynesian Conventional Belief, in contrast to the self-correcting outcomes associated with the Walrasian Conventional Belief. The article concludes that if agents operating in a neoclassical economy hold Keynesian beliefs, the economy's response to shocks will be influenced by these beliefs, resulting in Keynesian outcomes. This analysis underscores the potential of policies targeting nominal stability to stabilize expectations and support full employment while cautioning against excessive reliance on fiscal and monetary interventions in structurally weak economies. Aligning with Keynes's original policy vision, the article advocates combining "counter-cyclical" macroeconomic policies with "anti-cyclical" public-sector actions to enhance the economy's productivity and growth potential.

Key Words: Expectations formation; Involuntary unemployment; Macroeconomic policies; (Non)Walrasian equilibria; Shocks.

JEL Codes: D51; E12; E13

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[1] I am grateful to my wife Ornella, for her unremitting support.

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> «[T] he monetarist objections to Keynesian policies must be based (...) on the unverified assertion that economic agents have monetarist expectations (...). Therefore, it might benefit society more to tax all monetarist writings and subsidize the Keynesian ones» (Hahn, 1984, p. 135)
>
> «Mrs. Thatcher persuaded much of the British public of monetarist doctrine. The result was (and is) that increases in demand, which might well have led simply to increased output, instead led to self-confirming price rises» (Hahn, 1994, p. 256).

1. INTRODUCTION

Can an economy with perfectly flexible prices and wages still experience persistent unemployment? This question strikes at the heart of economic theory, challenging the foundational belief that price adjustments alone can restore full employment after a shock. Classical and neoclassical economists have long maintained that markets clear efficiently through flexible prices and wages, ensuring that any deviations from full employment are temporary and self-correcting. However, this article questions that assumption by exploring whether Keynesian unemployment – a state of involuntary unemployment caused by deficient aggregate demand – can arise even when wages and prices adjust freely.

This article explores the possibility of how expectations and conventional beliefs shape economic outcomes. In simple terms, the article contrasts two distinct belief systems that economic agents hold, in an otherwise identical (neoclassical) economy, when responding to shocks. One system is Walrasian in that price flexibility leads to efficient market clearing: if agents believe it, they act in ways that lead to full resource employment. The other system is Keynesian in that falling prices and quantities signal weak aggregate demand: if agents believe it, they act in ways that lead to unemployment.

In essence, following the intuition behind Prof. Hanh's provocative thoughts reported above in the epigraphs above, this article argues that macroeconomic outcomes are fundamentally influenced by the agents' prevailing expectations, and the beliefs that shape their formation, on how the economy works.

The article is within the spirit of Keynes's *General Theory* in two key respects. First, it focuses on involuntary unemployment, the defining problem of Keynesian economics, which arises when workers who are willing to work at the prevailing wage cannot find employment due to insufficient demand. Second, it challenges neoclassical theory on its own turf by assuming a neoclassical framework of fully flexible wages and prices. In doing so, it shows that even when the core assumptions of neoclassical economics are accepted, the mechanisms that supposedly lead to full employment can fail if economic agents interpret price adjustments in a way that reinforces downturns rather than correcting them.

The article is organized as follows. After establishing in this section the central question and scope of the study, Section 2 examines briefly the classical, neoclassical, and Keynesian perspectives on involuntary unemployment and flexible prices, and relates the approach used in the article to the relevant literature on the topic; Section 3 details the neoclassical model used in the article, defines and explain the concept of "conventional belief" applied to it, and derives belief-driven equilibria from it; Section 4 analyzes the implications of differing conventional beliefs; and Section 5 explores the role of fiscal and monetary policies in mitigating the persistent underuse of capital and labor resources and concludes by offering some reflections on Keynes's approach to involuntary unemployment in long-stagnating economies.

2. REVIEW OF THE LITERATURE

The belief that full price and wage flexibility ensures full employment of resources is a core tenet of classical and neoclassical economics. This principle has shaped economic thought for

centuries, influencing both policy decisions and academic debates. The foundation of this idea rests on two key concepts: the natural tendency of markets to clear through price adjustments and the classical notion that supply creates its own demand, commonly known as Say's Law.

The idea that markets self-correct through flexible prices and wages can be traced back to the seminal works of classical economists such as Adam Smith (1776), Jean-Baptiste Say (1803), and David Ricardo (1817). They all held that the economy tends toward full employment if markets are left to function freely. By the late 19th century, their ideas were formalized and expanded by neoclassical economists Leon Walras (1874) and Alfred Marshall (1890), who introduced the concepts of general equilibrium and marginal productivity. Walras developed a comprehensive model of general equilibrium, demonstrating how all markets (including labor markets) clear simultaneously through price adjustments. Marshall argued that in a flexible labor market, wages change to equal the marginal product of labor. According to his theory, unemployment is only a temporary phenomenon resulting from wage rigidities or external shocks; as real wages adjust, full employment is restored, ensuring that all willing workers find jobs.

John Maynard Keynes (1936) contended that price and wage flexibility alone cannot guarantee full employment, asserting that declining wages and prices could exacerbate unemployment by dampening consumer spending and reducing business profits. In contrast, the neoclassical synthesis, pioneered by John Hicks (1937) and later developed by Paul Samuelson (1948), posited that while in the short run, Keynesian ideas dominate, and price and wage rigidities can cause prolonged unemployment, in the long run the economy aligns with classical principles, where full employment is attained through the mechanisms of price and wage flexibility.[2]

[2] The neoclassical synthesis acknowledges that real-world frictions (e.g., minimum wages, labor unions, and sticky prices) can prevent immediate adjustments, but it maintains that these frictions are temporary.

A similar viewpoint was articulated by Friedman's (1968) monetarism, but the new classical school, initiated by Lucas (1972), reached a significantly more radical conclusion: wages and prices are fully flexible, markets always clear, and resources are always fully employed.

New Keynesian economists, such as Mankiw and Romer (1991), revitalized the neoclassical synthesis, acknowledging that wages and prices are sticky and adjust sluggishly and providing reasons for their stickiness. They recognized that this stickiness could lead to temporary unemployment and argued that the economy will eventually return to full employment once the adjustment is completed or if stickiness is removed.

New Keynesian economists revitalized the neoclassical synthesis by acknowledging that wages and prices exhibit stickiness, adjusting sluggishly to changes in economic conditions. They provided compelling explanations for this stickiness, emphasizing its potential to cause temporary unemployment. Furthermore, they argued that the economy is likely to return to full employment once the adjustment process is complete or if the factors contributing to stickiness are mitigated (Mankiw and Romer, 1991).

Finally, following Keynes, post-Keynesians reject the notion that wage and price flexibility ensures full employment. They argue that aggregate demand is the primary determinant of employment, and lowering wages can reduce demand further, exacerbating unemployment (Lavoie, 2014).

In conclusion, according to classical theory and all its derivations (henceforth referred to as "neoclassical"), price and wage flexibility is the key mechanism through which full employment is achieved. If unemployment is caused by real wages rising above the market-clearing level, the mechanism to restore full employment is straightforward: workers compete for jobs by accepting lower wages and, as real wages fall, the quantity of labor demanded increases, reducing unemployment. This adjustment continues until the labor market clears, with no involuntary

unemployment remaining. This mechanism relies on the assumption that nominal wages are perfectly flexible downward, meaning they can fall without legal, social, or institutional constraints. Unemployment, if it exists, it is temporary and it is either voluntary (workers choosing not to work at prevailing wages) or the result of frictions (temporary mismatches between supply and demand), the underlying belief being that real wages and prices always adjust to eliminate these mismatches. It is only in the context of (post) Keynesian theories that wage and price flexibility is part of the problem (not the solution) and government policies are necessary for retruning the economy to full employment.

Is it possible for an economy operating under neoclassical principles to reach a state of involuntary unemployment equilibrium? This brings us to the more recent literature on the theoretical efforts to demonstrate the existence of unemployment equilibria in models with full price flexibility.

The literature is rich with studies that derive multiple equilibria by moving away from the neoclassical framework. These studies introduce various forms of frictions and rigidities in the price mechanism, or assume quantity restrictions. Key examples in this domain include: Clower (1965), which examines how shortfalls in effective demand impede market clearing through rationing constraints; Barro and Grossman (1971), Malinvaud (1977), and Hall (2005), which demonstrate that disequilibrium unemployment arises as a result of sticky prices and wages; Shapiro and Stiglitz (1984), which introduces the concept of efficiency wages, suggesting that higher-than-market wages can be used as a discipline mechanism for workers, with further contributions by Akerlof and Yellen (1986); Ball and Romer (1990), whose findings reveal that even minor nominal frictions can lead to significant real unemployment effects; Diamond, Mortensen, and Pissarides (1994), whose seminal work employs search frictions to illustrate how persistent unemployment can result from matching inefficiencies; and Mankiw and Reis (2002), whose approach incorporates sticky information to explain how unemployment can emerge from informational delays.

Other more recent articles have attempted to demonstrate the possibility of involuntary unemployment in Walarsian environments. Farmer and Kupler (2018) assume rigidities in human capital formation and debt dynamics, which prevent the economy from adjusting to shocks efficiently. Unemployment arises because high public debt crowds out private investment, limiting the accumulation of productive capital and reducing demand for labor. In their view, structural weaknesses in the economy, rather than belief systems, are the primary cause of persistent unemployment.

Piluso (2024) aims to show that, under certain circumstances, unemployment does not decline even when competition and price flexibility are perfect. His analysis is neither neo-Keynesian (which assumes, among other things, imperfect information) nor disequilibrium theory (which assumes that all prices are fixed). Rather, following the Keynes of the Treatise on Money, Piluso models involuntary unemployment within the Walrasian general equilibrium framework, incorporating an asymmetry between banks/financial intermediaries and entrepreneurs, whereby the latters' investment decisions are constrained by (subordinated to) banks' credit restrictions.[3]

In fact, to this author's knowledge, the only attempt to show that unemployment is possible in a purely neoclassical framework within a competitive market envinroment with no frictions and rigidities is Roberts (1987). Robert's model relies on coordination failures in aggregate demand to explain how equilibrium unemployment can arise without any assumption of market frictions or wage rigidity. Coordination failures, in turn, are due to the uncertainty about the economy's future state and the agents' inability to anticipate future market-clearing wages and prices correctly. A central feature of Roberts' model is the possibility of self-fulfilling unemployment equilibria caused by expectation

[3] See also Peluso, cit., for other contributions that use general equilibrium frameworks to demonstrate that Keynesian unemployment is not necessarily based on assumptions of fixed prices or imperfect competition.

mismatches. These mismatches occur because agents may believe that a temporary demand shock will persist, causing them to adjust their behavior in a way that makes the shock more persistent.

As shown below, similar outcomes can be achieved by recognizing that agents' expectations are endogenous to the prevaling belief system (or commonly shared views) of how the economy works, referred to as **conventional beliefs** (see Section 3.B). This implies that price flexibility alone may cause or even exacerbate unemployment if agents interpret falling prices negatively (and vice versa). This article is, thus, more in the spirit of the work by Hahn (1977, 1978) on 'conjectural equilibria,' wherein agents form conjectures (expectations) about how other agents will respond to their actions, acting accordingly. Hahn introduced this notion to address some limitations of the classical Walrasian equilibrium framework, particularly regarding imperfect competition and expectations formation. His aim was to explain how agents form expectations in situations where market structures deviate from perfect competition, such as in oligopolistic markets.[4] Conversely, this article deliberately assumes perfect competition to demonstrate that non-Walrasian outcomes may evolve out of Walrasian contexts if agents think in non-Walrasian terms and act accordingly.

[4] It is worth noting the connection between Hahn's theory of conjectures and Roger Guesnerie's (1992) theory of 'eductive' expectations, which is built on the rational expectations framework but introduces a higher level of iterative reasoning. Agents form expectations based not only on economic fundamentals but on what they believe other agents expect. This iterative process of deducing others' expectations can result in convergence toward or divergence from equilibrium, depending on how well agents coordinate their beliefs. Both Hahn and Guesnerie focus on the fragility of market equilibria, particularly when expectations play a central role. While Hahn's conjecture highlights the risks of expectations destabilizing markets, Guesnerie's eductive expectations framework provides a mechanism to understand how agents might fail to coordinate on an equilibrium, reinforcing Hahn's concerns about equilibrium instability. Guesnerie's work essentially formalizes and extends Hahn's insights by focusing on the strategic nature of expectation formation and the conditions necessary for equilibrium to be eductively stable. Subsequent developments of this literature, without pretension of offering an exhaustive list of contributions to it, are Evans and Honkapohja (2001), Guesnerie (2005), Evans and Guesnerie (2005), Hommes and Wagener (2010), and Bao and Duffy (2016).

3. (UN)EMPLOYMENT IN A NEOCLASSICAL ECONOMY

A. A NEOCLASSICAL ECONOMY

The economy comprises four agents operating in a perfectly competitive environment: households, firms, the government, and the central bank. The model of the economy, here assumed, where these agents operate is deliberately "strict to the bone," to isolate the fundamentals of the price mechanism that lies at the core of this article's analysis: there is only one representative household of a multitude of atomistic homogeneous households, and similarly for the firms; there are no stock variables besides productive capital; no financial markets and lending/borrowing facilities; and the policy authorities (government and the central bank) are passive and do not interfere with the economy's resource allocation process (this assumption will be released in Section 5), and the role of the labor market is preserved, with no frictions or restrictions on either the supply or the demand of labor services.

Household *h* maximizes her lifetime utility, considering future expectations:

$$(1) \qquad \underset{\{c,s,n\}}{\text{Max}}\ \mathbb{E}_t[\sum_{t=0}^{\infty} \beta^t U(c_t, n_t)]$$

subject to the budget constraint:

$$(2) \qquad \text{ɯ}_{t+1} = (\text{ɯ}_t + \frac{w_t}{p_t} n_t - c_t + g_t - \ tax_t)(1 + r_t)$$

where c is consumption, r is the return on savings, g is government benefits, *tax* is taxes, and ɯ is wealth (all expressed in real terms), w is the nominal wage rate, p is the price of output, n is labor (and $1 - n$ is the time spent on leisure), $\beta \in (0,1)$ is the discount factor, and expectations $\mathbb{E}[\cdot]$ are based on all available information. The household's real wealth is $\text{ɯ} = k + s$ the sum of the fracton of firms' capital stock K owned by the houshold and savings s.

Firm *f* maximizes profits by choosing labor and capital, anticipating future real wages and returns on capital:

(3) $\underset{\{n,k\}}{\text{Max}}\, \mathbb{E}_t \left[\sum_{t=0}^{\infty} \beta^t \left(y_t - \frac{w_t}{p_t} n_t - r_t k_t\right)(1 + r_t)^t\right]$

where *y* is real output, produced through technology *F*:

(4) $y_t = F(k_t, n_t)$

Notice that $k_{t+1} = k_t + i_t$, where *i* is investment and $i_t = i(y_t, r_t)$, with $i_y > 0$, $i_r < 0$, that is, investment depends positively on output and negatively on the interest rate. Firms use rational expectations of future output, real wages and real interest rates when making current hiring and investment decisions. In equilibrium, after aggregating across all firms and households, $\sum_h s = S = \sum_f i = I$.

Government and the central bank are assumed to behave passively, in a neutral way. The government always pursues a balanced budget:

(5) $G_t = T_t$

where *G* is total government expenditure (after aggregating across all household benefits, $\sum_h g = G$ *g*) and *T* is total government revenue (after aggregating across all household taxes, $\sum_h tax = T$). Fiscal policy can influence households' and firms' expectations, affecting their current consumption, saving, investment and production decisions.

At each date, the central bank adjusts money supply *M* so that

(6) $\frac{\bar{M}_t}{P_t} = L(Y_t, r_t)$, with $L_Y > 0, L_r < 0$

where *L* is the conventional demand for money function, *Y* is total output (after aggregating across all firms, $\sum_f y = Y$) and *P* is the general price level, which coincides with output price *p* since this is a one-good economy). Agents are cognizant of the central bank's policy behavior, making monetary policy neutral in affecting real variables like output and employment. Consistent with the model's

assumptions, money circulates continuously within the economy to facilitate transactions, ensuring no accumulation occurs in any specific sector.[5]

Agents' expectations of future prices (including output prices, wages and interest rates) are consistent with market-clearing conditions:

(7) $$\mathbb{E}_t\left[\frac{w_{t+1}}{p_{t+1}}\right] = F_n(k_t, n_t)$$

(8) $$\mathbb{E}_t[p_{t+1}] = p_t = P_t$$

(9) $$\mathbb{E}_t[r_{t+1}] = r_t = F_k(k_t, n_t)$$

that is, agents anticipate the necessary adjustments to shocks hitting the economy, which lead to market clearing and full employment. They form their expectations around the same conventional belief – call it the ***Walrasian Conventional Belief*** **(WCB)** – whereby the economy will recover from the shock through price adjustments, and price adjustments will always restore the original, optimal equilibrium if left free to unfold.[6]

B. WHAT IS EXACTLY A "CONVENTIONAL BELIEF"?

Before solving the economic model described above under alternative conventional beliefs, let us define the concept of "conventional belief" and elaborate on it in more detail. A "conventional belief" is here defined as a collectively held understanding of how economic processes function and respond to shocks. More specifically, it is a cognitive framework based on an (implicit or explicit) model of the economy. This model is shared by a community of agents, including households, firms, and

[5] This assumption simplifies the model by ensuring that money serves exclusively as a medium of exchange, enabling transactions to occur seamlessly in equilibrium without the introduction of additional complexities arising from monetary hoarding or excess liquidity. Consequently, all monetary flows within the economy directly support real economic activity, aligning with the neoclassical framework of full market-clearing equilibrium.

[6] On the effects of different conventional beliefs on the effectiveness of macroeconomic policies, see Bossone (1996). I have returned to this issue in my forthcoming Bossone (2025), Ch.10, "On Money Effectiveness: Beyond the Lucas Critique."

policymakers. It shapes the way these agents understand market phenomena, rationalize events, and extract signals from the economy (e.g., good and asset prices, quantities exchanged, and interest and exchange rates). It influences how they search for relevant information to anticipate future developments, decide on strategies, and take action.

This framework is not necessarily grounded in objective or immutable truths; rather, it is a socially constructed consensus built on a logically coherent set of propositions derived from shared assumptions. While aiming to resemble reality, it evolves dynamically in response to historical, cultural, and institutional contexts. Conventional beliefs bear the following key features:

- ***Endogeneity to the economic system:*** Conventional beliefs are not exogenous; they evolve within the economy based on historical performance, policy outcomes, and institutional dynamics.
- ***Self-referential nature:*** These beliefs influence agent behavior in a way that makes them self-fulfilling. For example, if agents believe that falling prices indicate weaker demand, their actions (e.g., reduced investment and hiring) will reinforce that outcome.
- ***Shaping expectations:*** A conventional belief is essentially an expectations equilibrium. Agents form expectations not only about economic variables but also about how others in the economy will act.
- ***Sensitivity to signals:*** A conventional belief system influences agents' interpretation of economic signals within the context of the prevailing economic model. The belief system determines whether signals are perceived as transitory adjustments, indications of structural change, or signs of deeper economic imbalances.

In a formal economic model, the conventional belief acts as a meta-assumption that determines how agents interpret the parameters, constraints, and equilibria of the model. Specifically, it affects:

- ***Expectations formation:*** Agents' expectations about future prices, wages, output, and interest rates are contingent on the prevailing belief system.
- ***Behavioral rules****:* Agents' decisions on, say, labor supply, investment, and consumption, are influenced by their interpretation of market signals under the prevailing belief system.
- ***Adjustment mechanisms****:* The way markets respond to shocks (price, wage, and quantity adjustments) and their persistence depend on the dominant conventional belief.

In conclusion, conventional beliefs serve as an interpretive tool that links agents' expectations, decision-making processes, and macroeconomic dynamics, playing a pivotal role in determining the outcomes of economic models and policies.

C. SOLUTIONS

Solutions to the model described in Section 3.A can be derived under the general functional forms for hosudeholds' utility and firms' production. On the housholds' sector side, the solution to plan (1)-(2) gives the optimal intertemporal path for the household's supply of labor and capital, respectively, as:

(10) $$\mathbb{E}_t\left[\sum_{t=\tau}^{\infty}\frac{U_N(c_{t+\tau},n_{t+\tau})}{U_N(c_t,n_t)}\beta^{\tau}(1+r_{t+\tau})^{\tau}\frac{w_{t+\tau}}{p_{t+\tau}}\right]=\frac{w_t}{p_t}$$

and

(11) $$r_{t+\tau}=r_t=\frac{1}{\beta}-1=\varrho$$

where $\beta = \frac{1}{1+\varrho}$, and ϱ is the households' rate of time preference. Equation (10) shows, inter alia, that households raise their current labor supply if they expect the future real wage to grow and/or the real interest rate to increase. Eq. (11) says that, in equlibrium, the real interest rate must equal the households' rate of time preference.

As regards the firms, the solution to plan (3)-(4) sets the optimal intertemporal path for the firms' demand for labor and capital, respectively, as:

(12) $\mathbb{E}_t\left[\sum_{t=\tau}^{\infty} \beta^{\tau-t} F_N(k_{t+\tau}, n_{t+\tau})(1 + r_{t+\tau})^{-(t-\tau)}\right] = \frac{w_t}{p_t}$

and

(13) $\mathbb{E}_t\left[\sum_{t=\tau}^{\infty} \beta^{t-\tau} F_N(k_{t+\tau}, n_{t+\tau})(1 + r_{t+\tau})^{-(t-\tau)}\right] = r_t$

Equation (12) implies that, for a given productivity level of the labor factor, firms will hire less labor if they expect future real wages to increase. Similarly, Eq. (13) implies that, for a given productivity level of the capital factor, firms will hire less capital if they expect future real interest rates to increase. Notice that, although the interest rate does not apper in the demand for labor function, it does affect labor demand indirectly, through two channels: by influencing the firms's demand for capital, which affects the marginal productivity of labor, and by influencing intertemporal discounting, which affects the firms' hiring decisions over time. A higher (lower) real interest rates reduces (increases) firms' labor demand. This indirect relationship is relevant for the discussion below on the price adjustment mechanism, when the economy is hit by shocks.

In the neoclassical setup here assumed, a recessionary demand shock reduces output only temporarily, while agents look through the shock and keep price expectations steady at their market clearing levels, as in Eqs. (7)-(9). To see this in the next section, assume standard explicit functional forms for utility and production. For the households, replace Eq. (1) with a log utility with quasi-linear labor disutility function:

(14) $\underset{\{c,s,n\}}{\text{Max}}\ \mathbb{E}_t\left\{\sum_{t=0}^{\infty}\beta^t\left[\log\left(c_t-\psi\frac{n_t^{1+\gamma}}{1+\gamma}\right]\right\}\right.$

where ψ is the disutility of labor parameter and γ is the inverse Frisch elasticity of labor supply,[7] which, subject to Eq. (2), leads to the Euler equation:

(15) $1=\beta\mathbb{E}_t\left[\frac{c_t-\psi\frac{n_t^{1+\gamma}}{1+\gamma}}{c_{t+1}-\psi\frac{n_t^{1+\gamma}}{1+\gamma}}\right](1+r_{t+1})$

For the firms, assume the Cobb-Douglas production technology:

(16) $y_t=F(k_t,n_t)=A_tk_t^{\alpha}n_t^{1-\alpha}$

Using Eqs. (15) and (16), after aggregating across all households and firms, the equilibirum conditions in the market for labor $\sum_h n=N$ and capital $\sum_f k=K$ are, respectively:

(17) $\left[\frac{(1-\alpha)A_t\left(\frac{K}{N_t}\right)^{\alpha}}{p_t}\right]=\left(\frac{w_t}{\psi c_t p_t}\right)^{\frac{1}{\gamma}}$

and

(18) $\alpha A_t\left(\frac{N}{K}\right)^{1-\alpha}=\beta(1+r_{t+1})c_t$

with the real wage, real interest rate, and output price being given, respectively, by:

(19) $\frac{w_t}{p_t}=(1+\alpha)A_t\left(\frac{K_t}{N_t}\right)^{\alpha}$

(20) $r_t=\alpha A_t\left(\frac{N_t}{K_t}\right)^{1-\alpha}$

(21) $p_t=P_t=\frac{M_tV_t}{A_tK_t^{\alpha}N_t^{1-\alpha}}$

[7] This functional form ensures the key feature that households increase their labor supply when real income falls for $\gamma>1$, where γ is the inverse of the Frisch elasticity of labor supply. This parameter measures how labor supply (hours worked) responds to changes in the real wage, holding utility constant (i.e., assuming no changes in wealth or preferences). Assuming $\gamma>1$ is realistic and largely confirmed by empirical evidence.

where the value of p in Eq. (21) is accommodated by the central bank, which constantly adjusts the money supply so as to clear the market for the real money balances, given money velocity V at each date. Evaluate next the effects of a demand shock to this economy.

D. IMPACT OF A RECESSIONARY DEMAND SHOCK

Introduce, now, a (multiplicative) demand shock parameter $\lambda \neq 1$, which evolves over time according to an AR(1) process $\lambda_t = \rho \mathcal{S}_t \lambda_{t-1} + \varepsilon_t$, where $\rho \geq 0$ is a persistence parameter, $\mathcal{S}$ is a market signal variable, to be defined later, and $\varepsilon \sim \mathrm{N}(0, \sigma)$ is an innovation term, representing new information available at time t affecting the demand-side parameter λ_t.[8] A value $\lambda < 1$ is recessionary, while a value $\lambda > 1$ is expansionary ($\lambda \neq 1$ being understood, in practice, as parametrically augmenting or diminishing the value of aggregate output) .

Notice that higher values of ρ imply a longer persistence of the shock, although the size of the shock would decline over time (all else remaining the same) to the extent that $\rho < 1$. Nothing prevents $\rho \geq 1$, implying indefinite persistence (if $\rho = 1$) or even amplification of the original shock (if $\rho > 1$).[9] In an economy where agents share the WCB and behave accordingly, price and quantity adjustments are instantaneous and, therefore, $\rho = \rho_{WCB} = 0$.

At each date, the market signaling variable $\mathcal{S}$ reflects how agents read and interpret any observed changes in prices and quantities:

[8] Notice that increasing values of ρ lengthen the persistence of the shock, although the size of the shock would decline over time (all else remaining the same) as $\rho < 1$. Of course, nothing prevents $\rho \geq 1$, implying indefinite persistence (if $\rho = 1$or even increasing amplification of the original shock (if $\rho > 1$). More broadly, one could think of more complex (nonlinear) dynamics governing the shock, including ρ depending on the size of λ or taking into account its interaction with the behavioral response of the agents and the policy authorities, as discussed below in the text.

[9] The persistence parameter, which governs the evolution of shocks, is shaped by structural factors such as market structure, institutional frameworks, consumer and firm behavior, financial market characteristics, and global integration. Rigid labor markets, fiscal and monetary policies, consumption habits, credit constraints, and leverage levels play crucial roles in determining the extent to which shocks persist. Additionally, trade openness, technological dynamics, demographic trends, income inequality, and policy credibility influence how agents form expectations and adapt to market signals. Together, these factors interact to determine the duration and intensity of demand-side fluctuations over time.

(22) $\mathcal{S}_t = \mathcal{S}(\hat{\boldsymbol{x}}_t, \hat{\boldsymbol{q}}_t)$

where vectors $\boldsymbol{x}$ and $\boldsymbol{q}$ include, respectively, the prices *w*, *p*, and *r*, and quantities *N*, *K*, *c*, and *i*, and each of these elements is expressed as a deviation from its steady-state (optimal) values.[10] As noted, under the WBC, agents' expectations of future prices and quantities are always consistent with market-clearing conditions, so that:

(23) $\mathcal{S}_t = \mathcal{S}(\hat{\boldsymbol{x}}_t, \hat{\boldsymbol{q}}_t) = \mathcal{S}_{WCB} \lessgtr 0, if\ \mathcal{S}(\hat{\boldsymbol{x}}_t, \hat{\boldsymbol{q}}_t) \gtrless 0$

which implies that i) $\lambda_t = \rho_{WCB}\mathcal{S}_{WCB}\lambda_{t-1} + \varepsilon_t = \varepsilon_t$, that is, in a neoclassical economy where agents share the WBC, any demand shock is transitory and caused by exogenous events, and ii) any (positive or negative) price or quantity deviation from steady state is automatically corrected by an opposite change in the market signaling variable, so that for it offers an incentive (arbitrage opportunity) that rational agents will exploit through competition (arbitrage), , in a self-correcting progression. As the shock is aborbed through price adjustments, the economy (is expected by the agents to) return to its original, optimal, steady-state equilibium position.[11] ***Under the WCB, agents believe the economy works the way the convetion tells them it works, and act accordingly.***

To analyze the effects of shock λ under the WCB (that is, with $\rho_{WCB} = 0$), apply it to aggregate output, Eq. (15):

(24) $Y_t = \varepsilon_t A_t K_t^{\alpha} N_t^{1-\alpha}$

implying

(25) $\mathbb{E}_t[\mathrm{y}_{t+1}] = \varepsilon_t A_{t+1} K_{t+1}^{\alpha} N_{t+1}^{1-\alpha}$

[10] In this Walrasian context, the terms "optimal" and "steady state" invariably refer to "full employment," indicating the absence of resources being left involuntarily un(der)utilized.

[11] For this reason, price signals would be fully informative for agents acting under the WBC, with Eq. (23) thus reducing to $\mathcal{S}_{WCB} = \mathcal{S}(\hat{\boldsymbol{x}}_t) = 0$.

and derive the changes in N and K caused by shock λ, for given values of w/p and r, and the adjustments in w/p and r needed to restore optimal N and K after the shock, as it would be expected to happen in a neoclassical economy. To do so, linearize Eqs. (19) and (20) around the steady-state value of the key variables, linearize the value of shock λ as $\hat{\lambda}_t = \lambda_t - 1$, and assume technology A constant. The responses of labor and capital are thus:

(26) $$\widehat{N}_t^{WCB} = \frac{\gamma}{1+\gamma}\hat{\varepsilon}_t < 0$$

and

(27) $$\widehat{K}_t^{WCB} = \frac{1}{1+\gamma}\hat{\varepsilon}_t < 0$$

that is, both the demand for labor and the demand for capital fall temporarily in response to the recessionary shock ($\hat{\varepsilon}_t < 0$).

Linearizing, then, Eqs. (17) and (18) and substituting the expressions for $\widehat{N}_t^{WCB}$ and $\widehat{N}_t^{WCB}$, having posited $\gamma > 1$,[12] yield the required real wage and real interest rate downward adjustments to keep capital and labor fully employed after the shock:

(28) $$\left(\widehat{\frac{w}{p}}\right)_t^{WCB} = \alpha\frac{\gamma-1}{1+\gamma}\hat{\varepsilon}_t < 0$$

and

(29) $$\hat{r}_t^{WCB} = \gamma\frac{1-\alpha}{1+\gamma}\hat{\varepsilon}_t < 0$$

Considering the nominal wage and output price separately, their respective adjustments are:

(30) $$\widehat{w}_t^{WCB} = \left(\alpha\frac{1-\gamma}{1+\gamma} - 1\right)\hat{\varepsilon}_t < 0$$

and

[12] See footnote 7.

(31) $\hat{p}_t^{WCB} = -\frac{1}{1+\gamma}\hat{\varepsilon}_t < 0$

Notice from Eqs. (28) and (29) that both the real wage and the real interest rate must adjust to restore full resource employment, since labor demand and capital demand are tied each to different marginal products that are influenced by different factors in the production function. If only one of them adjusts to restore equilibrium in one market, the other market would remain off balance, leading to labor unemployment or excess capital.

Notice that the economy is poorer than before the shock only to the exent that the shock persists. However, since $\rho_{WCB} = 0$, in a pure neoclassical economy, no social losses (in terms of output and/or employment) may persist beyond the one-period recessionary shock ε_t.

4. KEYNESIAN UNEMPLOYMENT IN A NEOCLASSICAL ECONOMY

As noted, when the WBC prevails, the adjustment of prices following a shock is perceived by the agents as the efficient response of the economy, generating the right incentives for recovering full employment.

What happens, then, if in the same economy the agents hold a different conventional belief, one where, for instance, reductions in prices and quantities following the assumed recessionary demand shock are taken as signals that the economy might further weaken?

Call this belief the ***Keynesian Conventional Belief*** **(KCB)** and, using Eq. (22), define it as:

(32) $\mathcal{S}_t = \mathcal{S}(\hat{\boldsymbol{x}}_t, \hat{\boldsymbol{q}}_t) = \mathcal{S}_{KCB} \gtreqless 0, if\ \mathcal{S}(\hat{\boldsymbol{x}}_t, \hat{\boldsymbol{q}}_t) \gtreqless 0$

Notice that $\mathcal{S}'_{KCB}\mathcal{S}'_{WCB} < 0$; thus, comparing Eqs. (32) and (23), two main differences can be identified. Under the KCB:

- Price and quantity deviations signal changes in macroeconomic conditions: positive (negative) deviations mean that agents perceive a strengthening

(weakening) aggregate demand. Notice that while it is realistic to assume that agents consider quantity signals, in addition to price signals, this assumption is not stictly necessary and, as for the WCB case, agents can be assumed to consider prices signals only.

- Function $\mathcal{S}$ varies directly with price and quantity deviations (i.e., there is no self correction), with implications for the persistence of the demand shock $\lambda_t = \rho\mathcal{S}_t\lambda_{t-1} + \varepsilon_t$, since larger deviations cause the shock (and its effects) to persist, until some corrective mechanism is exogenously introduced.

Very importantly, notice also that because $\mathcal{S}'_{KCB} > 0$, any shock moves the economy further away from the full-employment position, implying necessarily that $\rho = \rho_{KCB} > \rho_{WCB} = 0$. Under the KCB, thus, any shock would be more persistent than the same shock under the WCB, and the persistence would be longer the larger the market signal. Parameter ρ, thus, becomes variable $\rho_{KCB} = \rho(\mathcal{S})$, with $\rho' > 0$.

Notice that values of λ proximate (equal to) 1 make the shock and its effects more persistent (permanent), causing typical Keynesian underempoyment to hold and the economy to stagnate.

When integrating the KCB into the economy's model, the intemporal plans of households and firms incorporate expected output. Considering shock $\lambda_t = \rho_{KCB}\mathcal{S}_t\lambda_{t-1} + \varepsilon_t \neq \varepsilon_t$ and its (anticipated) iterations with future output, setting (for simplicity) the expected future shocks equal to zero, and assuming invariant technology *A*, expected output is given by:

(33) $\mathbb{E}_t[\mathrm{y}_{t+1}] = Ae^{\rho(\mathcal{S}_t)\mathcal{S}_t\lambda_{t-1}}k_{t+1}^{\alpha}n_{t+1}^{1-\alpha}$

which changes the household's Euler equation and the firm's profit equation into, respectively:

(34) $c_t = \frac{\theta Ae^{\rho(\mathcal{S}_t)\mathcal{S}_t\lambda_{t-1}}k_{t+1}^{\alpha}n_{t+1}^{1-\alpha}}{\beta(1+r_{t+1})}$

where θ is the average propensity to consume out of output, and

(35) $\underset{\{n,k\}}{\text{Max}}\, \mathbb{E}_t \left[A e^{\rho(\mathcal{S}_t)\mathcal{S}_t \lambda_{t-1}} \sum_{t=\tau}^{\infty} \beta^t k_{t+\tau}^{\alpha} n_{t+\tau}^{1-\alpha} \left(k_t^{\alpha} n_t^{1-\alpha} - \frac{w_t}{p_t A e^{\lambda_t}} n_t - \frac{r_t}{A e^{\lambda_t}} k_t \right) (1+r_t)^t \right]$

Replicating the calculations done for the WCB case, and thus linearizing the demand shock $\hat{\lambda}_t = \frac{1}{1-\rho(\mathcal{S}_t)\mathcal{S}_t} \hat{\varepsilon}_t$, the adjustments of the variables in the KBC case are:

(36) $\widehat{N}_t^{KCB} = \frac{1}{(1-\alpha)[1-\rho(\mathcal{S}_t)\mathcal{S}_t]} \hat{\varepsilon}_t < 0$

(37) $\widehat{K}_t^{KCB} = \frac{1-\alpha}{\alpha[1-\rho(\mathcal{S}_t)\mathcal{S}_t]} \hat{\varepsilon}_t < 0$

(38) $\left(\widehat{\frac{w}{p}}\right)_t^{KCB} = -\frac{\alpha}{(1-\alpha)[1-\rho(\mathcal{S}_t)\mathcal{S}_t]} \hat{\varepsilon}_t < 0$

(39) $\hat{r}_t^{KCB} = \frac{\rho_t - 1}{1-\rho(\mathcal{S}_t)\mathcal{S}_t} \hat{\varepsilon}_t + \hat{\varepsilon}_{t+1} < 0$

(40) $\widehat{w}_t^{KCB} = \left[\frac{\mathcal{p}}{(1-\beta\rho)[1-\rho(\mathcal{S}_t)\mathcal{S}_t)} - \frac{\alpha}{(1-\alpha)[1-\rho(\mathcal{S}_t)\mathcal{S}_t]} \right] \hat{\varepsilon}_t < 0$

(41) $\hat{p}_t^{KCB} = \frac{\mathcal{p}}{[1-\beta\rho(\mathcal{S}_t)\mathcal{S}_t][1-\rho(\mathcal{S}_t)\mathcal{S}_t]} \hat{\varepsilon}_t < 0$

where parameter $\mathcal{p} > 0$ measures the price-to-cost sentivity.

Comparing Eqs. (33), (36) and (37) reepctively with Eqs. (25), (26) and (27), it emerges that the decline in output, labor and capital resulting from the recessionary shock under the KCB is more pronounced and persistent than under the WBC, driven by the agents' belief that price and quantity changes reflect ongoing demand changes (with persistence being dependent on the variable ρ and its interaction with the market signaling variable $\mathcal{S}$, as reflected in the composite variable $\rho(\mathcal{S})\mathcal{S}$, where $\rho > 0$ and $\mathcal{S}' > 0$.

This variable plays a key twofold role: it captures i) the different responses to shocks by a fully competitive economy under different conventional beliefs, everything elese remaining constant, and ii) the way the prevailing conventional belief influenes the dynamics of a shock (i.e, its duration

and intensity). The variable $\rho(\mathcal{S})\mathcal{S}$ makes shocks endogenous to the agents' expectations, which are influenced by prevailing conventional beliefs.

Notice that, under the KCB, stabilizing nominal wages and prices would attenuate the anticipated impact of the shock on output, labor and capital. This is in contrast to the commonly accepted argument that downward rigidity in wages and prices worsens the impact of recessionary shocks on resource employment and that, conversely, their flexibility improves the economy's capacity to recover from these shocks.

More on this issue will follow shortly, but to conclude this section it is worth pointing out that the agents' expectations (and the economy's outcomes) under the KCB are as rational as those formed by the agents under the WCB: ***Agents believe the economy works the way the prevailing convention tells them it works, and act accordingly.*** Furthermore, in contrast to the WCB case, the shock dynamics in the KCB – specifically their duration and intensity – are significantly shaped by the expectations and responses of the agents. This is further compounded by the impact of government stabilization policies and their announcements, provided these are perceived as credible, as they also influence agents' expectations and reactions.

Conclusion: If agents operating in a neoclassical economy hold non-neoclassical beliefs (such as Keynesian ones), the economy's response to shocks will be influenced by these beliefs, leading to non-neoclassical outcomes (such as Keynesian ones). This conclusion is exemplified by Professor Hahn's thought-provoking remarks, highlighted in the epigraphs of this article. In his words, as Monetarism had become the new conventional belief (supplanting Keynesian orthodoxy), the public behaved in ways that corresponded with monetarist predictions.

5. KEYNESIAN REFLECTIONS ON POLICY

In closing this article, a few remarks are in order on the policy implications that can be drawn from a careful reading of the (certainly more realistic) KCB context. From what precedes, it follows that if

fiscal and monetary policies are aimed at supporting nominal wages and prices, for instance by using public spending and taxation, this stabilizes agent expectations and helps agents coordinate their acts toward full employment. While this statement is anathema to the proponents of price flexibility (and expansionary austerity) as a solution to macroeconomic imbalances, it reflects the logical outcome of the Keynesian perspective. This perspective explains how individuals perceive the economy and react to market signals in the way and with the outcomes discussed in Section 4. However, as shown below, caution is needed when invoking the use of active macro policies while neglecting the underlying structural conditions of the economy.

Apply the model above to an economy with a long history of stagnation, whose business environment is not conducive to investment, that is, where $i_t = i(y_t, r_t)$, with a low i_t and a high i_r, and where the stock of capital is below what would be necessary to employ all available labor, so that $K_t < K^*$ and $N_t < N^*$, real wages are lower and so are labor and capital productivity, that is, $\frac{w_t}{p_t} = F_N(N_t, K_t) < F_N(N^*, K^*)$ and $r_t = F_K(N_t, K_t) < F_K(N^*, K^*)$. Assume the government pursues full labor employment through deficit spending $G_{t+\tau} - T_{t+\tau} > 0$ over an indefinite period $\tau \in (0, \dots)$, where $G_{t+\tau} = \mathcal{g}(N^* - N_{t+\tau})$, and $T_{t+\tau} = \vartheta Y_{t+\tau}$, with public debt accumulation $D_{t+\tau} = D_{t+\tau-1}(1 + r_{t+\tau-1}) + \mathcal{g}(N^* - N_{t+\tau}) - \vartheta Y_{t+\tau}$. Assume, also, that the central bank maneuvers the interest rate to keep the level of P stable, so that $r_t = r_{t-1} + r_P \hat{P}_t$, with $r_P > 0$. Bearing in mind that $K_t < K^*$ and changes sluggishly, prices tend to increase as output rises in response to higher demand, due to constrained capacity, prompting the central bank to adjust the policy rate, so that $r_P \hat{P}_t = r_P \phi \hat{Y}_t$, with $\phi > 0$.

Linearizing the key variables of the model around the steady state, the dynamics of public debt would be:

(42) $\quad \widehat{D}_{t+1} = (1 + r_t)\widehat{D}_t + D_t r_P \phi \hat{Y}_t + \mathcal{g}\widehat{N}_t - \vartheta \hat{Y}_t$

where $D_t r_P \phi \hat{Y}_t$ represents the burden of rising interest rates on the public debt, taking into account the central bank's response to price pressures driven by output gaps.

Given the economy described, some criticalities must be considered. The suboptiomal level of the capital stock, the persistent investment stagnation, the associated demand-driven inflationary tendency, and the central bank's policy response, all require the government to extend its deficit spending in an attempt to close the output gap and achieve labor full-empolyment. At the same time, though, this exposes public debt to incresing risk of unsustainability.

In terms of Eq. (42), the persistence of the output gap and labor unemplioyment (casued by the slow adjustment of capital) leads to rising interest rate (lest the price level increases) and to growing debt. Specifically, after manipulating Eq. (42) and considering the general debt sustainability condition $r \leq \mathcal{Y}$, where $\mathcal{Y}$ is the rate growth of output, the same condition expressed in terms of fiscal deficits is:

$$(43) \quad \left| g\hat{N}_t - \vartheta \hat{Y}_t \right| \leq \bar{D}_t \left(\frac{r_{t-1} + r_P \phi \hat{Y}_t r_t - \mathcal{Y}}{1 + \mathcal{Y}} \right)$$

which says that the primary deficit (in absolute value) should not outpace the growth-adjusted debt service burden to avoid debt becoming unsustainable. This implies an inherent tension between the government's plan to run persistent deficits to achieve full empoyment (under the economic structural constraints assumed above) and the sustainability constraint. Even more so, to the extent that persistent deficits lead to increasing interest rates, over time, which makes the constraint increasingly binding.

Here is where the original Keynes's policy approach (far from its vulgarized interpretations) takes on an essential relevance. For an economy like the one depicted above, relying exclusively on fiscal and monetary policies to redress the macro-imbalances would

be ineffective and potentially destabilizing (as real-world experience shows). A different recipe is required, as advocated by Keynes, which should fundamentally center on the "anti-cyclical" (rather than "counter"cyclical) role of the public sector, supported by a conservative use of the fiscal lever (Aspromourgos, 2018). In practice, the adoption of large socialization programs of investment, industrial policies, and measures to improve the business environment would help expand the quantity and improve the quality of capital, increase capital and labor productivity, and raise real wages and labor employment. The economy's capacity and output potential would grow and the public deficits needed to close the output gap and to achieve full employment would be smaller in size and shorter in duration. All this would weaken the pressure on prices, allow for lower real interest rates, and convey to the agents signals of higher and more equitable growth and greater stability. Synergies could be extracted from the two roles of the public sector (anti-cyclical and counter-cyclical) by using the debt (fiscal budget deficits) to induce the expansion of (private and public) *K*, in the given economic conditions, rather than just increasing output by supporting nominal incomes and consumption. This would bear the additional benefit of letting the economy generate the future resources needed to repay the debt and to keep it within sustainable limits – or, more meaningfully, within the limits beyond which repaying it would drag from the economy's resources.

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