Journal of Post Keynesian Economics

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/mpke20

Capital productivity and the decreasing wage share in the United States: a Keynesian Approach

Carles Manera, Ferran Navines, Jose Pérez-Montiel & Javier Franconetti

To cite this article: Carles Manera, Ferran Navines, Jose Pérez-Montiel & Javier Franconetti (2022) Capital productivity and the decreasing wage share in the United States: a Keynesian Approach, Journal of Post Keynesian Economics, 45:3, 429-453, DOI: 10.1080/01603477.2022.2068034

To link to this article: https://doi.org/10.1080/01603477.2022.2068034

JOURNAL OF POST KEYNESIAN ECONOMICS
2022, VOL. 45, NO. 3, 429–453
https://doi.org/10.1080/01603477.2022.2068034

Routledge
Taylor & Francis Group

Capital productivity and the decreasing wage share in the United States: a Keynesian Approach

Carles Manera, Ferran Navines, Jose Pérez-Montiel, and Javier Franconetti

ABSTRACT
We argue that in the US there is a causal relationship running unidirectionally from negative shocks in capital productivity to negative variations in the wage share. We sustain that, faced with a capital productivity decrease, the US firm sector pushes wages down to maximize the rate of profit. Through asymmetric SVAR techniques that are robust to endogeneity and structural breaks; we show that decreases in capital productivity unidirectionally cause decreases in the wage share. We offer some possible explanations for that.

KEYWORDS
Capital productivity; wage share; asymmetric causality; SVAR; United States

Since the seventies, the US working class has experienced a generalized stagnation of its incomes and the wage share has substantially decreased (Taylor 2020; Stirati and Meloni 2021). This has been studied by several Keynesian authors such as Hein (2015), Kapeller and Schütz (2014, 2015), Stirati (2018), Kohler, Guschanski, and Stockhammer (2019), Nishi and Stockhammer (2020), and Bengtsson and Stockhammer (2021), among others. As Tridico and Pariboni (2018) and Fasianos, Guevara, and Pierros (2018) document, Keynesian authors generally coincide in that the set of neoliberal policies boosting financialisation and globalization implemented from the seventies onwards explain the reduction of the wage share (Shaikh 2017; Meloni and Stirati 2021). These policies include, among others, deregulation of the financial and of the labor markets, liberalization of trade, capital mobility, wage flexibility, structural adjustments, the dismantle of the welfare state, the downsize of the State and of its tasks, the reduction of the progressive nature of taxation, and the policy shift from full employment to the fighjting of inflation (Tridico and Pariboni 2018, 239).

Carles Manera is Full Professor of Economic History at the University of the Balearic Islands. He is Senior Researcher in 4 competitive R&D projects and Member of the Governing Council of the Bank of Spain.
Ferran Navines is a former associate professor of economics at the University of Girona. He is senior Economist of the Economic and Social Council (CES) of the Balearic Islands and Director of its Annual Report. Senior Technician of the General Directorate of the University of the Balearic Islands; and Councilor of the CES on behalf of the Government of the Balearic Islands.
Jose Pérez-Montiel is PhD in economics and assistant professor of economic history at the University of the Balearic Islands.
Javier Franconetti is Assistant professor of applied economics at the University of the Balearic Islands.

In this paper, we suggest that the reduction of the wage share does not only obey to the new legislation and regulation scheme stablished during the seventies. We sustain that decreases in the wage share generally take place due to decreases in capital productivity (Lapavitsas 2013; Manera, Navinés i Badal, and Franconetti 2016; Manera, Navinés, Franconetti, and Pérez-Montiel 2019): faced with a decrease in capital productivity, the firm sector pushes wages down in order to maximize the rate of profit. With insights from Sylos Labini (1984, 1999), Manera, Navinés i Badal, and Franconetti Manchado (2016) and Manera, Navinés, Franconetti, and Pérez-Montiel (2019) explain that when capital productivity increases or remains stable, decreases in the wage share are detrimental for the firm sector (because lower wage growth negatively affects sales and profits); however when capital productivity decreases (usually in phases in which markets are rigid to expand due to the effects of globalization and growing competition), the way firms can maximize the profit rate is by increasing the profit share, thereby pushing wages down. Under the neoliberalism shame (see Palma 2009), Unions are more sensitive to accept the wage reduction, since trade liberalization, deregulation of the labor market and capital mobility threaten thousands of jobs (see Vercelli 2015; Vercelli and Vercelli 2017).

In Keynesian strands, it is questionable how the US capitalism, as we know it (that is, with a very social and political role attributed to consumerism and mass consumption), has survived to the decrease in the purchasing power of the wage-earning households since the seventies. The secular trend of consumption, and therefore that of investment, have not plummeted due to the decrease of the wage share (see Pérez-Montiel and Manera 2020). Many post Keynesian authors, such as Bricall (2013), Kapeller and Schütz (2014), Stockhammer (2015), Manera (2015), Hein (2019) and Dünhaupt and Hein (2019), among others, suggest that since then aggregate consumption has been fueled by household debt, which has acted as a substitute of wages. In turn, the credit bubble is fed back by the growing inequality in income distribution (Bellettini and Delbono 2013). This has led many researchers to focus on the viability of a debt-led growth regime (also called *financial capitalism*), which collapsed in 2008 (see Barba and Pivetti 2008; Stockhammer and Wildauer 2016; Setterfield and Kim 2016; Pariboni 2016; Kohler 2017; Fontana, Pitelis, and Runde 2019; Pierros 2020; Pariboni, Paternesi Meloni, and Tridico 2020; Stockhammer and Kohler 2020, among others).

In the present paper, we do not focus on the macroeconomic effects of the mentioned changes in income distribution, neither on the sustainability of the mentioned debt-driven growth regime. Instead, we study whether

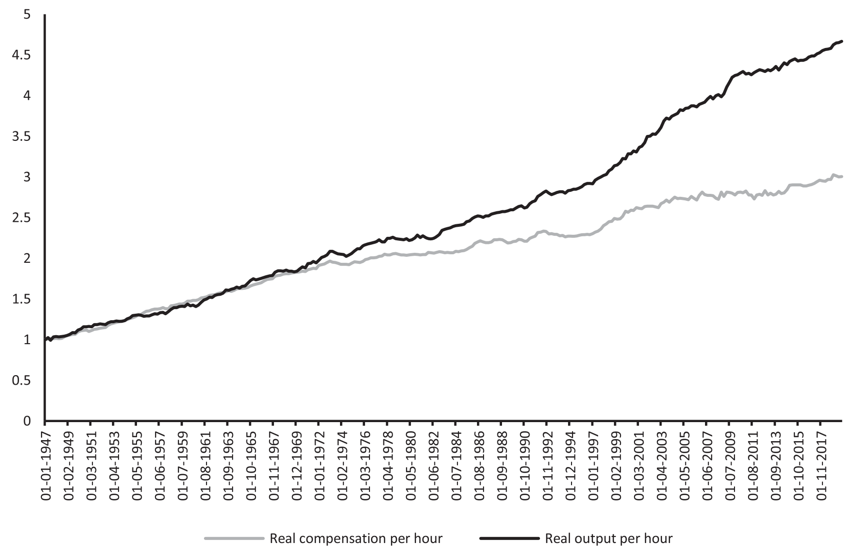


Figure 1. Evolution of Wage Compensation and Labor Productivity in the USA 1947–2019 (1947 = 1). Source: Own elaboration with Federal Reserve Bank of St. Louis data. Seasonally adjusted quarterly data. Non-farm sector: Real compensation per Hour and real output per hour worked.

the reductions of the wage share in the US are caused by decreases in capital productivity. We believe that our findings open the door for alternative future research lines. We argue that the behavior of the rate of profit has an ex-ante link: capital productivity (which is motorized by the degree of capacity utilization and the incremental capital output ratio) conditioned to the social relations that explain the dynamics of functional income distribution.

The paper proceeds as follows: The first section, *Capital productivity and the wage share: A preliminary discussion*, exposes how conventional economics tries to explain why the wage share has increased during the last decades. The *A Keynesian approach to study the decreasing wage share* Section exposes our proposed theoretical approach to explain the dynamics of capital productivity and income distribution. The *Data and methodology* and *Empirical results* Sections present the econometrics methodology and the results of our empirical analysis for the US economy; while the *Conclusions* Section concludes.

Capital productivity and the wage share: a preliminary discussion

According to neoclassical economics, real wages track labor productivity. However, from the seventies onwards real wages for the typical worker have flat-lined, while labor productivity has continued to increment (see

Figure 1). It explains the fall of the wage share, since it falls when average labor productivity increases (decreases) faster (slower) than real wages.

Various researches in neoclassical strands suggest that the cause of a decreasing wage share is technical change (see the Economic Co-operation and Development [OECD] 2012; Kumhof, Rancière, and Winant 2015; Burger 2015; Grossman et al. 2017; Mertens 2019; Knoblach, Roessler, and Zwerschke 2020; Dolado, Felgueroso, and Jimeno 2021, among others). Changes in information technology might have increased the productivity of physical capital relative to labor productivity, thereby leading to a decreasing wage share (OECD 2012).[1] In addition to the role of technical change, neoclassical authors also attribute the decreasing wage share to the decreasing power of Unions. According to Rodrik (1999), the outside option for the owners of capital reduces the bargaining power of workers. Globalization and financialisation lead this to occur (see International Labor Office (ILO) 2013).

Financialisation is associated with an increased role of aggressive, returns-oriented investor institutions, and is linked to more outside options for domestic capital. If financial investors perceive good outside income options (i.e. higher rates of return offshore), they will require a higher rate of return on domestic investment. This also implies that, at any given rate of return, financial investors will supply less investable funds locally than before (Burger 2015, 168). The increase in the required rate of return and a smaller supply of investable funds lead to an upward shift of the curve of investable funds, which puts downward pressure on capital-output ratios. This presses firms to deliver such higher returns, in pursuit of which firms typically implement capital-augmenting labor-saving technology that causes a decline in labor's income share (Burger 2015, 168).

The above stated suggests that the neoclassical approach attributes changes in income shares to labor-saving technical innovation. These conclusions rely on a well-behaved factor substitution mechanism and the consequent tendency to the full employment of factors. However, the factor substitution mechanism is unable to generate a well-defined interest-elastic investment function from the demand-for-'capital' unless the continuous full employment of labor is assumed—an illegitimate assumption, since the tendency to full employment should emerge as a result of the analysis (see Petri 2019).[2] According to Petri (2015, 2019), the implications of this basic observation justifies the adoption of a totally non-neoclassical approach to distribution, employment and growth.

On the other hand, nonmainstream approaches (Palley 2013; Stockhammer 2009; Hein 2015; Kohler, Guschanski, and Stockhammer 2019, among others) also associate changes in income distribution with the effects of globalization and financialisation. However, these approaches do not rely on connections between changes in distribution and changes in the labor to output ratio or in the capital stock to output ratio. Thus, decreases in nominal and real wages are not seen as the route that leads to full employment, because employment levels depend, even in the long run, on the principle of effective demand (Stirati 2018, 265). Stirati (2018) describes how changes in distribution have been analyzed by nonmainstream approaches, particularly within the framework of the surplus approach. Our paper is in this line of research.

A Keynesian Approach to study the decreasing wage share

With insights from Sylos Labini (1984, 1999) and Navines (1989), Manera, Navinés, and Franconetti (2016), Manera, Navinés, Franconetti, and Pérez-Montiel (2019) explain capitalism dynamics through the evolution of income distribution. Sylos Labini's research program constitutes a "Smithian" interpretation of the central aspects of classical political economy, which are characterized by the representation of the economic process as a circular one. This approach focuses on the causes that allow the production of surplus and determine its distribution -between the different social classes and the various sectors of the economy- and its use (Roncaglia 2019, 420–421).

According to Sylos Labini, the periods of maximum economic growth are characterized by oscillations of the profit share (q) within an equilibrium range (q^*). In terms of real Gross Value Added (GVA) at factor cost, output (Y) can be represented as Y = Wage income (W) + Capital income (E), or equivalently: $1 = W/Y + E/Y$. Then, we can describe the profit share as:

$$q \equiv 1 - (W/Y) \equiv 1 - (W/L)/(Y/L) = 1 - (\omega/\pi L),$$

where L is the quantity of workers employed, ω is the average wage rate, and πL is labor productivity. If there is an exact equality between the growth rate of real unit labor costs, $g(\omega)$, and the growth rate of real labor productivity, $g(\pi L)$; q remains unchanged and, thus, there is a period of perfect stability in the distribution of income between wages and profits. The values of q within q^* are compatible with the expected profitability of investment and with the evolution of wages in line with labor productivity growth. From an institutionalist approach, this rule of behavior is characterized by a tendency to negotiate collective agreements in such a way that $g(\omega) = g(\pi L)$.

As stated, neoclassical economics suggests that real wages should track labor productivity; however, in the real economy, $g(\omega)$ and $g(\pi L)$ rarely match perfectly. But if some wage pact domains the collective bargaining sphere; then, according to Sylos Labini, the bulk of the economy tends to reflect a process of economic growth recovery, while there is also a process of stability in income distribution. This allows us to infer and obtain the equilibrium values of q (i.e., q^*) when the economy goes through one of these periods of stability in the process of growth and distribution (see Manera, Navinés, and Franconetti 2019).

The period of maximum stability of q in the United States economy, which coincided with the period of maximum economic growth, was throughout the *Keynesian regulatory phase*. More specifically, the greatest stability of q took place between 1950 and 1968, within the full effect of the Treaty of Detroit (See Armstrong, Glyn, and Harrison 1991; Noah 2012).[3] Figure 1 shows that the period 1950–1968 was mainly characterized by the *pari pasu* evolution of wages and labor productivity. In this period, wages were able to maintain the purchasing power and aggregate consumption without appealing to an increasing households' indebtedness. In turn, business profits, and their growth expectations, due to the sustained growth of consumer demand, were enough to maintain the sustainability of investment financing, economic growth and employment.[4]

Sylos Labini's contribution also helps explaining the imbalances occurred when q is out of its equilibrium values. If $g(\omega)$ does not adjust to $g(\pi L)$ for a given rate of growth of employment; then the growth rate of aggregate demand and that of aggregate supply do not match. If it is due to an excess of wage growth ($g(\omega) > g(\pi L)$), inflation problems generated by excessive production costs might emerge; so the international competitiveness of the economy cannot be maintained over time, thereby producing a stagflation crisis. If it is due to insufficient wage growth ($g(\omega) < g(\pi L)$), problems of insufficiency of aggregate demand arise and an adjustment process is triggered.

On the other hand, Sylos Labini's approach is also useful to study the dynamics of the rate of profit (r). The rate of profit can be represented by the ratio of the Net Operating Surplus (E) to the net capital stock (K); thus, $r = E/K$. Therefore, we can explain r through the following well-known identity (see Lavoie 2014, 355 and Hein 2014, 6):

$$r \equiv \frac{E}{K} \equiv \frac{E}{Y} \cdot \frac{Y}{K} = q \cdot \pi k,$$

where $q = E/Y$ is the profit share in terms of Net Operating Surplus and $\pi k = Y/K$ represents *capital productivity*. We are aware that the proper decomposition of the rate of profit is $r \equiv \frac{E}{Y} \cdot \frac{u}{v}$ (as suggested by Weisskopf, 1979), where u is the degree of productive capacity utilization and v is the incremental capital output ratio (the amount of capital required to increase each unit of total output). Thus, a change in what we call capital productivity (πk) might ensue from a technical (or productive techniques) change (change in v) or from a change in aggregate demand that causes a change in u. Since in the literature there is a huge controversy on the proper data to be used as proxies of u and v (see Fazzari, Ferri, and Variato 2017; Gahn and González 2019; Gahn 2020, 2021; Nikiforos 2020, among others), we decide to use $\pi k = Y/K$ instead of $\pi k = u/v$.

With insights from Sylos Labini (1984, 1999) and Navines (1989), we see that in epochs in which q oscillates within its equilibrium range (due to a labor agreement, for example), economic growth becomes more robust and the evolution of r basically depends on the evolution of πk. In epochs of recurrent decreases of πk, however, firms can increment r only by pushing q up, which means pushing wages down. Following Sylos Labini, Manera et al. (Manera, Navinés i Badal, and Franconetti 2016, Manera, Navinés, Franconetti, and Pérez-Montiel 2019) show that when πk grows or remains stable, an increase in q is detrimental for the rate of profit; however, when πk decreases, increasing q becomes necessary for the firm sector to maximize the rate of profit.

Our hypothesis is that in the US the regulation change of the seventies inaugurated an epoch of increasing volatility that lead to recurrent contractions of aggregate demand, and thus of u (especially due to the reduction of the Government sector and the loss of Unions' bargaining power). This could have favored important institutional changes aimed at sustaining aggregate demand in a phase of increasing social inequalities: containment of the prices of consumer goods via imports from low-wage areas (see Perry and Cline 2016); which leaded to increasing domestic employment in labor-intensive tertiary sectors related to lower wages and lower productive returns (Navines 1989), which implied increases of v.

The mentioned institutional changes are key to understand the so-called *Great Moderation* (see Bernanke 2004; Kim 2020), which is characterized by recurrent reductions of πk. In other words, from the seventies onwards, the profitability of investment started not to coincide with the expected one by firms, thereby resulting in decreases of πk. According to Manera, Navinés i Badal, and Franconetti (2016), Manera, Navinés, Franconetti, and Pérez-Montiel (2019), in the event of decreases in πk, for the US firm sector becomes more profitable selling and/or producing abroad unless wages are pushed down. Thus, the recurrent decreases of the wage share (w) might be explained by the recurrent decreases of πk. In the following sections, we use econometric techniques to analyze causal relationships between capital productivity and the wage share.

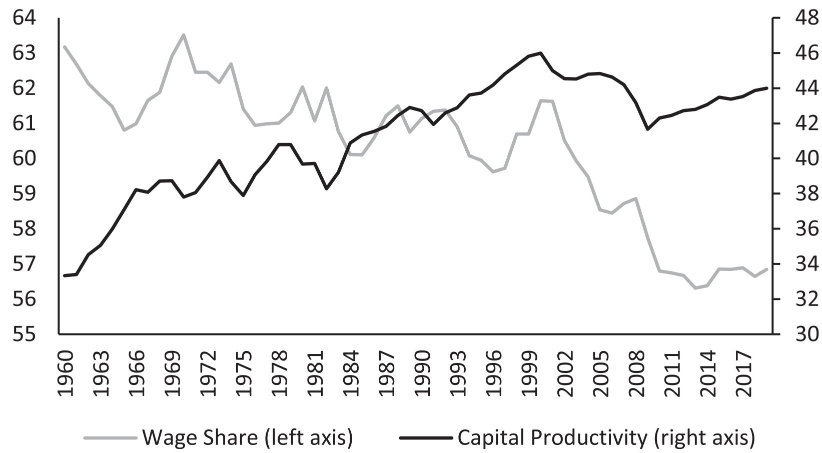


Figure 2. Capital productivity and the wage share (1960–2019). *Note*: Own elaboration with AMECO data. Data in percentage.

Data and methodology

Data

We employ annual series between 1960 and 2019 from the Annual Macro-Economic Database of the European Commission's Directorate General for Economic and Financial Affairs (AMECO). As a proxy variable for capital productivity (πk) we use the variable *Capital productivity* provided by AMECO (which is defined as Gross domestic product at 2015 reference levels per unit of net capital stock). As proxy of the wage share (w) we use the variable *Adjusted wage share* provided by AMECO (which is defined as compensation per employee as percentage of GDP at market prices per person employed). Figure 2 plots the series for the period 1960–2019. We can see that, while πk has a long-run increasing trend, w follows a long-run decreasing trend. However, if we look at short-run fluctuations; it seems that decreases in πk are followed by decreases in w; nevertheless, visual observation is not enough to extract conclusions, being necessary a more rigorous analysis of the statistical relationship between the two variables.

Asymmetric causal relationships

In time series analysis, focusing exclusively on the study of linear dependencies obviates some properties that are relevant when the series are nonlinear or have considerable nonlinearities (Pérez-Montiel and Manera 2022, 9). In fact, empirical studies confirm that many macroeconomic time series contain nonlinearities and are nonlinearly connected (see Marquez-Ramos and Mourelle 2019 and Pérez-Montiel and Pariboni 2022). These nonlinearities arise both in the dynamics of the individual series and in the relationships between two or more time series (Fiszeder and Orzeszko 2018, 329).

The problem of the linear approach to causality is its inability to detect nonlinear causal relationships between variables (Brock, Hsieh, and LeBaron 1991). Conventional (symmetric) causality tests do not allow to separately study the impacts of positive and negative shocks of one variable on another. In this regard, the approach of Hatemi-J (2012) allows for asymmetric causal effects between the variables: Positive and negative shocks may have different causal impacts. This method has been employed in recent researches in economics, such as Ranjbar et al. (2017), Shahbaz et al. (2017), Tugcu and Topcu (2018), and Saliminezhad and Bahramian (2020), among others.

On the other hand, one of the key assumptions of time series analysis is that of parameter stability, that is, the parameters in equations relating the variables do not change over the sample under consideration (Gupta, Gil-Alana, and Yaya 2015, 803). Given that we consider a relatively long span of time (1960–2019), it is likely that the relationship between πk and w has experienced structural breaks. In fact, as stated in previous sections, there have been different regulatory phases in the period under analysis. However, a benefit of using asymmetric causality testing is that, unlike the standard causality testing, parameter instability/structural breaks do not affect the results; thus, it is robust to parameter instability (Ranjbar et al. 2017).

We examine the asymmetric causality relationships between πk and w by incorporating the partial sum decompositions specified by Hatemi-J (2012, 2014) and Hatemi-J and El-Khatib (2016) in the augmented vector auto regression (VAR) approach. Nonlinearities in VARs are normally modeled via threshold, smooth transition or Markov switching VARs. These methods allow for potential asymmetric effects between the variables, but are basically based on the same model without totally separating the positive shocks from the negative ones (Hatemi-J and Roca 2014, 3). The method of Hatemi-J (2012, 2014) can overcome this potential shortcoming. Thus, unlike other tests which allow for asymmetric effects, the method of Hatemi-J (2012, 2014) allows to investigate the impact of positive (negative) changes of one variable on positive (negative) changes of another variable or any other combination that one might be interested in (Hatemi-J, Al Shayeb, and Roca 2017, 1587). Thus, this method allows us to study whether a negative shock in capital productivity results in a negative response in the wage share.

Assume that πk_t and w_t have the following data generating process: $\pi k_{\mathrm{t}} \equiv \pi k_{t-1} + e_{1t} = \pi k_0 + \sum_{i=1}^{T} e_{1i}$ and $w_t \equiv w_{t-1} + e_{2t} = w_0 + \sum_{i=1}^{T} e_{2i}$, where πk_0 and w_0 are the initial values of πk and w respectively, and e_{1i} and e_{2i} are *i.i.d* with variance $\sigma^2_{e_1}$ and $\sigma^2_{e_2}$ respectively. Hatemi-J (2012, 2014) defines positive shocks as:

$$e^+_{1t} = \max(e_{1t}, 0) \text{ and } e^+_{2t} = \max(e_{2t}, 0);$$

while negative shocks are defined as:

$$e^-_{1t} = \min(e_{1t}, 0) \text{ and } e^-_{2t} = \min(e_{2t}, 0).$$

Thus, $e_{1t} = e^+_{1t} + e^-_{1t}$ and $e_{2t} = e^+_{2t} + e^-_{2t}$; while $\pi k_t = \pi k_0 + \sum_{i=1}^{t} e^+_{1t} + \sum_{i=1}^{t} e^-_{1t}$ and $w_t = w_0 + \sum_{i=1}^{t} e^+_{2t} + \sum_{i=1}^{t} e^-_{2t}$. With insights from Granger and Yoon (2002), Hatemi-J (2012) defines positive and negative shocks of each variable in a cumulative form as: $\pi k^+_t = \sum_{i=1}^{t} e^+_{1t}$; $\pi k^-_t = \sum_{i=1}^{t} e^-_{1i}$; $w^+_t = \sum_{i=1}^{t} e^+_{2t}$; and $w^-_t = \sum_{i=1}^{t} e^-_{2i}$. In a bivariate setting, there are four combinations of positive and negative shocks $((\pi k^+_t, w^+_t)$, $(\pi k^-_t, w^-_t)$, $(\pi k^+_t, w^-_t)$, and $(\pi k^-_t, w^+_t))$.

Structural vector auto regression analysis

As stated, we examine the asymmetric causal relationships between πk and w by incorporating the partial sum decompositions specified by Hatemi-J (2012, 2014) and Hatemi-J and El-Khatib (2016) in a structural vector auto regression (SVAR) approach. The use of a SVAR model allows to both examining asymmetric effects via positive and negative cumulative sums, as well as considering the restrictions imposed by the theoretical assumptions in the estimation process (Ozcelebi, 2019). With insights from Al-Shayeb and Hatemi-J (2016), Hatemi-J, Al Shayeb, and Roca (2017), and Ozcelebi (2019, 2021), we decompose the variables into cumulative positive and negative sums and use them to investigate their causal relationships via Impulse Response Functions (IRFs).

The original VAR approach employs a Choleski decomposition to obtain impulse responses; however, a Choleski decomposition implies a causal ordering that may itself not be credible. Another inherent weakness of a reduced form VAR model is its inability to consider the contemporaneous relationship between the variables. This generally causes cross-correlation among the residuals series. Although this may not undermine the properties of unbiasedness and efficiency of the estimation, it is likely to considerably affect the impulse responses (Tang, Wu, and Zhang 2010). To deal with it, it is common to introduce a contemporaneous coefficient matrix B_0 into the VAR model to serve as structural restrictions, thereby constructing a Structural Vector Auto Regression (SVAR) model.

A SVAR(p) can be represented as follows in Equation (1):

$$B_0 \boldsymbol{Y}_t = a_t + \sum_{i=1}^{p} B_i \boldsymbol{Y}_{t-p} + \varepsilon_t, \tag{1}$$

being $\boldsymbol{Y}_t$ the k x 1 vector of considered variables; B_0 the matrix of contemporaneous relationships between the k variables in $\boldsymbol{Y}_t$; B_i the $k \times k$ matrix of autoregressive slope coefficients; and ε_t the vector of serially uncorrelated structural shocks (see Kilian and Lütkepohl 2017). The B_0 matrix is estimated by the Maximum Likelihood method; which requires imposing and identifying restrictions on the contemporaneous relationships between the variables under analysis.

Empirical results and discussion

In this section we present the empirical results of our research. For the econometric analysis we transform the variables into logarithms for consistent and reliable empirical results. Our first step is to apply unit root and stationarity tests to know the degree of integration of the variables. We apply the Augmented Dickey–Fuller test (Said and Dickey 1984) and the nonparametric method of Phillips and Perron (1988). For robustness, we also present the results of the Dickey-Fuller Test with GLS Detrending (DFGLS) of Elliott, Rothenberg, and Stock (1996), the Elliot, Rothenberg, and Stock Point Optimal (ERS) test, and the Ng and Perron (2001) test. As can be seen in Table 1, the results of the unit root and stationarity tests suggest that the results are mixed (variables are I(0) and I(1) processes).

Since we focus on short-run dynamics; we follow the indications of Sims (1980) and Sims, Stock, and Watson (1990), who state that a VAR in levels correctly estimates the dynamics of the system.[5] Thus, we estimate a SVAR in levels, which is common in the VAR literature (see Elbourne, 2008; Farzanegan and Markwardt 2009; Tang, Wu, and Zhang 2010; Iwayemi and Fowowe 2011; Alom, Ward, and Hu 2013; Köhler and Stockhammer 2020, among others). The fact that some variables may be I(1) does not constitute a problem because the slope coefficients on the I(1) variables could be re-written as coefficients on differenced (and thus I(0)) variables (Stockhammer et al. 2019, 89). Additionally, using the variables in levels in the SVAR representation "avoids the controversial issue of which cointegration restrictions to impose in estimation" (Kilian and Lütkepohl 2017, 103).

Bivariate SVAR models

We first use the bivariate setting employed by Hatemi-J and Uddin (2012) and Hatemi-J (2012) and by the empirical literature stemming from it (Hatemi-J 2014; Hatemi-J and El-Khatib, 2016, 2020; Chang, Ranjbar, and Jooste 2017; Ranjbar et al. 2017; Uzuner and Ghosh 2021). Within this bivariate approach, if we are interested in testing for causality between the

Table 1. Stationarity tests results.

	ADF	DFGLS	PP	ADF with break
Model with intercept				
πk	−2.94**	−0.09	−3.09**	−4.60**
w	−0.88	−0.05	−0.86	−3.81
πk^+	−0.48	0.64	−1.98	−3.51
πk^-	−0.46	0.79	−0.49	−1.80
w^+	−1.46	1.51	−1.42	−2.58
w^-	−0.60	2.25	−0.61	−2.05
$\Delta\pi k$	−5.82***	−5.90***	−5.83***	−6.62***
Δw	−6.89***	−6.49***	−6.87***	−3.82***
$\Delta\pi k^+$	−1.99	−0.75	−16.31***	−11.63***
$\Delta\pi k^-$	−6.40***	−6.09***	−6.31***	−7.72***
Δw^+	−7.22***	−6.71***	−7.21***	−7.81***
Δw^-	−6.95***	−6.55***	−7.09***	−7.48***
Model with intercept and trend				
πk	−2.34	−1.28	−2.32	−5.13**
w	−2.18	−2.23*	−2.33	−3.54
πk^+	−3.89**	−2.23	−4.62***	−5.31**
πk^-	−2.65	−2.64	−2.43	−3.41
w^+	−1.22	−1.34	−1.22	−3.79
w^-	−2.73	−2.80*	−2.98	−3.88
$\Delta\pi k$	−6.23***	−6.18***	−6.09***	−28.57***
Δw	−6.84***	−6.70***	−6.82***	−7.41***
$\Delta\pi k^+$	−2.67	−1.30	−6.98***	−7.51***
$\Delta\pi k^-$	−6.37***	−6.40***	−6.27***	−7.69***
Δw^+	−7.41***	−7.07***	−7.41***	−8.34***
Δw^-	−6.88***	−6.81***	−7.00***	−7.65***

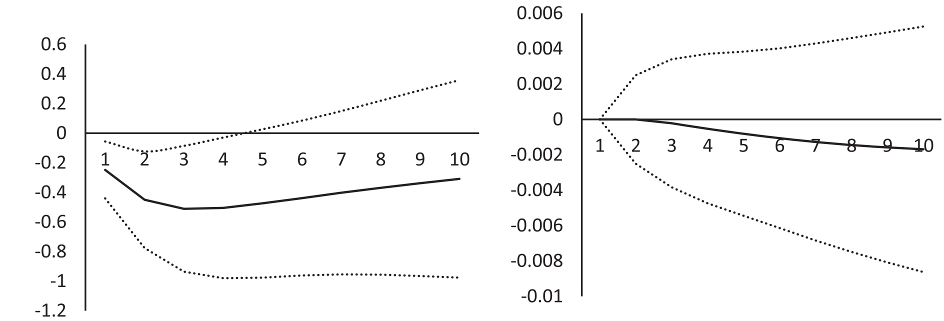
Notes. This table show the results of the unit root test of the variables in levels and in first differences. Δ denotes first differences. We present two model specifications, one with only intercept and another one with intercept and trend. The lag length is chosen according to the AIC criterion. The null hypothesis assumes no stationarity. Thus, the asterisks ** and *** indicate stationarity at the 5% and 1% significance levels.

positive components of the variables, our data is defined as $Y_t^+ = (\pi k_t^+, w_t^+)$ (Hatemi-J and Uddin 2012, 464). In our research, we focus on $(\pi k_t^+, w_t^+)$ and $(\pi k_t^-, w_t^-)$.

Our theoretical assumption is that exogenous changes in πk affect changes in w in the same year, while exogenous changes in w affect changes in πk in the following periods, but not within the same year. However, results do not qualitatively change when we adopt the opposite identification strategy.[6] Thus, our chosen SVAR representation can be described as:

$$B_0 \mathbf{Y}_t = \begin{bmatrix} - & 0 \\ - & - \end{bmatrix} \begin{bmatrix} \pi k_t \\ w_t \end{bmatrix}, \tag{2}$$

where "–"represents unrestricted parameter and "0" indicates zero restrictions. Identification makes it possible to generate a structural model and detect and quantify the causal relationships between the variables of interest by estimating IRF (Deleidi and Levrero 2021). We select the lag length of the SVARs that minimizes the Akaike's information criterion (Akaike 1974) and the Bayesian information criterion (Schwarz 1978) allowing for a maximum lag length of 12 years. We select 1 or 2 lags in the different SVAR specifications, which are enough to avoid serial correlation of the



Response of w to πk shocks   Response of πk to w shocks

Figure 3. Non-accumulated impulse response functions between πk and w. *Note*: Solid lines are point estimates (the value of the response of one variable to unanticipated shocks of the other variable). Dotted lines are the 95% confidence interval bands estimated through a Monte Carlo procedure (1000 repetitions).

residuals. The lag length is validated by the absence of serial correlation in the residuals through the Breusch-Godfrey Lagrange multiplier test (Breusch 1978; Godfrey 1998).

In the standard SVAR framework, we assume that the impact of πk (w) on w (πk) is linear. However, the use of a SVAR model allows both studying asymmetric effects and considering the restrictions imposed by the theoretical assumptions in the estimation process. In Figure 3, we display the results of the IRF of the symmetric analysis; i.e., the SVAR (πk, w). The results suggest that shocks in πk do not affect w; while shocks in w negatively affect πk. However, from the third year onwards the impact that shocks in w have on πk becomes statistically null. Thus, we do not find long-lasting effects of one variable on another.

The results of Figure 3, however, might lead to wrong conclusions. On the one hand, since macroeconomic time series contain nonlinearities and are nonlinearly connected; we need to study the asymmetric relationships between the variables. On the other hand, since we work with long-time series, the results might also be biased by structural breaks. Thus, we need to apply the asymmetric SVAR method; which is robust to nonlinearity and structural breaks in the relationship between the variables.

Next, we examine the asymmetric impacts of πk (w) on w (πk) using the non-linear transformations of πk and w developed by Hatemi-J (2012).[7] Following Hatemi-J and Uddin (2012), Hatemi-J (2012), Hatemi-J (2014), Hatemi-J and Roca (2014), Hatemi-J and El-Khatib (2016), and Hatemi-J, Al Shayeb, and Roca (2017), among others, we specify two SVAR models in levels $(\pi k^{-}, w^{-})$ and $(\pi k^{+}, w^{+})$. Again, we assume that exogenous changes in πk^{+} (πk^{-}) affect changes in w^{+} (w^{-}) in the same year, while exogenous changes in w^{+} (w^{-}) affect changes in πk^{+} (πk^{-}) in the following periods, but not within the same year. However, again, results do not

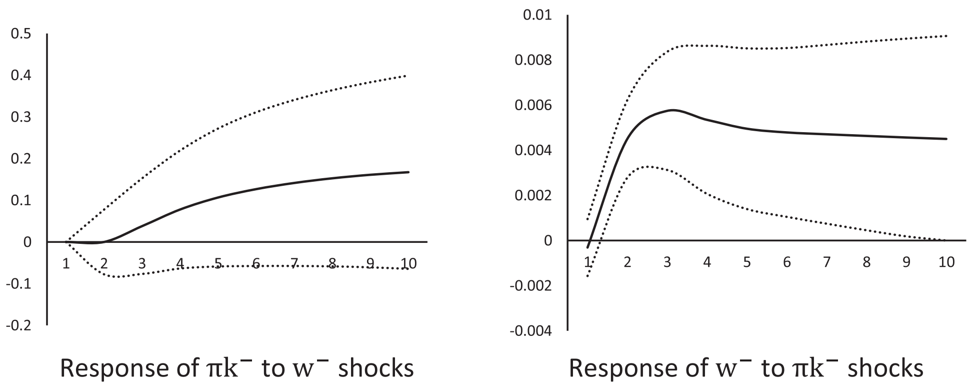


Figure 4. Non-accumulated impulse response functions between πk^- and w^-. *Note*: Solid lines are point estimates (the value of the response of one variable to unanticipated shocks of the other variable). Dotted lines are the 95% confidence interval bands estimated through a Monte Carlo procedure (1000 repetitions).

qualitatively change if we adopt the opposite identification strategy:[8]

$$B_0 Y_t^+ = \begin{bmatrix} - & 0 \\ - & - \end{bmatrix} \begin{bmatrix} \pi k_t^+ \\ w_t^+ \end{bmatrix}, \text{ and } B_0 Y_t^- = \begin{bmatrix} - & 0 \\ - & - \end{bmatrix} \begin{bmatrix} \pi k_t^- \\ w_t^- \end{bmatrix}. \tag{3}$$

The results of Figure 4 suggest that cumulative negative changes in w do no statistically affect cumulative negative changes in πk. However, cumulative negative changes of w significantly react to an impulse in the cumulative negative changes of πk. Thus, Figure 4 suggests that a negative change of πk results in a negative change of w (for the intepretation of this result, see Hatemi-J 2014, 21; Hatemi-J, Al Shayeb, and Roca 2017, 1587). Our hypothesis is that, faced with an unanticipated decrease in πk, firms react pushing wages down.

On the other hand, Figure 5 shows the effect of $w^+(\pi k^+)$ on $\pi k^+(w^+)$. Despite there is a statistically significant effect in the first year; we see that $w^+(\pi k^+)$ do not have significant long-lasting effects on $\pi k^+(w^+)$. Our hypothesis to explain that πk^+ do not lead to w^+ is that w increases only in situations of fast economic growth, shortage of manpower and strong Union's bargaining power; and these conditions have not been met since the dissolution of the Detroit Agreements. The rest of the SVAR specifications $((\pi k_t^+, w_t^-)$ and $(\pi k_t^-, w_t^+))$ suggest no significant effects between πk and w. We do not display the results because Hatemi-J (2012) suggests to focus on the combinations (y_t^+, x_t^+) and (y_t^-, x_t^-), but they are available upon request.

Multivariate SVAR model

Next, for the sake of robustness, we use a multivariate approach, thereby constructing a four-variable SVAR model, $Y_t = (\pi k_t^+,\ w_t^+,\ \pi k_t^-, w_t^-)$, and

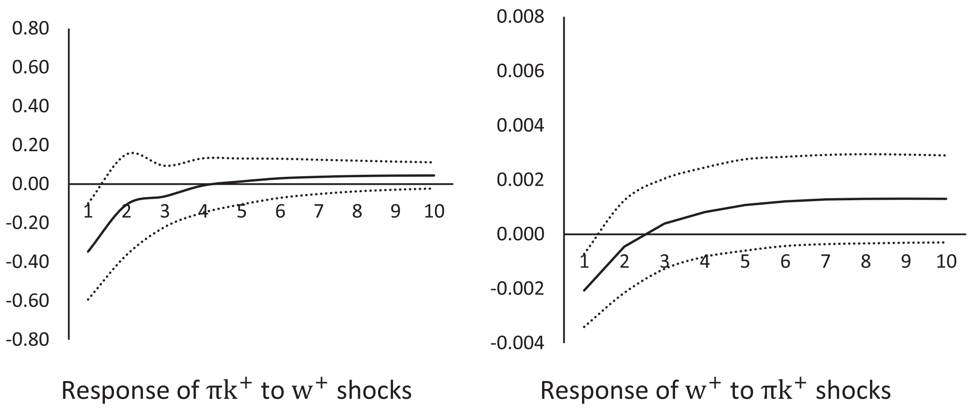


Figure 5. Non-accumulated impulse response functions between πk^{+} and w^{+}. *Note*: Solid lines are point estimates (the value of the response of one variable to unanticipated shocks of the other variable). Dotted lines are the 95% confidence interval bands estimated through a Monte Carlo procedure (1000 repetitions).

testing the relationship between shocks on the variables. The key issue now is choosing the identification structure for a 4-dimensional system of πk_t^{+}, w_t^{+}, πk_t^{-}, and w_t^{-}. To solve this issue, we identify the contemporaneous causal flows between the endogenous variables through the Directed Acyclic Graphs (DAG) method, introduced in the literature by Pearl (1995), Bessler and Akleman (1998) and Spirtes, Glymour, and Scheines (2000). The DAG method allows us to identify the contemporaneous causal structure between multiple time series, thereby providing a data-driven solution to the "identification" issue in a vector auto regression (VAR) model (Perez-Montiel and Manera 2021).[9] Thus, we impose short-run restrictions on the relationships among the k elements of $\varepsilon_{\mathrm{it}}$ based on the DAG method. The DAG analysis suggests that the four-variable SVAR representation can be stated as:

$$B_0 Y_t = \begin{bmatrix} - & 0 & 0 & 0 \\ - & - & 0 & - \\ - & - & - & 0 \\ - & - & - & - \end{bmatrix} \begin{bmatrix} w_t^{+} \\ w_t^{-} \\ \pi k_t^{+} \\ \pi k_t^{-} \end{bmatrix} \tag{4}$$

Figure 6 suggests that cumulative positive changes in πk (w) do not significantly affect cumulative positive changes in w (πk).

On the other hand, Figure 7 shows that cumulative negative changes in w do not significantly affect cumulative negative changes in πk; while cumulative negative changes in πk significantly affect cumulative negative changes in w. Thus, the results of the multivariate analysis qualitatively coincide with those of the bivariate framework. The results of the other impulse response functions ($\pi k_t^{+} \leftrightarrow w_t^{-}$ and $\pi k_t^{-} \leftrightarrow w_t^{+}$) suggest no

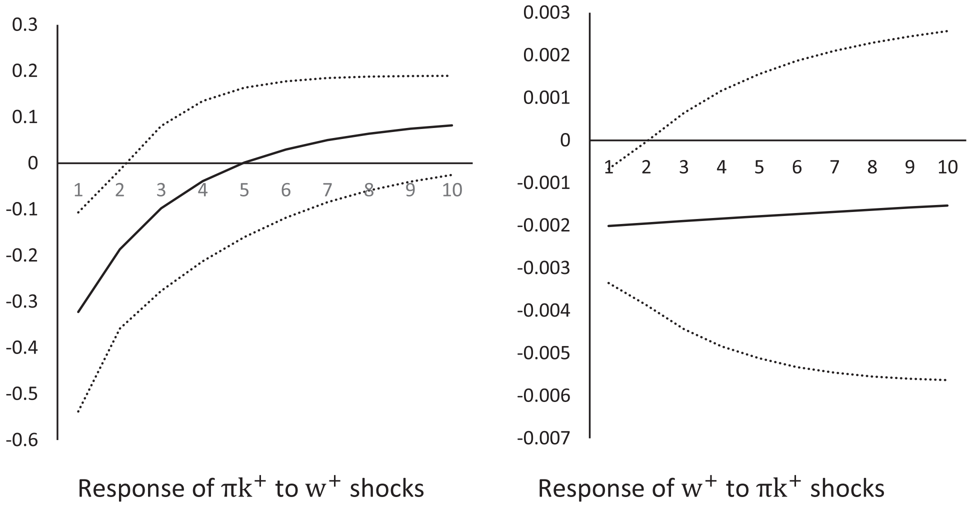


Figure 6. Non-accumulated impulse response functions between πk^{+} and w^{+}. *Note*: Solid lines are point estimates (the value of the response of one variable to unanticipated shocks of the other variable). Dotted lines are the 95% confidence interval bands estimated through a Monte Carlo procedure (1000 repetitions).

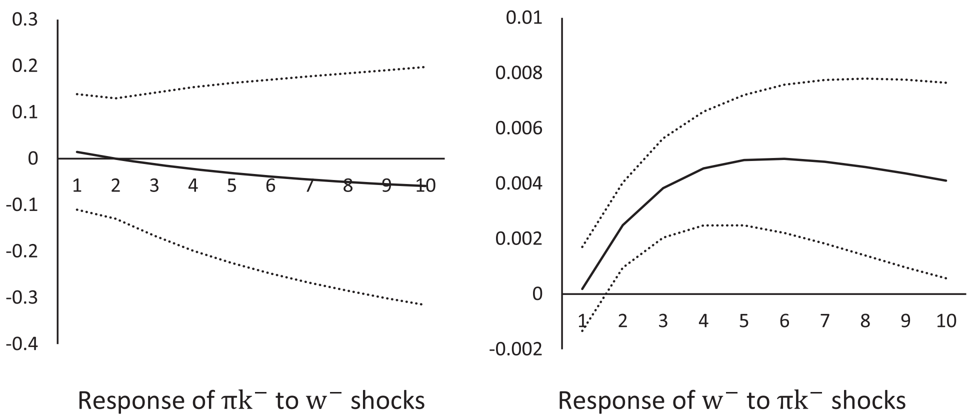


Figure 7. Non-accumulated impulse response functions between πk^{-} and w^{-}. *Note*: Solid lines are point estimates (the value of the response of one variable to unanticipated shocks of the other variable). Dotted lines are the 95% confidence interval bands estimated through a Monte Carlo procedure (1000 repetitions).

significant effects between πk and w. We do not display the results for reasons of space, but they are available upon request.

Conclusions

We use the share of wages in national income (w) as reference variable to analyze income distribution. The main results of Lapavitsas (2013) Manera, Navinés i Badal, and Franconetti (2016), and Manera, Navinés, Franconetti, and Pérez-Montiel (2019) suggest that firms counteract decreases in capital productivity (πk) by pushing wages down with the aim of maximizing the rate of profit. Our results empirically validate these hypotheses through asymmetric Structural Vector Auto Regression (SVAR) techniques. We show that cumulative negative changes in w do no statistically affect cumulative negative changes in πk; however, cumulative negative changes of w significantly react to an impulse in the cumulative negative changes of πk. Thus, we show that decreases of πk unidirectionally cause decreases of w.

Our results complement those of Pariboni and Tridico (2019). These authors state that in the finance-dominated capitalism trade unions have lost power vis-à-vis capital and labor flexibility has increased, thereby decreasing the wage share. Our results can also complement those of Kohler, Guschanski, and Stockhammer (2019), who state that financialisation has contributed to the decline of the wage share. We argue that the decrease of the wage share is not only caused by the loss of power of unions against capital in a context of increasing globalization and financialisation. We sustain that in situations of capital productivity decreases, firms try to maximize the rate of profit by pushing wages down.

We believe that our results shed new light on the debate about the determinants of the evolution of the rate of profit. That is to say, the behavior of the rate of profit has an ex-ante link that cannot be forgotten: capital productivity, conditioned to the social and political relations that explain the dynamics of functional income distribution. An in-depth analysis of the determinants of the reduction of capital productivity is the object of our future research.

Acknowledgements

We thank two anonymous referees for useful and stimulating comments and suggestions. It goes without saying that the usual disclaimer applies. Funding: This work was supported by the research grant FP I/1866/2016, financed by the European Social Fund, and by the project PGC2018 093896-B-100, granted by the Spanish Ministry of Economy, Industry, and Competitiveness (MINECO), which is gratefully acknowledged.

Notes

1. However, Kohler, Guschanski, and Stockhammer (2019) show empirical evidence that undermine the role of technical change in negatively affecting the wage share in OECD countries.
2. Without the continuous full employment of labor, the rate of interest can only determine the desired ratio of capital to labor. According to Petri (2019), this implies that investment remains indeterminate until the desired capital stock is determined; and the determination of the desired capital stock implies looking at desired productive capacity and hence at expected demand and its variations.

3. The Treaty of Detroit is the most relevant post-war labor agreement, signed by the United Auto Workers (UAW) and the Detroit giants (Ford, General Motors and Chrysler). The agreement stated that wages will grow in line with labor productivity growth. The treaty was followed in a cascade by the rest of the most important collective agreements of the United States until 1968. This agreement generated a period of stability in the evolution of social inequalities, and coincided with high rates of growth (Manera, Navinés i Badal, and Franconetti 2016).
4. This is in line with several studies indicating that redistributive measures aimed at increasing the wage share would not necessarily undermine economic growth and employment, especially if they are complemented by supportive fiscal and monetary policies (Storm and Naastepad 2017; De Jesús and López 2019; Jetin and Reyes Ortiz 2020; Oyvat, Öztunalı, and Elgin 2020).
5. Since Phillips (1998) showed that impulse responses from VARs in levels are inconsistent at long horizons, and Faust and Leeper (1997) demonstrated that small mistakes in specifying the cointegrating relations affect the short-run parameters, the safest approach appears to be estimating the model in levels and only focusing on the short-horizon responses (Elbourne 2008).
6. The results are available upon request.
7. The approach of Hatemi-J (2012) can be employed in a SVAR framework (see Hatemi-J 2014; Al-Shayeb and Hatemi-J 2016; Hatemi-J, Al Shayeb, and Roca 2017; and Ozcelebi, 2019, 2021).
8. The results are available upon request.
9. To apply the DAG method, we first obtain the four-variable VAR residual correlation matrix; then we create a complete undirected graph of πk_t^+, w_t^+, πk_t^-, and w_t^-. Next, we use the PC algorithm in TETRAD of Peter and Clark to analyze the residual correlation coefficient matrix and to obtain the directivity of simultaneous causality among πk_t^+, w_t^+, πk_t^-, and w_t^-. The influence coefficient is then calculated using a parameter estimation method (see Pan et al. 2019; Esmaeili and Rafei 2021, among others).

ORCID

Jose Pérez-Montiel http://orcid.org/0000-0001-8667-2980

References

Akaike, H. 1974. *A New Look at the Statistical Model Identification*, 215–222. New York, NY: Springer. doi:10.1007/978-1-4612-1694-0_16.

Alom, F., B. D. Ward, and B. Hu. 2013. “Macroeconomic Effects of World Oil and Food Price Shocks in Asia and Pacific Economies: Application of SVAR Models.” *OPEC Energy Review* 37 (3):327–372. doi:10.1111/opec.12015.

Al-Shayeb, A., and A. Hatemi-J. 2016. “Trade Openness and Economic Development in the UAE: An Asymmetric Approach.” *Journal of Economic Studies* 43 (4):587–597. doi:10.1108/JES-06-2015-0094.

Armstrong, P., A. Glyn, and J. Harrison. 1991. *Capitalism Since 1945*. Oxford: Basil Blackwell.

Barba, A., and M. Pivetti. 2008. “Rising Household Debt: Its Causes and Macroeconomic Implications—a Long-Period Analysis.” *Cambridge Journal of Economics* 33 (1):113–137. doi:10.1093/cje/ben030.

Bellettini, G., and F. Delbono. 2013. “Persistence of High Income Inequality and Banking Crises: 1980–2010.” https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2286071

Bengtsson, E., and E. Stockhammer. 2021. “Wages, Income Distribution and Economic Growth: Long-Run Perspectives in Scandinavia, 1900–2010.” *Review of Political Economy* 33 (4):725–745. doi:10.1080/09538259.2020.1860307.

Bernanke, B. (2004). *The Great Moderation*. Washington, DC.

Bessler, D. A., and D. G. Akleman. 1998. “Farm Prices, Retail Prices, and Directed Graphs: Results for Pork and Beef.” *American Journal of Agricultural Economics* 80 (5): 1144–1149. doi:10.2307/1244220.

Breusch, T. S. 1978. “Testing for Autocorrelation in Dynamic Models.” *Australian Economic Papers* 17 (31):334–355. doi:10.1111/j.1467-8454.1978.tb00635.x.

Bricall, J. 2013. *Cinco ensayos sobre la crisis: y sus consecuencias Para el estado de bienestar*. Barcelona: RBA Libros.

Brock, W. A., D. A. Hsieh, and B. D. LeBaron. 1991. *Nonlinear Dynamics, Chaos, and Instability: statistical Theory and Economic Evidence*. Cambridge, MA: MIT Press.

Burger, P. 2015. “Wages, Productivity and Labour’s Declining Income Share in Post-Apartheid South Africa.” *South African Journal of Economics* 83 (2):159–173. doi:10.1111/saje.12092.

Chang, T., O. Ranjbar, and C. Jooste. 2017. “Stock Market Interactions Between the BRICS and the United States: Evidence from Asymmetric Granger Causality Tests in the Frequency Domain.” *Iranian Economic Review* 21 (2):297–320. doi:10.22059/ier.2017.62105.

De Jesús, V., and J. López. 2019. “On Wage- and Profit-Led Demand Regimes: Learning from the Evidence.” *Journal of Post Keynesian Economics* 42 (4):620–637. doi:10.1080/01603477.2019.1672562.

Deleidi, M., and E. S. Levrero. 2021. “Monetary Policy and Long-Term Interest Rates: Evidence from the U.S. Economy.” *Metroeconomica* 72 (1):121–147. doi:10.1111/meca.12313.

Dolado, J. J., F. Felgueroso, and J. F. Jimeno. 2021. “Past, Present and Future of the Spanish Labour Market: when the Pandemic Meets the Megatrends.” *Applied Economic Analysis* 29 (85):21–41. doi:10.1108/AEA-11-2020-0154.

Dünhaupt, P., and E. Hein. 2019. “Financialization, Distribution, and Macroeconomic Regimes Before and After the Crisis: A post-Keynesian View on Denmark, Estonia, and Latvia.” *Journal of Baltic Studies* 50 (4):435–465. doi:10.1080/01629778.2019.1680403.

Elbourne, A. 2008. “The UK Housing Market and the Monetary Policy Transmission Mechanism: An SVAR Approach.” *Journal of Housing Economics* 17 (1):65–87. doi:10.1016/j.jhe.2007.09.002.

Elliott, G., T. J. Rothenberg, and J. H. Stock. 1996. “Efficient Tests for an Autoregressive Unit Root.” *Econometrica* 64 (4):813. doi:10.2307/2171846.

Esmaeili, P., and M. Rafei. 2021. “Dynamics Analysis of Factors Affecting Electricity Consumption Fluctuations Based on Economic Conditions: Application of SVAR and TVP-VAR Models.” *Energy* 226:120340. doi:10.1016/j.energy.2021.120340.

Farzanegan, M. R., and G. Markwardt. 2009. “The Effects of Oil Price Shocks on the Iranian Economy.” *Energy Economics* 31 (1):134–151. doi:10.1016/j.eneco.2008.09.003.

Fasianos, A., D. Guevara, and C. Pierros. 2018. “Have We Been Here Before? Phases of Financialization Within the Twentieth Century in the US.” *Review of Keynesian Economics* 6 (1):34–61. doi:10.4337/roke.2018.01.03.
Faust, J., and E. M. Leeper. 1997. “When Do Long-Run Identifying Restrictions Give Reliable Results?” *Journal of Business & Economic Statistics* 15 (3):345–353. doi:10.1080/07350015.1997.10524712.
Fazzari, S., P. Ferri, and A. Variato. 2017. “Demand-Led Growth and Accommodating Supply.” *Papers.Ssrn.Com*.
Fiszeder, P., and W. Orzeszko. 2018. “Nonlinear Granger Causality Between Grains and Livestock.” *Agricultural Economics-(Czech Republic)* 64:328–36.
Fontana, G., C. Pitelis, and J. Runde. 2019. “Financialisation and the New Capitalism?” *Cambridge Journal of Economics* 31 (6):799–804. doi:10.1093/CJE.
Gahn, S., and A. González. 2019. “On the ‘Utilisation Controversy’: A Comment.” *Cambridge Journal of Economics* 31 (6):703–707. doi:10.1093/cje/bez056.
Gahn, Santiago J. 2021. “On the Adjustment of Capacity Utilisation to Aggregate Demand: Revisiting an Old Sraffian Critique to the Neo-Kaleckian Model.” *Structural Change and Economic Dynamics* 58:325–360. doi:10.1016/j.strueco.2021.06.009.
Gahn, Santiago José. 2020. “Is There a Declining Trend in Capacity Utilization in the US Economy? A Technical Note.” *Review of Political Economy* 32: 283–296. doi:10.1080/09538259.2020.1769906.
Godfrey, L. G. 1998. “Hausman Tests for Autocorrelation in the Presence of Lagged Dependent Variables: Some Further Results.” *Journal of Econometrics* 82 (2):197–207. doi:10.1016/S0304-4076(97)00056-0.
Granger, C. W., and G. Yoon. 2002. “Hidden Cointegration.” University of California, Economics Working Paper, (2002-02).
Grossman, G., E. Helpman, E. Oberfield, and T. Sampson. 2017. *The Productivity Slowdown and the Declining Labor Share: A Neoclassical Exploration* (No. w23853). National Bureau of Economic Research.
Gupta, R., L. A. Gil-Alana, and O. S. Yaya. 2015. “Do Sunspot Numbers Cause Global Temperatures? Evidence from a Frequency Domain Causality Test.” *Applied Economics* 47 (8):798–808. doi:10.1080/00036846.2014.980575.
Hatemi-J, A., and Y. El-Khatib. 2016. “An Extension of the Asymmetric Causality Tests for Dealing With Deterministic Trend Components.” *Applied Economics* 48 (42):4033–4041. doi:10.1080/00036846.2016.1150950.
Hatemi-J, A. 2012. “Asymmetric Causality Tests With an Application.” *Empirical Economics* 43 (1):447–456. doi:10.1007/s00181-011-0484-x.
Hatemi-J, A. 2014. “Asymmetric Generalized Impulse Responses With an Application in Finance.” *Economic Modelling* 36:18–22. doi:10.1016/j.econmod.2013.09.014.
Hatemi-J, A., A. Al Shayeb, and E. Roca. 2017. “The Effect of Oil Prices on Stock Prices: Fresh Evidence from Asymmetric Causality Tests.” *Applied Economics* 49 (16):1584–1592. doi:10.1080/00036846.2016.1221045.
Hatemi-J, A., and Y. El-Khatib. 2020. “The Nexus of Trade-Weighted Dollar Rates and the Oil Prices: An Asymmetric Approach.” *Journal of Economic Studies* 47 (7):1579–1589. doi:10.1108/JES-06-2019-0266/FULL/XML.
Hatemi-J, A., and E. Roca. 2014. BRICs and PIGS in the Presence of Uncle Sam and Big Brothers: Who Drive Who? Evidence Based on Asymmetric Causality Tests. Griffith Business School Discussion Papers Finance.

Hatemi-J, A., and G. S. Uddin. 2012. "Is the Causal Nexus of Energy Utilization and Economic Growth Asymmetric in the US?." *Economic Systems* 36 (3):461–469. doi:10.1016/j.ecosys.2011.10.005.

Hein, E. 2014. *Distribution and Growth after Keynes: A Post-Keynesian Guide*. Cheltenham, UK; Northampton, MA: Edward Elgar Publishing.

Hein, E. 2015. "Finance-Dominated Capitalism and Re-distribution of Income: A Kaleckian Perspective." *Cambridge Journal of Economics* 39 (3):907–934. doi:10.1093/CJE.

Hein, E. 2019. "Financialisation and Tendencies Towards Stagnation: The Role of Macroeconomic Regime Changes in the Course of and after the Financial and Economic Crisis 2007–09." *Cambridge Journal of Economics* 43 (4):975–999. doi:10.1093/cje/bez022.

International Labor Office. 2013. "Global Wage Report 2012/13: Wages and Equitable Growth." https://www.voced.edu.au/content/ngv:55305

Iwayemi, A., and B. Fowowe. 2011. "Impact of Oil Price Shocks on Selected Macroeconomic Variables in Nigeria." *Energy Policy* 39 (2):603–612. doi:10.1016/j.enpol.2010.10.033.

Jetin, B., and L. Reyes Ortiz. 2020. "Wage-Led Demand as a Rebalancing Strategy for Economic Growth in China." *Journal of Post Keynesian Economics* 43 (3):341–366. doi:10.1080/01603477.2020.1774392.

Kapeller, J., and B. Schütz. 2014. "Debt, Boom, Bust: A Theory of Minsky-Veblen Cycles." *Journal of Post Keynesian Economics* 36 (4):781–814. doi:10.2753/PKE0160-3477360409.

Kapeller, J., and B. Schütz. 2015. "Conspicuous Consumption, Inequality and Debt: The Nature of Consumption-Driven Profit-Led Regimes." *Metroeconomica* 66 (1):51–70. doi:10.1111/meca.12061.

Kilian, L., and H. Lütkepohl. 2017. *Structural Vector Autoregressive Analysis*. Cambridge: Cambridge University Press.

Kim, H. 2020. "A Missing Element in the Empirical Post Keynesian Theory of Inflation—Total Credits to Households: A First-Differenced VAR Approach to U.S. inflation." *Journal of Post Keynesian Economics* 43 (4):640–656. doi:10.1080/01603477.2019.1672559.

Knoblach, M., M. Roessler, and P. Zwerschke. 2020. "The Elasticity of Substitution Between Capital and Labour in the US Economy: A Meta-Regression Analysis." *Oxford Bulletin of Economics and Statistics* 82 (1):62–82. doi:10.1111/obes.12312.

Kohler, K. 2017. "Currency Devaluations, Aggregate Demand, and Debt Dynamics in Economies With Foreign Currency Liabilities." *Journal of Post Keynesian Economics* 40 (4):487–511. doi:10.1080/01603477.2017.1368027.

Kohler, K., A. Guschanski, and E. Stockhammer. 2019. "The Impact of Financialisation on the Wage Share: A Theoretical Clarification and Empirical Test." *Cambridge Journal of Economics* 43 (4):937–974. doi:10.1093/cje/bez021.

Köhler, K., and E. Stockhammer. 2020. *Periodic Business and Exchange Rate Cycles. Evidence from 7 Emerging Markets* Working paper number 58, FMM Working paper.

Kumhof, M., R. Rancière, and P. Winant. 2015. "Inequality, Leverage, and Crises." *American Economic Review* 105 (3):1217–1245. doi:10.1257/aer.20110683.

Lapavitsas, C. 2013. *Profiting Without Producing: How Finance Exploits Us All*. London: Verso Books.

Lavoie, M. 2014. *Post-Keynesian Economics: New Foundations*. Cheltenham, UK; Northampton, MA: Edward Elgar Publishing.

Manera, C. 2015. *La extensión de la desigualdad: austeridad y estancamiento*. Madrid: Los Libros de la Catarata.

Manera, C., F. Navinés I Badal, and J. Franconetti Manchado. 2016. "Distribución de la renta, beneficio y desigualdad:una aplicación a la historia económica de Estados Unidos, 1910-2010." *Revista de Economía Mundial* 42:89–108.

Manera, Carles, F. Navinés, and J. Franconetti. 2019. "Going Out of the Great Recession? Contrast between the United States and Europe: Proposed Work from Economic History, 1960–2014." *Journal of Post Keynesian Economics* 42 (2):255–273. doi:10.1080/01603477.2018.1431794.

Manera, Carles, F. Navinés, J. Franconetti, and J. Pérez-Montiel. 2019. "Crisi, desigualtat i anàlisi econòmica, 1910-2015: alguns instruments de l'economia clàssica." *Scripta Nova* 23 (610):0. doi:10.1344/sn2019.23.21645.

Marquez-Ramos, L., and E. Mourelle. 2019. "Education and Economic Growth: An Empirical Analysis of Nonlinearities." *Applied Economic Analysis* 27 (79):21–45. doi:10.1108/AEA-06-2019-0005.

Meloni, W., and A. Stirati. 2021. *What Has Driven the Delinking of Wages from Productivity? A Political Economy-Based Investigation for High-Income Economies.* Working paper number 2104; Post Keynesian Economics Society Working Paper Series.

Mertens, M. 2019. *Micro-Mechanisms Behind Declining Labour Shares: Market Power, Production Processes, and Global Competition* (No. 2; 2019). Halle (Saale): Leibniz-Institut für Wirtschaftsforschung Halle (IWH). www.iwh-halle.de

Navines, F. 1989. "Crisis económica y política económica: el caso de la economía española (1964–1986)." *Información Comercial Española* 665:25–44.

Ng, S., and P. Perron. 2001. "LAG Length Selection and the Construction of Unit Root Tests With Good Size and Power." *Econometrica* 69 (6):1519–1554. doi:10.1111/1468-0262.00256.

Nikiforos, M. 2020. "On the 'Utilisation Controversy': A Rejoinder and Some Comments." *Cambridge Journal of Economics* 44 (3):709–722. doi:10.1093/cje/bez058.

Nishi, H., and E. Stockhammer. 2020. "Distribution Shocks in a Kaleckian Model with Hysteresis and Monetary Policy." *Economic Modelling* 90:465–479. doi:10.1016/j.econmod.2019.11.030.

Noah, T. 2012. *The Great Divergence: Crisis and What We Can Do About It*. New York, NY: Bloomsbury Press.

OECD (Organization for Economic Co-operation and Development). (2012). Employment outlook 2012.

Oyvat, C., O. Öztunalı , and C. Elgin. 2020. "Wage-Led versus Profit-Led Demand: A Comprehensive Empirical Analysis." *Metroeconomica* 71 (3):458–486. doi:10.1111/meca.12284.

Ozcelebi, O. 2019. "Assessment of Asymmetric Effects on Exchange Market Pressure: Empirical Evidence from Emerging Countries." *The North American Journal of Economics and Finance* 48:498–513. doi:10.1016/j.najef.2019.03.016.

Ozcelebi, O. 2021. "Assessing the Impacts of Global Economic Policy Uncertainty and the Long-Term Bond Yields on Oil Prices." *Applied Economic Analysis* 29 (87):226–244. doi:10.1108/AEA-05-2020-0046.

Palley, T. I. 2013. "Financialization: What It Is and Why It Matters." In *Financialization*, 17–40. London: Palgrave Macmillan UK. doi:10.1057/9781137265821_2.

Palma, J. G. 2009. "The Revenge of the Market on the Rentiers. Why Neo-liberal Reports of the End of History Turned Out to Be Premature." *Cambridge Journal of Economics* 33 (4):829–869. doi:10.1093/cje/bep037.

Pan, X., B. Ai, C. Li, X. Pan, and Y. Yan. 2019. "Dynamic Relationship Among Environmental Regulation, Technological Innovation and Energy Efficiency Based on

Large Scale Provincial Panel Data in China." *Technological Forecasting and Social Change* 144:428–435. doi:10.1016/j.techfore.2017.12.012.

Pariboni, R. 2016. "Household Consumer Debt, Endogenous Money and Growth: A Supermultiplier-Based Analysis." *PSL Quarterly Review* 69 (278):211–233.

Pariboni, R., W. Paternesi Meloni, and P. Tridico. 2020. "When Melius Abundare Is No Longer True: Excessive Financialization and Inequality as Drivers of Stagnation." *Review of Political Economy* 32 (2):216–242. doi:10.1080/09538259.2020.1769282.

Pariboni, R., and P. Tridico. 2019. "Labour Share Decline, Financialisation and Structural Change." *Cambridge Journal of Economics* 43 (4):1073–1102. doi:10.1093/CJE.

Pearl, J. 1995. "Causal Diagrams for Empirical Research." *Biometrika* 82 (4):669–688. doi: 10.1093/biomet/82.4.669.

Perez-Montiel, J., and C. Manera. 2021. "Government Public Infrastructure Investment and Economic Performance in Spain (1980–2016)." *Applied Economic Analysis.*, ahead-of-print. doi:10.1108/AEA-03-2021-0077.

Pérez-Montiel, J. A., and C. Manera. 2022. "Is Autonomous Demand Really Autonomous in the United States? An Asymmetric Frequency-Domain Granger Causality Approach." *Metroeconomica* 73 (1):78–92. doi:10.1111/meca.12354.

Pérez-Montiel, Jose A., and C. Manera. 2020. "Permanent Demand and Private Investment in the General Theory: An Empirical Investigation." *Revista de Economía Mundial* 54 (54):107–128. doi:10.33776/rem.v0i54.3835.

Pérez-Montiel, José A., and R. Pariboni. 2022. "Housing is NOT ONLY the Business Cycle: A Luxemburg-Kalecki External Market Empirical Investigation for the United States." *Review of Political Economy* 34 (1):1–22. doi:10.1080/09538259.2020.1859718.

Perry, N., and N. Cline. 2016. "What Caused the Great Inflation Moderation in the US? A Post-Keynesian View." *Review of Keynesian Economics* 4 (4):475–502. doi:10.4337/roke.2016.04.08.

Petri, F. 2015. "Neglected Implications of Neoclassical Capital-Labour Substitution for Investment Theory: Another Criticism of Say's Law." *Review of Political Economy* 27 (3):308–340. doi:10.1080/09538259.2015.1067367.

Petri, F. 2019. "Capital Theory 1873–2019 and the State of Macroeconomics." *History of Economics Review* 74 (1):1–24. doi:10.1080/10370196.2020.1722411.

Phillips, P. C. B. 1998. "Impulse Response and Forecast Error Variance Asymptotics in Nonstationary VARs." *Journal of Econometrics* 83 (1–2):21–56. doi:10.1016/S0304-4076(97)00064-X.

Phillips, P. C. B., and P. Perron. 1988. "Testing for a Unit Root in Time Series Regression." *Biometrika* 75 (2):335–346. doi:10.1093/biomet/75.2.335.

Pierros, C. 2020. "Insolvency Dynamics of the Greek Private Sector During the Era of Austerity: An Empirical Assessment." *Journal of Post Keynesian Economics* 43 (3):367–390. doi:10.1080/01603477.2020.1734466.

Ranjbar, O., T. Chang, E. Nel, and R. Gupta. 2017. "Energy Consumption and Economic Growth Nexus in South Africa: Asymmetric Frequency Domain Approach." *Energy Sources, Part B: Economics, Planning and Policy* 12 (1):24–31. doi:10.1080/15567249.2015.1020120.

Rodrik, D. 1999. "Democracies Pay Higher Wages." *The Quarterly Journal of Economics* 114 (3):707–738. doi:10.1162/003355399556115.

Roncaglia, A. 2019. *La era de la disgregación: historia del pensamiento económico contemporáneo*. Zaragoza, Spain: Prensas de la Universidad de Zaragoza.

Said, E., and D. A. Dickey. 1984. "Testing for Unit Roots in Autoregressive-Moving Average Models of Unknown Order." *Biometrika* 71 (3):599–607. doi:10.1093/biomet/71.3.599.

Saliminezhad, A., and P. Bahramian. 2020. "Clean Energy Consumption and Economic Growth Nexus: Asymmetric Time and Frequency Domain Causality Testing in China." *Energy Sources, Part B: Economics, Planning and Policy* 15 (1):1–12. doi:10.1080/15567249.2020.1729900.

Schwarz, G. 1978. "Estimating the Dimension of a Model." *The Annals of Statistics* 6 (2):461–464. doi:10.1214/aos/1176344136.

Setterfield, M., and Y. K. Kim. 2016. "Debt Servicing, Aggregate Consumption, and Growth." *Structural Change and Economic Dynamics* 36:22–33. doi:10.1016/j.strueco.2015.10.002.

Shahbaz, M., T. H. Van Hoang, M. K. Mahalik, and D. Roubaud. 2017. "Energy Consumption, Financial Development and Economic Growth in India: New Evidence from a Nonlinear and Asymmetric Analysis." *Energy Economics* 63:199–212. doi:10.1016/j.eneco.2017.01.023.

Shaikh, A. 2017. "Income Distribution, Econophysics and Piketty." *Review of Political Economy* 29 (1):18–29. doi:10.1080/09538259.2016.1205295.

Sims, C. A. 1980. "Macroeconomics and Reality." *Econometrica* 48 (1):1. doi:10.2307/1912017.

Sims, C. A., J. H. Stock, and M. W. Watson. 1990. "Inference in Linear Time Series Models With Some Unit Roots." *Econometrica* 58 (1):113. doi:10.2307/2938337.

Spirtes, P., C. N. Glymour, and R. Scheines. 2000. *Causation, Prediction, and Search*. Cambridge, MA: MIT Press.

Stirati, A. 2018. "On the Causes of the Changes in Income Shares: Some Reflections in the Light the United States Experience." *Journal of Post Keynesian Economics* 41 (2):260–283. doi:10.1080/01603477.2017.1348902.

Stirati, A., and W. P. Meloni. 2021. "Unemployment and the Wage Share: A Long-Run Exploration for Major Mature Economies." *Structural Change and Economic Dynamics* 56:330–352. doi:10.1016/j.strueco.2021.01.003.

Stockhammer, E. 2009. *Determinants of functional income distribution in OECD countries (5/2009; IMK Study)*. Düsseldorf: Hans-Böckler-Stiftung, Institut für Makroökonomie und Konjunkturforschung (IMK). http://hdl.handle.net/10419/106229www.econstor.eu

Stockhammer, E. 2015. "Rising Inequality as a Cause of the Present Crisis." *Cambridge Journal of Economics* 27 (2):935–958. doi:10.1093/cje/27.2.225.

Stockhammer, E., R. Calvert Jump, K. Kohler, and J. Cavallero. 2019. "Short and Medium Term Financial-Real Cycles: An Empirical Assessment." *Journal of International Money and Finance* 94:81–96. doi:10.1016/j.jimonfin.2019.02.006.

Stockhammer, E., and K. Kohler. 2020. "Financialization and Demand Regimes in Advanced Economies." In *The Routledge International Handbook of Financialization*, edited by P. Mader, D. Mertens, and N. Van der Zwan. London and New York: Routlege.

Stockhammer, E., and R. Wildauer. 2016. "Debt-Driven Growth? Wealth, Distribution and Demand in OECD Countries." *Cambridge Journal of Economics* 40 (6):1609–1634. doi:10.1093/cje/bev070.

Storm, S., and C. W. M. Naastepad. 2017. "Bhaduri–Marglin Meet Kaldor–Marx: Wages, Productivity and Investment." *Review of Keynesian Economics* 5 (1):4–24. doi:10.4337/roke.2017.01.02.

Sylos Labini, P. 1999. "The Employment Issue: investment, Flexibility and the Competition of Developing Countries." *PSL Quarterly Review* 52 (10):257–280. http://ojs.uniroma1.it/index.php/PSLQuarterlyReview/article/viewFile/10924/10803.

Sylos-Labini, P. 1984. *Le forze dello sviluppo e del declino*. Rome and Bari: Laterza.

Tang, W., L. Wu, and Z. X. Zhang. 2010. "Oil Price Shocks and Their Short- and Long-Term Effects on the Chinese Economy." *Energy Economics* 32 (SUPPL. 1):S3–S14. doi:10.1016/j.eneco.2010.01.002.

Taylor, L. 2020. "Macroeconomic Inequality from Reagan to Trump." In *Macroeconomic Inequality from Reagan to Trump*. Cambridge: Cambridge University Press. doi:10.1017/9781108854443.

Tridico, P., and R. Pariboni. 2018. "Inequality, Financialization, and Economic Decline." *Journal of Post Keynesian Economics* 41 (2):236–259. doi:10.1080/01603477.2017.1338966.

Tugcu, C. T., and M. Topcu. 2018. "Total, Renewable and Non-renewable Energy Consumption and Economic Growth: Revisiting the Issue With an Asymmetric Point of View." *Energy* 152:64–74. doi:10.1016/j.energy.2018.03.128.

Uzuner, G., and S. Ghosh. 2021. "Do Pandemics Have an Asymmetric Effect on Tourism in Italy?" *Quality & Quantity* 55 (5):1561–1579. doi:10.1007/S11135-020-01074-7/TABLES/5.

Vercelli, A. 2015. "The Neoliberal Trajectory, the Great Recession and Sustainable Development." In *Finance and the Macroeconomics of Environmental Policies*, 37–73. London, UK: Palgrave Macmillan UK. doi:10.1057/9781137446138_2.

Vercelli, A., and A. Vercelli. 2017. "The Neoliberal Trajectory and the Crisis." In *Crisis and Sustainability*, 119–44. London, UK: Palgrave Macmillan UK. doi:10.1057/978-1-137-60069-1_5.

Weisskopf, T. E. 1979. "Marxian Crisis Theory and the Rate of Profit in the Postwar U.S. Economy on JSTOR." *Cambridge Journal of Economics* 3 (4):341–378. doi:10.1093/oxfordjournals.cje.a035429.