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FUNCTIONAL INCOME DISTRIBUTION AND SLUGGISH GROWTH IN EUROPE: THE POST-KEYNESIAN DEBATE ON WAGE- OR PROFIT-LED GROWTH MODELS[1]

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ABSTRACT

In the last four decades, policymakers in the more developed countries have privileged the adoption of wage restraint policies to sustain economic growth. During that time, the wage share has registered a sustained fall, and economic growth has been rather dismal, which seems to support the theoretical claims of post-Keynesian economics that wage restraint policies are detrimental to economic growth because their disruptive effects on private consumption do not counterbalance their supportive effects on private investment and net exports. We analyse the relationship between the wage share and economic growth by performing a panel data econometric analysis of all European Union countries from 1981 to 2021. Results confirm that wage share positively influences economic growth in the European Union countries, which follow a wage-led growth model. Results also show that the decline of the wage share has represented one of the main constrainers of growth in these countries in the last four decades, particularly in the euro area countries. These results suggest that policymakers in the European Union countries should adopt pro-labour policies in order to revert the decreasing (increasing) trend of the wage (profit) share and prevent the consolidation of a prolonged period of sluggish growth in Europe.

KEYWORDS

Post-Keynesian Economics, Functional Income Distribution, Economic Growth Drivers, European Union, Panel Autoregressive Distributed Lag, Pooled Mean-Group Estimator

JEL CLASSIFICATION

C23, D33, E12 and O47

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In the last four decades, policymakers in the more developed countries have privileged the adoption of wage restraint policies to sustain economic growth. During that time, the wage share has registered a sustained fall, and economic growth has been rather dismal, which seems to support the theoretical claims of post-Keynesian economics that wage restraint policies are detrimental to economic growth because their disruptive effects on private consumption do not counterbalance their supportive effects on private investment and net exports. We analyse the relationship between the wage share and economic growth by performing a panel data econometric analysis of all European Union countries from 1981 to 2021. Results confirm that wage share positively influences economic growth in the European Union countries, which follow a wage-led growth model. Results also show that the decline of the wage share has represented one of the main constrainers of growth in these countries in the last four decades, particularly in the euro area countries. These results suggest that policymakers in the European Union countries should adopt pro-labour policies in order to revert the decreasing (increasing) trend of the wage (profit) share and prevent the consolidation of a prolonged period of sluggish growth in Europe.

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1. INTRODUCTION

It is widely acknowledged that the wage share has registered a sustained fall in the majority of the developed countries in the last four decades (Kristal, 2010; Dünhaupt, 2011; Stockhammer, 2012, 2017; Karabarbounis and Neiman, 2013; Lin and Tomaskovic-Devey, 2013; Stockhammer and Wildauer, 2016; Barradas and Lagoa, 2017; Barradas, 2019; Alcobia and Barradas, 2023), and economic growth has been rather dismal (Krugman, 2013; Summers, 2014; Pariboni *et al*., 2020). These two stylised facts have fed the belief that a decline in the wage share could potentially cause the consolidation of a prolonged period of sluggish growth, thereby reviving the post-Keynesian debate on wage- or profit-led growth models (Naastepad and Storm, 2006).

We assess the relationship between the wage share and economic growth by performing a panel data econometric analysis of all European Union (EU) countries from 1981 to 2021. Our analysis offers at least five contributions to the existing literature on this matter. The first contribution is that the analysis is of EU countries, and empirical evidence for these countries is relatively scarce (Onaran and Obst, 2016). The EU countries are a very interesting case study because the majority of them have experienced a sustained decline of the wage share and a quite anaemic growth pattern (Figure 1 and Figure 2), which has fed the fears of the emergence of a prolonged period of sluggish growth. The fall of the wage share has been more pronounced in the case of the European countries vis-à-vis Eastern countries due to their transition from planned to market economies since the mid-1990s (Lupu *et al*., 2022).

The second contribution is the use of a panel data econometric analysis, which tends to offer more advantages vis-à-vis the cross-sectional econometric analysis and/or time series econometric analysis because it allows the collection of more observations and larger samples with higher heterogeneity that contribute to more consistent and more efficient estimates (Baltagi, 2005). Kiefer and Rada (2015) and Rada and Kiefer (2016) also performed a panel data econometric analysis, but they assessed the relationship between the wage share and economic growth in thirteen OECD countries (Australia, Canada, Finland, France, Germany, Ireland, Italy, Japan, Korea, Netherlands, Sweden, the United Kingdom and the United States).

The third contribution is the use of an aggregative approach, which offers several advantages vis-à-vis the structural approach, namely by capturing the potential dynamic interactions between the wage share and the individual components of the aggregate demand (Blecker and Setterfield, 2019). Nonetheless, empirical works that employ an aggregative approach are scarcer (Teixeira *et al*., 2022).

The fourth contribution is the estimation of a growth model that includes six post-Keynesian growth drivers (wage share, property prices, financial asset prices, credit, public

spending and non-price competitiveness) in order to mitigate the risk of potentially inconsistent and biased estimates resulting from omitted relevant variables (Wooldridge, 2003).

The fifth contribution is the analysis of the economic effects (McCloskey and Ziliak, 1996; Ziliak and McCloskey, 2004), which allows an identification of the main growth triggers and the main growth constraints in the EU countries in the last four decades. To the best of our knowledge, this is the first paper centred on all EU countries that performs a panel data econometric analysis, employs the aggregative approach, includes several post-Keynesian growth drivers and assesses the economic effects of the drivers.

We employed a panel autoregressive distributed lag econometric methodology by relying on the pooled mean-group (PMG) estimator due to the existence of a mixture of variables that are stationary in levels and stationary in the first differences (Pesaran and Smith, 1995; Pesaran, 1997; Pesaran *et al*., 1997 and 1999). We estimated a growth model by taking into account six different post-Keynesian growth drivers, namely wage share, property prices, financial asset prices, credit, public spending and non-price competitiveness.

Our results show that wage share, property prices and financial asset prices exert a positive influence on economic growth in the EU countries, whilst credit and public spending exert a negative influence. Our results confirm that the EU countries follow a wage-led growth model. The decline of the wage share has represented one of the main constrainers of growth in the EU countries and, particularly, in the euro area countries in the last four decades.

This paper is organised as follows. In Section 2, we provide the theoretical and empirical literature on the nexus between functional income distribution and economic growth. The growth model and the corresponding hypotheses are presented in Section 3. Section 4 describes the dataset. The econometric methodology is depicted in Section 5. In Section 6, we present and discuss the main results. Finally, Section 7 concludes.

2. THEORETICAL AND EMPIRICAL LITERATURE ON FUNCTIONAL INCOME DISTRIBUTION AND ECONOMIC GROWTH

The hypothesis around the constancy of the wage share, identified by Kaldor (1957), has increasingly been questioned due to the trend of a generally decreasing wage share in the majority of countries all over the world since the 1980s (Kristal, 2010; Dünhaupt, 2011; Stockhammer, 2012, 2017; Karabarbounis and Neiman, 2013; Lin and Tomaskovic-Devey, 2013; Stockhammer and Wildauer, 2016; Barradas and Lagoa, 2017; Barradas, 2019; Alcobia and Barradas, 2023). Due to this decreasing trend in wage share, the relationship between its changes and economic growth has progressively been more investigated in order to derive the respective policy

implications because public policies have the ability to influence the functional income distribution (Lavoie and Stockhammer, 2013).

According to Lavoie and Stockhammer (2013), pro-capital policies are public policies that are implemented for the purpose of reducing the importance of wages in national income, and pro-labour policies are those adopted to promote the rise in the weight of wages in total national income. This happens because the implementation of pro-capital policies leads to moderate wage growth or even wage stagnation. In that case, the tendency is for real wage growth to be lower than labour productivity growth, which leads to a reduction in the wage share (Felipe and Kumar, 2014). On the other hand, growth in real wages that is higher (similar) than the growth in labour productivity implies a rise (stabilisation) in the wage share.

While public policies are relevant, there are other factors that can affect functional income distribution and explain the downward trend observed in the wage share since the 1980s, namely neoliberalism, globalisation, financialisation and technological progress (Stockhammer, 2012; Barradas, 2019).

In most popular and mainstream models of macroeconomics, changes in the wage share play a secondary role, as the functional income distribution is considered to depend on the marginal productivity of the different factors of production in accordance with the underlying characteristics of perfect competition (Solow, 1957; Lucas, 1972; Romer, 1986). These models recognise that economic growth in the long term is determined by supply-side factors that move the economy to its trend path, and thus, aggregate demand is not relevant in the long term.

In contrast, heterodox economics tends to attribute strong importance to the effect of changes in functional income distribution on economic growth. For Keynes (1937), the level of wages is the main determinant of household consumption and provides a stimulus to the level of aggregate demand (and thus to economic growth) due to the existence of a marginal propensity to consume that is greater than zero.

Post-Keynesians also emphasise the role of the level of aggregate demand in explaining long-term economic growth. There are several channels for this happen. On the one hand, a higher level of aggregate demand leads to an acceleration of labour productivity growth by allowing the dilution of corporate fixed costs and by allowing a better division of labour and more efficient learning within corporations. This is the so-called Smith effect (Smith, 1776) or the Classical Kaldorian-Verdoorn effect (Verdoorn, 1949). On the other hand, when the level of aggregate demand is sufficiently high and the level of unemployment is low, a shortage of labour supply occurs, and wages tend to rise. In these situations, corporations have greater incentives to invest in research and development for the purpose of reducing the demand for labour, with positive effects on technical progress (Robinson, 1956). Therefore, according to the post-Keynesian theory, the level of economic growth in the long term is endogenous given the evolution of the components of aggregate demand. The literature has also shown that negative shocks on the

aggregate demand, such as the one that occurred during the Great Recession, cause hysteresis effects that reduce the growth potential of economies in the long term (Blanchard and Summers, 1987; Ball, 2014).

There are essentially two types of models that show the specific impact of functional income distribution on economic growth[1]. The first model was advocated by Kalecki (1954), who assumed that income from profits and wages is associated with different marginal propensities to consume. Since wages are at the subsistence level, an increase in income would be fully spent by workers, and thus, the redistribution of income in favour of wages would increase the level of aggregate demand due to the stimulus effect on private consumption. This occurred because this author defined a marginal propensity to consume of 1 for wages. The second model was supported by Goodwin (1967), who emphasised that an increase in the profit share would lead to a higher level of private investment with positive effects on economic growth[2]. The same conclusion was obtained by Kaldor (1955). According to these two models, an increase in the wage share tends to contribute to a decrease in corporate margins, which results in a reduction in the aggregate value of profits (although there might be an increase in the level of capacity utilisation).

These two models have been unified with the creation of the model proposed by Bhaduri and Marglin (1990). According to these authors, situations in which an increase in the wage share leads to an acceleration of economic growth are designated as wage-led demand growth. Conversely, when an increase in the wage share leads to a deceleration in economic growth, the situation is classified as profit-led demand growth. A country would be in one of the two regimes, depending on the differential of marginal propensities to consume between wages and profits as well as the sensitivity of private investment to changes in aggregate profits.

The sustained fall of the wage share (Kristal, 2010; Dünhaupt, 2011; Stockhammer, 2012, 2017; Karabarbounis and Neiman, 2013; Lin and Tomaskovic-Devey, 2013; Stockhammer and Wildauer, 2016; Barradas and Lagoa, 2017; Barradas, 2019; Alcobia and Barradas, 2023), and the sluggish growth of the economic growth in the majority of the developed countries in the last four decades (Krugman, 2013; Summers, 2014; Pariboni *et al*., 2020) does not corroborate the theoretical predictions of mainstream economics on the positive role that wage restraint policies play in economic growth (Naastepad and Storm, 2006).

Effectively, and according to the post-Keynesian economics, the proliferation of wage restraint policies based on Reaganomics and Thatcherism is effectively detrimental to economic growth because the disruptive effects such policies have on private consumption do not counterbalance the supportive effects they have on private investment and net exports. This

[1] There are other important post-Keynesian models in which the rise of wage share contributes to an acceleration of economic growth (Robinson, 1956 and 1962; Rowthorn, 1981; Blecker, 1989).

[2] Nevertheless, Steindl (1952) also considered that the level of private investment could be positively affected by wage increases if they contribute to a higher level of capacity utilisation.

happens because the orthodox view advocates that countries follow a profit-led growth model, but they actually follow a wage-led growth model (Naastepad and Storm, 2006). The post-Keynesian literature has pointed out at least five reasons that justify the positive (negative) impact of the wage (profit) share on economic growth. First, corporations tend to immediately increase production in reaction to significant increases in aggregate demand because their productive capacity is not normally fully utilised (Kalecki, 1939). Second, the degree of profitability is not as relevant in the case of bank-based countries vis-à-vis the market-based countries because the main funding sources of corporations in the former are retained profits and/or long-term banking credit, which contributes to a greater level of long-term investments and a higher tolerance behind lower returns on capital (Naastepad and Storm, 2006). Third, wage restraint policies could depress the aggregate demand in countries that follow a profit-led growth model because the level of both private investment and net exports in these countries depend on the private consumption in the countries that follow a wage-led growth model (Naastepad and Storm, 2006). Fourth, wages also represent a further source of demand that boosts private investment and is clearly induced by the level of aggregate demand (Lavoie, 2009). Fifth, wage incomes are normally related to higher consumption propensities than profit incomes (Stockhammer, 2012).

Most of the empirical studies on the relationship between the wage share and economic growth follow one of the two general approaches. The first approach, called the structural approach, considers functional income distribution to be exogenous, according to which the effects of changes in wage share on the various components of aggregated demand are separately estimated (Bowles and Boyer, 1995; Gordon, 1995; Onaran and Stockhammer, 2005; Naastepad, 2006; Naastepad and Storm, 2006; Ederer and Stockhammer, 2007; Stockhammer *et al.,* 2008; Onaran and Galanis, 2012; Onaran and Obst, 2016; Jetin and Ortiz, 2020; Tomio, 2020). The second approach, called the aggregative approach, analyses the effect of changes in the wage share on aggregate demand (Stockhammer and Onaran, 2004; Barbosa-Filho and Taylor, 2006; Nikiforos and Foley, 2012; Kiefer and Rada, 2015; Rada and Kiefer, 2016; Kurt, 2020; Teixeira *et al.,* 2022; Alcobia and Barradas, 2023).

The empirical literature has shown that the majority of the developed countries tend to fall into the wage-led demand growth approach (Naastepad and Storm, 2006; Onaran and Obst, 2016). The few exceptions are small and/or highly open countries (e.g., Austria, Belgium and Ireland) and market-based countries (e.g., Japan and the United States). In the same vein, emerging countries (e.g., Argentina, China, India and Mexico) fall into the profit-led demand growth approach (Onaran and Galanis, 2014). Nonetheless, the more recent literature, more focused on developing countries, such as Brazil (Tomio, 2020; Teixeira *et al*., 2022), China (Jetin and Ortiz, 2020), and Turkey (Kurt, 2020), has highlighted that these countries follow a wage-led growth model. Onaran and Obst (2016) also investigated the effects on the implementation of

pro-labour policies in the EU countries and concluded that they would produce very positive effects in all EU countries, even in the ones in the profit-led demand growth group.

To the best of our knowledge, this is the first paper centred on all EU countries that performs a panel data econometric analysis, employs the aggregative approach, includes several post-Keynesian growth drivers and assesses the economic effects of the drivers.

3. POST-KEYNESIAN ECONOMIC GROWTH DRIVERS AND HYPOTHESES

Our growth model builds on post-Keynesian literature in order to assess the determinants of the aggregate demand in all the EU countries (Jungmann, 2021; Stockhammer and Kohler, 2022). It does this by including a variable to take into account the wage share in the EU countries. Our growth model takes the following form in the long term:

$$Y_{i,t} = \beta_0 + \beta_1 WS_{i,t} + \beta_2 X_{i,t} + \alpha_i + \varepsilon_t \quad \textbf{(1)}$$

where *i* is the country, *t* is the time period (years), *Y* is the growth rate of the real gross domestic product, *WS* is the wage share, *X* is a set of control variables, and α and ε are the two-way error term components to account for unobservable country-specific effects and time-specific effects.

Our control variables were chosen according to the variables that are theoretically and empirically considered to be important post-Keynesian growth drivers by influencing the level of aggregate demand, namely property prices, financial asset prices, credit, public spending and non-price competitiveness (Stockhammer and Wildauer, 2016; Alexiou *et al*, 2018; Gräbner *et al*., 2020; Jungmann, 2021; Stockhammer and Kohler, 2022; Alcobia and Barradas, 2023).

Therefore, our growth model takes the following form in the long term:

$$Y_{i,t} = \beta_0 + \beta_1 WS_{i,t} + \beta_2 PP_{i,t} + \beta_3 FAP_{i,t} + \beta_4 CR_{i,t} + \beta_5 PS_{i,t} + \beta_6 NPC_{i,t} + \alpha_i + \varepsilon_t \quad \textbf{(2)}$$

where *i* is the country, *t* is the time period (years), *Y* is the growth rate of the real gross domestic product, *WS* is the wage share, *PP* is property prices, *FAP* is financial asset prices, *CR* is credit, *PS* is public spending, *NPC* is the non-price competitiveness and α and ε are the two-way error term components to account for unobservable country-specific effects and time-specific effects.

Our hypotheses assume that wage share, property prices, financial asset prices, credit, public spending and non-price competitiveness exert a positive influence on aggregate demand,

which boosts economic growth. According to our hypotheses, the estimated coefficients of our variables in the long term should have the following signs:

$$\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \beta_5 > 0, \beta_6 > 0 \quad \textbf{(3)}$$

Following the post-Keynesian literature, wage share should have a positive impact on aggregate demand and, for that reason, enhance economic growth because its positive effect on private consumption more than compensates for its negative effect on private investment and on net exports (Jungmann, 2021; Alcobia and Barradas, 2023).

Aggregate demand and then economic growth are positively dependent on property prices due to their positive effects on private consumption and on private investment (Stockhammer and Bengtsson, 2020; Stockhammer and Kohler, 2022) through the so-called 'realised wealth effect', 'unrealised wealth effect' and 'liquidity constraints effect' (Boone and Girouard, 2002, Ludwig and Sløk, 2002; Gonçalves and Barradas, 2021; Barradas, 2022a).

Financial asset prices are also expected to positively influence aggregate demand and then economic growth due to their positive effects on private consumption and on private investment (Ludwig and Sløk, 2002; Stockhammer and Bengtsson, 2020; Gonçalves and Barradas, 2021; Barradas, 2022a), due to the aforementioned 'realised wealth effect', 'unrealized wealth effect', 'liquidity constraints effect' and the so-called 'stock option value effect', 'passive informant effect', 'active informant effect' and 'stock market pressure effect' (Stockhammer and Bengtsson, 2020).

Credit positively influences aggregate demand, which stimulates economic growth, because it represents a source of finance by allowing an increase in private consumption by households and private investment by corporations (Hein, 2012; Stockhammer and Wildaeur, 2016; Jungmann, 2021).

Public spending is expected to have a positive effect on aggregate demand and, consequently, on economic growth in accordance with assumptions of the Keynesian theory, primarily its fiscal multipliers, especially during economic recessions, hysteresis and sources of autonomous demand (Jungmann, 2021; Stockhammer and Kohler, 2022).

Finally, aggregate demand and economic growth are also positively affected by the degree of non-price competitiveness (Storm and Naastepad, 2015; Gräbner *et al*., 2020; Gala *et al.*, 2018; Alcobia, 2023; Alcobia and Cabral, 2023). These authors maintain that countries that produce more sophisticated goods have more export capabilities and also have greater potential for productivity improvements in the production of these goods with beneficial effects on growth.

4. DATA

We collected annual data for all EU countries from 1981 to 2021 by composing a panel dataset with a total of 28 cross-sectional units ($N = 28$) observed over 40 years ($T = 40$)[3]. This represents the time span and the frequency for which all data were available. The proxy to assess the non-price competitiveness was effectively available only from 1981 onwards, and the majority of proxies to assess our variables were only available on a yearly basis, and they are not yet available for 2021. We collected all data in June 2023.

We obtained an unbalanced panel because it was not possible to collect all variables for all countries in all years. Our unbalanced panel was composed of 724 observations, and 424 observations were missing. The structure and composition of our unbalanced panel is displayed in Table 1.

Table 1 – The structure and composition of our unbalanced panel

Country	Period	Observations	Missing
Austria	2001-2021	21	20
Belgium	1987-2021	35	6
Bulgaria	2006-2021	16	25
Croatia	2003-2021	19	22
Cyprus	2005-2021	17	24
Czechia	2009-2021	13	28
Denmark	1984-2021	38	3
Estonia	2006-2021	16	25
Finland	1981-2021	41	0
France	1981-2021	41	0
Germany	1992-2021	30	11
Greece	1998-2021	24	17
Hungary	2008-2021	14	27
Ireland	1981-2021	41	0
Italy	1981-2021	41	0
Latvia	2007-2021	15	26
Lithuania	2000-2021	22	19
Luxembourg	2008-2021	14	27
Malta	2006-2021	16	25
Netherlands	1981-2021	41	0
Poland	2006-2021	16	25
Portugal	1989-2021	33	8
Romania	2010-2021	12	29
Slovakia	2006-2021	16	25
Slovenia	2008-2021	14	27
Spain	1986-2021	36	5
Sweden	1981-2021	41	0
United Kingdom	1981-2021	41	0

Proxies, units and sources for our variables are exhibited in Table 2. The descriptive statistics of our variables are included in Table 3. The correlations between our variables are provided in Table 4, in which we exclude the existence of severe multicollinearity between our variables because all correlations are lower than 0.8 in absolute terms (Studenmund, 2005). Figure 1 shows the evolution of the wage share in each EU country since 1981 and Figure 2 expresses the plots of our variables in all the EU countries from 1981 to 2021.

[3] The United Kingdom was included in our panel dataset because our panel is constituted by annual data from 1981 to 2021, and Brexit only occurred at the beginning of 2020.

Table 2 – The proxies, units and sources for our variables

Acronym	Variable	Proxy and Unit	Source
Y	Economic growth	GDP growth (annual %)	World Bank
W	Wage share	Adjusted labour share (% of GDP at current market prices)	AMECO
PP	Property prices	Real residential property prices (2010=100, annual %)	BIS[4]
FAP	Financial asset prices	Share price index (2015=100, annual %)	OECD[5]
CR	Credit	Domestic credit to private sector (% of GDP)	World Bank
PS	Public spending	Total public expenses (% of GDP)	World Inequality
NPC	Non-price competitiveness	Gross domestic expenditure on research and development (% of GDP)	OECD[6]

Table 3 – The descriptive statistics

Variable	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
Y	0.022	0.024	0.244	-0.148	0.035	-0.584	8.375
WS	0.544	0.548	0.668	0.304	0.055	-0.512	3.902
PP	0.025	0.026	0.456	-0.396	0.080	0.226	8.222
FAP	0.078	0.066	1.313	-0.776	0.241	0.603	5.510
CR	0.831	0.773	2.547	0.131	0.400	1.205	5.005
PS	0.403	0.392	0.938	0.225	0.076	1.221	8.663
NPC	0.016	0.015	0.039	0.004	0.008	0.526	2.353

Table 4 – The correlation matrix

Variable	Y	WS	PP	FAP	CR	PS	NPC
Y	1.000						
WS	-0.265***	1.000					
PP	0.553***	-0.133***	1.000				
FAP	0.363***	0.016	0.267***	1.000			
CR	-0.233***	0.109***	-0.135***	-0.179***	1.000		
PS	-0.293***	0.280***	-0.158***	-0.061*	0.083**	1.000	
NPC	-0.124***	0.173***	0.002	0.020	0.179***	-0.071*	1.000

Note: *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

During that time, the wage share registered a sustained fall in the majority of the EU countries (Figure 1) from around 63% on average in 1981 to around 53% on average in 2021 (Figure 2). It is worth noting that in some of the EU countries, the wage share already represented less than half of the total national income (Figure 1), which reflects a stronger unequal functional income distribution in detriment of labour (workers) and in favour of capital (capitalists). This is the case for Cyprus, Hungary, Ireland, Poland, Romania, Slovakia and Sweden.

In the same vein, the economic growth in the EU countries has been rather dismal (Figure 2) in a context in which the EU countries have only grown around 2.2 per cent on average from 1981 and 2021 (Table 1). During these four decades, property prices and financial asset prices showed an average growth of about 2.5 per cent and 7.8 per cent, respectively (Table 1), while the rise of credit (particularly up to the Great Recession) and the increase in both public spending and non-price competitiveness were not enough to sustain a higher economic growth in the EU countries (Figure 2). The positive correlation between property prices (or financial asset prices)

[4] The property prices for Greece, Poland and Portugal were collected from the OECD database due to its unavailability on the BIS database.

[5] The financial asset prices for Cyprus, Malta and Lithuania were collected from the Fred St. Louis database due to its unavailability on the OECD database.

[6] The non-price competitiveness for Croatia, Cyprus and Malta were collected from the UNESCO database due to its unavailability on the OECD database.

and economic growth in the EU countries and the negative correlation between credit (or public spending or non-price competitiveness) and economic growth in the EU countries supports these beliefs (Table 4). This seems to confirm our expectations that the decline of the wage share has decisively contributed to the registered anaemic growth in the EU countries and has fuelled concerns about the emergence of a prolonged period of sluggish growth in the EU countries, whether or not the general decreasing trend in the near future would be reverted.

Figure 1 – Adjusted wage share (% of GDP at current market prices) in each EU country

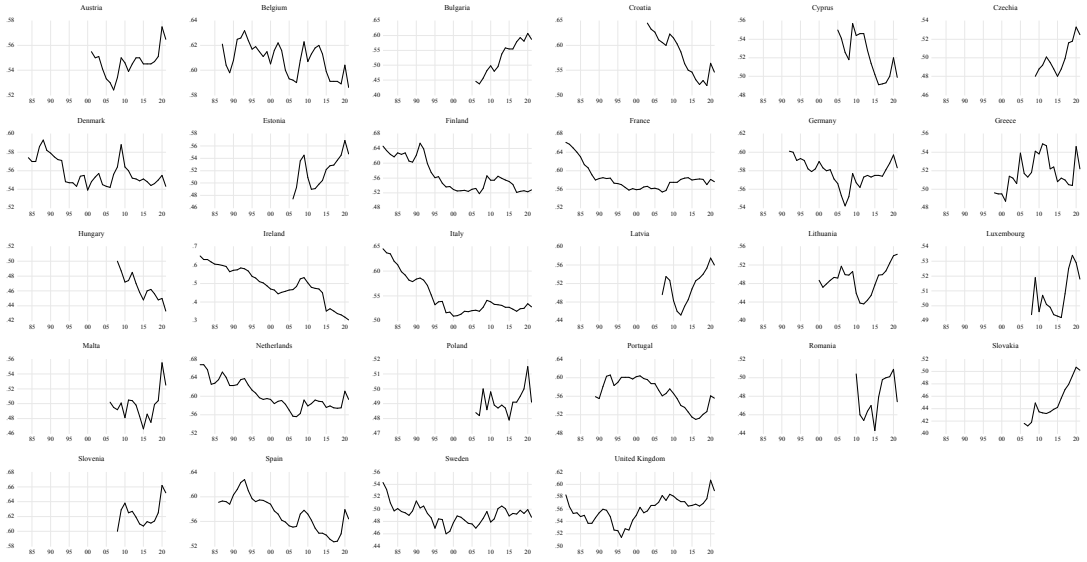


Figure 2 – Plots of our variables (unweighted averages for all the EU countries)

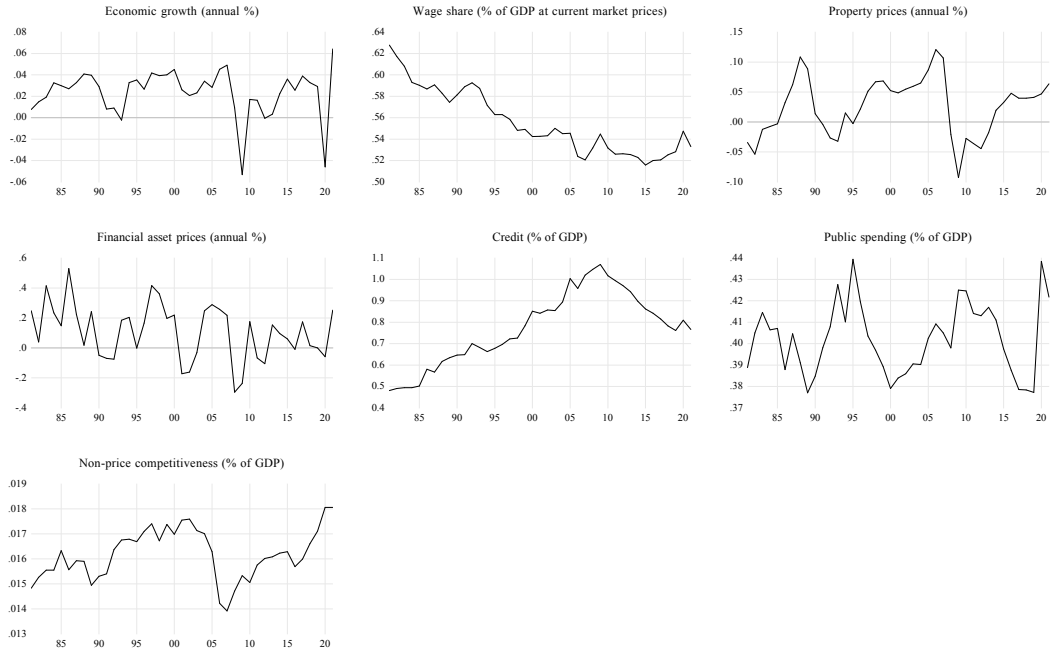


Table 5 – *P-values* of the Karavias and Tzavalis (2014) panel unit root test

Variable	Levels		First Differences	
	Intercepts	Intercepts and Linear Trends	Intercepts	Intercepts and Linear Trends
Y	0.000 (1982 and 1983)	0.000 (1983 and 1985)	n.a.	n.a.
WS	1.000 (1984 and 1987)	1.000 (1987 and 1989)	0.000 (1982 and 1983)	0.000 (1982 and 1985)
PP	0.000 (1982 and 1983)	0.000 (1983 and 1985)	n.a.	n.a.
FAP	0.000 (1982 and 1983)	0.000 (1982 and 1983)	n.a.	n.a.
CR	0.000 (1982 and 1983)	1.000 (1983 and 1985)	n.a.	0.000 (1983 and 1985)
PS	0.000 (1982 and 1983)	1.000 (1985 and 1987)	n.a.	0.000 (1983 and 1985)
NPC	0.000 (1982 and 1983)	1.000 (1987 and 1992)	n.a.	0.000 (1983 and 1985)

Note: Estimated break dates are reported in ()

The results of the recent Karavias and Tzavalis (2014) panel unit root test are demonstrated in Table 5. This panel unit root test was performed in Stata software (version 17) by applying the 'xtbunitroot' routine developed by Chen *et al*. (2022). We chose this panel unit root test because it produces trustworthy conclusions according to the characteristics of our data. This panel unit root test can be applied in panels with small or large time-series dimensions and in both balanced and unbalanced panels, and it presents several advantages vis-à-vis other panel unit root tests, namely it allows for one or two known or unknown structural breaks, intercepts and intercepts and linear trends, non-normal errors, cross-sectional heteroskedasticity, cross sectional dependence, and homogeneity or heterogeneity among the different cross-sectional units (Karavias and Tzavalis, 2014). The results of the Karavias and Tzavalis (2014) panel unit root test suggest that we have a mixture of variables that are integrated of order zero (i.e., variables that are stationary in levels) and integrated of order one (i.e., variables that are stationary only in the first differences).

5. ECONOMETRIC METHODOLOGY

Our estimates were produced by means of the panel autoregressive distributed lag econometric methodology that was used due to the existence of a mixture of variables that are integrated of order zero and integrated of order one. This econometric methodology was developed by Pesaran and Smith (1995), Pesaran (1997) and Pesaran *et al*. (1997, 1999) by employing an autoregressive distributed lag approach to dynamic panel data regressions in an error correction form, which allows the existence of both short-term and long-term effects, the inclusion of lags for both the dependent and the independent variables and the existence of heterogeneity among the different cross-sectional units.

The mean-group (MG) estimator, the dynamic fixed-effects (DFE) estimator and the PMG estimator could be directly performed through the panel autoregressive distributed econometric methodology. The MG estimator was introduced by Pesaran and Smith (1995), and it allows the heterogeneity of all estimates (long-term coefficients, short-term coefficients, intercepts, the error correction terms and the error variances) in a context in which they can differ

across the different countries. This happens because the estimates are first produced individually for each country and then are pooled by a simple arithmetic average for all countries as a whole. According to Pesaran and Smith (1995), the MG estimator produces consistent estimates, mainly in the case of larger panels, and even in the case of potential problems of endogeneity due to the inclusion of lags for both the dependent and the independent variables.

The DFE estimator assumes the homogeneity of the majority of estimates (long-term coefficients, short-term coefficients, the error correction terms and the error variances) in a context in which only the intercepts are allowed to differ across the different countries. According to Blackburne III and Frank (2007), the DFE estimator also produces consistent estimates, mainly in the cases in which intercepts are in fact identical among the different countries.

The PMG estimator was introduced by Pesaran *et al*. (1997, 1999), and it allows the short-term coefficients, the error correction terms and the error variances to differ across the different countries but constrains the long-term coefficients to be equal across the different countries. As emphasised by Blackburne III and Frank (2007), the PMG estimator effectively represents an intermediate estimator between the MG estimator and the DFE estimator. According to Pesaran *et al*. (1999), the PMG estimator also produces consistent estimates and tends to produce more efficient estimates in comparison to those produced by the MG estimator because it has a lesser number of estimated parameters. Note also that the PMG estimator produces reliable estimates (in terms of consistency and efficiency) even when there are endogenous variables among the independent variables (Chudik *et al*., 2023).

We performed the panel autoregressive distributed lag econometric methodology in Stata software (version 17) by applying the 'xtpmg' routine, which was developed by Blackburne III and Frank (2007) using a maximum likelihood method to produce the respective estimates. We also employed the traditional Hausman's (1978) specification test in Stata software (version 17) by applying the 'Hausman' routine in order to choose the best appropriate estimator (the MG estimator, the DFE estimator or the PMG estimator) in terms of consistency and efficiency. However, we only took the MG estimator and the PMG estimator into consideration because the DFE estimator took rather unrealistic assumptions (Makhlouf *et al*., 2020), its estimates were potentially inconsistent in the cases in which intercepts were not identical among the different countries (Blackburne III and Frank, 2007) and its estimates were biased due to the potential endogeneity between the error term and the lagged dependent variable (Nickel, 1981; Baltagi, 2005).

We used only one lag to produce our estimates for three reasons. First, the use of one lag is the traditional rule of thumb for annual data in order to not lose very degrees of freedom (Wooldridge, 2003). Second, the use of one lag is the indication provided by the information criteria and, particularly, by the Schwarz information criterion and the Hannan-Quinn information

criterion[7]. Third, the use of one lag is the traditional empirical strategy adopted in the majority of empirical works on the nexus between the wage share and economic growth (Naastepad and Storm, 2006; Hein and Vogel, 2008; Stockhammer *et al*., 2008; Kiefer and Rada, 2015; Onaran and Obst, 2016; Alcobia and Barradas, 2023).

6. FINDINGS AND DISCUSSION

Our long-term and short-term estimates for all the EU countries are presented in Table 6. These estimates are produced by employing the PMG estimator, which is preferable in terms of consistency and efficiency vis-à-vis the MG estimator according to the Hausman's (1978) specification test. The PMG estimator is the one that effectively offers more realistic assumptions in the context of the EU countries by assuming that there are no significant differences among the EU countries with regard to their long-term drivers of economic growth, but only some differences in the short term, which is important to ensure the specific idiosyncrasies across the different countries.

Given our interest in assessing the role of the wage share on economic growth in EU countries, we focused our analysis on the long-term estimates because the short-term estimates only capture the short-term adjustments to temporary deviations from the long-term trend. In relation to the short-term estimates, the most important finding pertains to the error correction term, which is statistically significant at the traditional significance levels and exhibits a negative coefficient that lies between -2 and 0. This ensures the existence of a cointegration relationship among our variables, that is, a long-term relationship among them, and the convergence of our model to the long-term equilibrium even when some disturbances occur in the short term. The speed of adjustment of any shock in the short term is automatically corrected within a year by around 93.2 per cent.

In the long term, all variables are statistically significant at the conventional significance levels, with the exception of non-price competitiveness[8]. The lack of statistical significance of non-price competitiveness is not too surprising in the case of EU countries, particularly because of its relative stability and low levels in the last four decades (Figure 2). Non-price competitiveness in the EU countries has only represented an average of around 1.6% of GDP during that time (Table 3), which is not enough to boost economic growth. As previously discussed, this happens because policymakers all over the world, including those in EU countries,

[7] The results of the information criteria are available upon request.

[8] All of the long-term and short-term results do not change in terms of statistical significance and signs if we use the real gross domestic product per capita (annual %) instead of the real gross domestic product (annual %). Results are available upon request.

have (wrongly) privileged the adoption of wage restraint policies as a way to stimulate price competitiveness and its corresponding economic growth (Naastepad and Storm, 2006).

The remaining variables are statistically significant and have the expected signs, with the exception of credit and public spending. Credit exerts a negative effect on economic growth in the EU countries, which does not support the post-Keynesian claims for the positive role played by credit on the aggregate demand and, mainly, on private consumption and on private investment (Hein, 2012; Stockhammer and Wildaeur, 2016; Jungmann, 2021). As discussed by Barradas (2020, 2022b), this counterintuitive result is due to an excessive growth of credit and the corresponding higher levels of indebtedness of economic agents and, particularly, households through mortgage credit in the era of financialisation, which has decreased the resilience of banks and increased the likelihood of a systemic banking crisis, increased the vulnerability of economies to any negative shocks and originated less available funds to support tangible investments that would be more growth enhancing (Correia and Barradas, 2021; Barradas, 2023). Higher levels of indebtedness of economic agents implies higher costs of debt service, that is, higher interest payments, which penalises the level of aggregate demand by depressing economic growth (Stockhammer and Wildauer, 2015). This result supports the 'demand following hypothesis' instead of the 'supply leading hypothesis', according to which the positive role played by finance only occurs in the early stages of economic development and, consequently, in the less developed economies (Alexiou *et al*., 2018). A negative relationship between credit and economic growth was also found by Rioja and Valev (2004a, 2004), Aghion *et al*. (2005), Kose *et al*. (2006), Prasad *et al*. (2007), Rousseau and Wachtel (2011), Breintenlechner *et al*. (2015), Ehigiamusoe and Lean (2017), Alexiou *et al*. (2018), Redmon and Nasir (2020), Barradas (2020, 2022b) and Shahbaz *et al.* (2022), including for the specific case of the EU countries.

Public spending negatively impacts the economic growth in the EU countries, which also does not support the post-Keynesian beliefs on the positive role played by public spending on the aggregate demand through its fiscal multipliers, especially during economic recessions, hysteresis and source of autonomous demand (Jungmann, 2021; Stockhammer and Kohler, 2022)[9]. Several reasons are identified in the literature that could explain this negative relationship between public spending and economic growth, such as inefficient state-owned corporations, corruption, higher inflation pressures and higher levels of taxation to support public spending (Alexiou *et al*., 2018). A negative effect of public spending on economic growth was also reported by Rioja and Valev (2004a, 2004b), Hassan *et al*. (2011), Rousseau and Wachtel (2011), Cecchetti and Kharroubi (2012), Breintenlechner *et al*. (2015), Barradas (2020, 2022a) and Alcobia and Barradas (2023), including for the specific case of the EU countries.

[9] The negative impact of public spending on economic growth in the EU countries does not change if we use the general government final consumption (% of GDP) instead of the total government expenditures (% of GDP). Results are available upon request.

Property prices, financial asset prices and wage share have the expected positive effects on economic growth in the EU countries. Property prices and financial asset prices are positive determinants of the economic growth in EU countries, which is in accordance with the post-Keynesian theoretical predictions that asset price inflation is growth inducing due to its beneficial effects on aggregate demand and, especially, on private consumption and on private investment (Stockhammer and Bengtsson, 2020; Stockhammer and Kohler, 2022). It is also important to highlight that the impact of property prices on economic growth in EU countries is expressively higher to that exerted by financial asset prices. This happens because housing assets are more widespread in the population than financial assets (Sousa, 2008; Onaran *et al*., 2011; Stockhammer and Bengtsson, 2020) due to lower levels of household participation in financial markets in EU countries, probably because the majority of EU countries are bank-based instead of market-based (Boone *et al*., 1998; Ludwig and Sløk, 2002).

Wage share exerts a positive effect on economic growth in EU countries, which corroborates the post-Keynesian expectations on the positive role played by wage share on the growth of aggregate demand, particularly because its positive effects on private consumption more than compensate for its negative effects on private investment and on net exports (Jungmann, 2021; Alcobia and Barradas, 2023)[10]. This shows that all the EU countries are categorised by a wage-led growth model instead of a profit-led growth model, which is a similar result to the findings obtained by Naastepad and Storm (2006), Onaran and Obst (2016) and Onaran and Galanis (2014), who have already concluded that the majority of OECD countries, EU countries and emerging countries, respectively, are, in fact, classified by a wage-led growth model. Although we obtain similar results, our empirical work is relatively more reliable because we employ the so-called aggregative approach, assessing the effect of changes in the wage share on aggregate demand as a whole. In contrast, Naastepad and Storm (2006), Onaran and Obst (2016), and Onaran and Galanis (2014) use the so-called structural approach, analysing the effects of changes in the wage share on the various components of aggregate demand separately. As argued by Blecker and Setterfield (2019), the use of an aggregative approach offers several advantages over the structural approach, particularly by capturing the potential dynamic interactions between the wage share and the individual components of aggregate demand.

[10] The positive impact of wage share on economic growth in the EU countries does not change if we use the adjusted wage share (% of GDP at current factor cost) instead of the adjusted wage share (% of GDP at current market prices). Results are available upon request.

Table 6 – Long-term and short-term estimates

Variable	All Countries	Euro Area Countries	Non-Euro Area Countries	Core Countries	Peripheral Countries	Catching-Up Countries	Financial Hub Countries	Countries (Increase of the Wage Share)	Countries (Decrease of the Wage Share)	Countries (Wage Share Above Average)	Countries (Wage Share Below Average)	Countries (Wage Share Above 50% on Average)	Countries (Wage Share Below 50% on Average)	Countries (Exports % of GDP Above 50% on Average)	Countries (Exports % of GDP Below 50% on Average)
Long-term Coefficients															
WS_t	0.084***	0.082***	0.052***	0.032***	0.122***	0.190***	0.083***	0.085***	0.057***	0.071***	0.091***	0.081***	0.114***	0.126***	0.085***
	(0.007)	(0.010)	(0.015)	(0.012)	(0.017)	(0.018)	(0.029)	(0.015)	(0.009)	(0.009)	(0.019)	(0.008)	(0.023)	(0.019)	(0.009)
	[10.61]	[7.98]	[3.57]	[2.66]	[7.22]	[10.86]	[2.83]	[5.85]	[6.23]	[8.19]	[4.77]	[9.99]	[4.98]	[6.64]	[9.73]
PP_t	0.155***	0.202***	0.116***	0.132***	0.158***	0.132***	0.132***	0.184***	0.144***	0.144***	0.187***	0.155***	0.123***	0.197***	0.140***
	(0.010)	(0.014)	(0.012)	(0.015)	(0.023)	(0.025)	(0.017)	(0.016)	(0.012)	(0.011)	(0.019)	(0.011)	(0.019)	(0.019)	(0.011)
	[15.73]	[14.21]	[9.34]	[8.58]	[6.80]	[5.36]	[7.72]	[11.35]	[12.32]	[12.66]	[9.92]	[14.36]	[6.62]	[10.37]	[12.46]
FAP_t	0.022***	0.022***	0.014**	0.013**	0.023***	0.037***	0.031***	0.027***	0.022***	0.020***	0.021***	0.021***	0.009	0.018**	0.020***
	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.011)	(0.009)	(0.008)	(0.004)	(0.004)	(0.008)	(0.004)	(0.010)	(0.008)	(0.004)
	[6.04]	[5.04]	[2.31]	[2.30]	[3.86]	[3.37]	[3.35]	[3.64]	[5.33]	[4.87]	[2.70]	[5.37]	[0.90]	[2.29]	[4.91]
CR_t	-0.008***	-0.013***	-0.007***	-0.007***	-0.016***	-0.061***	-0.003	-0.014***	-0.009***	-0.006***	-0.013***	-0.007***	0.001	-0.017***	-0.007***
	(0.001)	(0.003)	(0.002)	(0.002)	(0.005)	(0.009)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.001)	(0.005)	(0.004)	(0.001)
	[-5.76]	[-4.59]	[-4.61]	[-4.21]	[-3.45]	[-6.95]	[-1.08]	[-5.07]	[-5.68]	[-3.84]	[-3.84]	[-4.91]	[0.19]	[-4.07]	[-4.82]
PS_t	-0.056***	-0.049***	0.003	-0.006	-0.091***	-0.133***	-0.043	0.006	-0.033***	-0.046***	-0.022	-0.055***	-0.047	-0.084***	-0.058***
	(0.009)	(0.011)	(0.021)	(0.015)	(0.018)	(0.022)	(0.035)	(0.021)	(0.011)	(0.010)	(0.025)	(0.010)	(0.029)	(0.020)	(0.011)
	[-5.96]	[-4.30]	[0.15]	[-0.39]	[-5.17]	[-6.12]	[-1.24]	[0.29]	[-3.09]	[-4.47]	[-0.88]	[-5.58]	[-1.63]	[-4.12]	[-5.34]
NPC_t	-0.122	-0.126	-0.242**	0.176	-0.025	0.331	-0.672**	-1.045***	0.125	-0.126	-0.429***	-0.153	-0.766***	-0.550**	-0.108
	(0.077)	(0.109)	(0.105)	(0.118)	(0.205)	(0.321)	(0.287)	(0.169)	(0.089)	(0.099)	(0.131)	(0.093)	(0.159)	(0.280)	(0.080)
	[-1.58]	[-1.15]	[-2.30]	[1.49]	[-0.12]	[1.03]	[-2.34]	[-6.18]	[1.40]	[-1.28]	[-3.27]	[-1.65]	[-4.82]	[-1.97]	[-1.34]
Short-term Coefficients															
Error Correction Term$_t$	-0.932***	-0.886***	-1.103***	-0.949***	-0.912***	-0.981***	-0.850***	-0.882***	-0.949***	-1.007***	-0.843***	-0.987***	-0.843***	-0.895***	-0.985***
	(0.050)	(0.049)	(0.108)	(0.037)	(0.116)	(0.094)	(0.136)	(0.076)	(0.054)	(0.048)	(0.056)	(0.053)	(0.035)	(0.101)	(0.068)
	[-18.51]	[-17.95]	[-10.17]	[-25.94]	[-7.90]	[-10.47]	[-6.26]	[-11.59]	[-17.65]	[-20.85]	[-15.11]	[-18.72]	[-24.15]	[-8.83]	[-14.58]
ΔWS_t	-0.650***	-0.903***	0.054	-1.192***	-0.912***	-0.473*	-1.026**	-0.658***	-0.740***	-0.804***	-0.493*	-0.559***	-0.466	-0.920***	-0.560***
	(0.180)	(0.206)	(0.427)	(0.230)	(0.348)	(0.286)	(0.413)	(0.228)	(0.221)	(0.184)	(0.281)	(0.198)	(0.547)	(0.334)	(0.188)
	[-3.61]	[-4.39]	[0.13]	[-5.19]	[-2.62]	[-1.65]	[-2.48]	[-2.88]	[-3.36]	[-4.37]	[-1.76]	[-2.83]	[-0.85]	[-2.75]	[-2.98]
ΔPP_t	-0.048	-0.069**	-0.020	-0.109***	-0.052	-0.072	-0.006	-0.087**	-0.042	-0.038	-0.074	-0.047*	0.023	-0.006	-0.089***
	(0.033)	(0.032)	(0.127)	(0.013)	(0.050)	(0.054)	(0.082)	(0.042)	(0.054)	(0.029)	(0.077)	(0.027)	(0.140)	(0.060)	(0.027)
	[-1.45]	[-2.18]	[-0.16]	[-8.22]	[-1.04]	[-1.32]	[-0.07]	[-2.07]	[-0.78]	[-1.33]	[-0.97]	[-1.76]	[0.16]	[-0.10]	[-3.31]
ΔFA_t	-0.012***	-0.010**	-0.014*	-0.012***	-0.015***	-0.009	-0.030***	-0.008	-0.016***	-0.012*	-0.007	-0.010**	-0.006	-0.016*	-0.010**
	(0.004)	(0.005)	(0.008)	(0.003)	(0.005)	(0.013)	(0.007)	(0.010)	(0.004)	(0.006)	(0.007)	(0.005)	(0.006)	(0.009)	(0.005)
	[-2.71]	[-2.08]	[-1.70]	[-3.90]	[-2.78]	[-0.71]	[-4.20]	[-0.78]	[-4.40]	[-1.92]	[-1.01]	[-2.06]	[-1.11]	[-1.83]	[-2.08]
ΔCR_t	-0.078	-0.060	-0.144	-0.035	-0.106***	-0.067	-0.077	-0.075	-0.145	-0.050*	-0.089	-0.066**	-0.040	0.005	-0.160*
	(0.063)	(0.049)	(0.199)	(0.024)	(0.029)	(0.145)	(0.086)	(0.066)	(0.101)	(0.026)	(0.091)	(0.032)	(0.148)	(0.077)	(0.084)
	[-1.24]	[-1.22]	[-0.72]	[-1.46]	[-3.62]	[-0.46]	[-0.90]	[-1.14]	[-1.43]	[-1.94]	[-0.97]	[-2.05]	[-0.27]	[0.06]	[-1.91]
ΔPS_t	-0.609***	-0.526***	-0.749***	-0.457***	-0.466***	-0.828***	-0.379*	-0.747***	-0.514***	-0.540***	-0.711***	-0.645***	-0.592***	-0.446***	-0.691***
	(0.094)	(0.105)	(0.146)	(0.101)	(0.107)	(0.153)	(0.220)	(0.135)	(0.121)	(0.133)	(0.140)	(0.115)	(0.183)	(0.150)	(0.115)
	[-6.51]	[-4.98]	[-5.13]	[-4.51]	[-4.35]	[-5.42]	[-1.72]	[-5.53]	[-4.24]	[-4.06]	[-5.07]	[-5.61]	[-3.23]	[-2.98]	[-6.00]
ΔNPC_t	0.929	0.492	4.208	0.238	-4.666**	3.349	0.789	1.106	1.190	-0.127	0.641	-1.163	3.301	2.156	0.438
	(1.330)	(1.428)	(3.094)	(0.820)	(2.019)	(2.074)	(4.132)	(2.138)	(1.605)	(0.781)	(2.772)	(1.067)	(4.099)	(2.192)	(1.617)
	[0.70]	[0.34]	[1.36]	[0.29]	[-2.31]	[1.62]	[0.19]	[0.52]	[0.74]	[-0.16]	[0.23]	[-1.09]	[0.81]	[0.98]	[0.27]
Observations	696	513	183	200	186	162	148	231	465	418	278	526	170	235	461
Countries (Years)	28 (30)	20 (40)	8 (40)	6 (40)	6 (40)	11 (21)	5 (40)	13 (40)	15 (40)	13 (40)	15 (40)	20 (40)	8 (40)	11 (40)	17 (40)
Hausman Test (MG vs PMG)	0.999	0.976	0.110	0.941	0.096	1.000	0.998	0.999	0.812	0.845	1.000	0.947	0.018	0.952	0.777
Estimator	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level. Short-term coefficients per country are not reported, but they are available upon request

Table 7 – The economic effects of the long-term estimates

Countries	Variable	Long-term Coefficient	Actual Cumulative Change	Economic Effect	Economic Growth
All Countries	WS_t	0.084	-0.004	-0.0003	0.022
	PP_t	0.155	0.025	0.0039	
	FAP_t	0.022	0.078	0.0017	
	CR_t	-0.008	0.015	-0.0001	
	PS_t	-0.056	0.002	-0.0001	
Euro Area Countries	WS_t	0.082	-0.004	-0.0003	0.022
	PP_t	0.202	0.024	0.0048	
	FAP_t	0.022	0.074	0.0016	
	CR_t	-0.013	0.010	-0.0001	
	PS_t	-0.049	0.003	-0.0001	
Non-Euro Area Countries	WS_t	0.052	-0.002	-0.0001	0.022
	PP_t	0.116	0.027	0.0031	
	FAP_t	0.014	0.090	0.0013	
	CR_t	-0.007	0.035	-0.0002	
	NPC_t	-0.242	-0.002	0.0005	
Core Countries	WS_t	0.032	-0.002	-0.0001	0.018
	PP_t	0.132	0.024	0.0032	
	FAP_t	0.013	0.106	0.0014	
	CR_t	-0.007	0.039	-0.0003	
Peripheral Countries	WS_t	0.122	-0.004	-0.0005	0.015
	PP_t	0.158	0.017	0.0027	
	FAP_t	0.023	0.072	0.0017	
	CR_t	-0.016	0.013	-0.0002	
	PS_t	-0.091	0.005	-0.0005	
Catching-Up Countries	WS_t	0.190	0.004	0.0008	0.025
	PP_t	0.132	0.029	0.0038	
	FAP_t	0.037	0.064	0.0024	
	CR_t	-0.061	0.119	-0.0073	
	PS_t	-0.133	0.004	-0.0005	
Financial Hub Countries	WS_t	0.083	-0.005	-0.0004	0.031
	PP_t	0.132	0.030	0.0040	
	FAP_t	0.031	0.065	0.0020	
	NPC_t	-0.672	0.003	-0.0020	
Countries (Increase of the Wage Share)	WS_t	0.085	-0.001	-0.0001	0.023
	PP_t	0.184	0.033	0.0061	
	FAP_t	0.027	0.050	0.0014	
	CR_t	-0.014	0.028	-0.0004	
	NPC_t	-1.045	-0.007	0.0073	
Countries (Decrease of the Wage Share)	WS_t	0.057	-0.005	-0.0003	0.021
	PP_t	0.144	0.021	0.0030	
	FAP	0.022	0.093	0.0020	
	CR_t	-0.009	0.017	-0.0002	
	PS_t	-0.033	0.002	-0.0001	
Countries (Wage Share Above Average)	WS_t	0.071	-0.003	-0.0002	0.017
	PP_t	0.144	0.022	0.0032	
	FAP_t	0.020	0.084	0.0017	
	CR_t	-0.006	0.021	-0.0001	
	PS_t	-0.046	0.004	-0.0002	
Countries (Wage Share Below Average)	WS_t	0.091	-0.004	-0.0004	0.028
	PP_t	0.187	0.029	0.0054	
	FAP_t	0.021	0.071	0.0015	
	CR_t	-0.013	0.014	-0.0002	
	NPC_t	-0.429	-0.001	0.0004	
Countries (Wage Share Above 50% on Average)	WS_t	0.081	-0.003	-0.0002	0.017
	PP_t	0.155	0.022	0.0034	
	FAP_t	0.021	0.072	0.0015	
	CR_t	-0.007	0.016	-0.0001	
	PS_t	-0.055	0.004	-0.0002	
Countries (Wage Share Below 50% on Average)	WS_t	0.114	-0.005	-0.0006	0.036
	PP_t	0.123	0.033	0.0041	
	NPC_t	-0.766	0.0001	-0.0001	
Countries (Exports % of GDP Above 50% on Average)	WS_t	0.126	-0.005	-0.0006	0.029
	PP_t	0.197	0.032	0.0063	
	FAP_t	0.018	0.060	0.0011	
	CR_t	-0.017	0.008	-0.0001	
	PS_t	-0.084	-0.002	0.0002	
	NPC_t	-0.550	0.009	-0.0050	
Countries (Exports % of GDP Below 50% on Average)	WS_t	0.085	-0.003	-0.0003	0.018
	PP_t	0.140	0.021	0.0029	
	FAP_t	0.020	0.088	0.0018	
	CR_t	-0.007	0.019	-0.0001	
	PS_t	-0.058	0.004	-0.0002	

Note: The long-term coefficient is the estimated coefficient of the corresponding variable. The actual cumulative change corresponds to the average of annual growth rate of the corresponding variable from 1981 to 2021 (in the case of catching-up countries, the actual cumulative change corresponds to the average of annual growth rate of the corresponding variable from 2000 to 2021). The economic effect is the multiplication of the long-term coefficient by the actual cumulative change. Economic growth refers to the average of the annual growth rate of the real gross domestic product during that periods

In order to assess the robustness of our long-term and short-term estimates to resampling and to take advantage of the cross-sectional dimension of our panel data, we performed a jackknife analysis, which involves the re-estimation of our growth model by excluding one country at a time (Quenouille, 1949, 1956; Tukey, 1958). Long-term and short-term estimates of the jackknife analysis ensured the robustness of our results because variables did not change substantially in terms of statistical significance and signs in comparison to the long-term and short-term estimates for all EU countries[11].

As a heterogenous analysis, we also divided our sample and re-estimated our growth model in different subsamples, which allowed us to examine whether the wage share (and the remaining post-Keynesian determinants of economic growth) were affected in the same mode and/or intensity in the different EU countries. Fourteen subsamples were created by following a certain rational and institutional setting through the use of five different criteria. The first criterion was the presence in the eurozone, which allowed us to distinguish between the euro area countries and the non-euro area countries[12]. The second criterion was the evolutionary process and path-dependent trajectories that were triggered by the European integration (Gräbner *et al*., 2020), which suggests the existence of four different groups, namely the core countries, peripheral countries, catching-up countries and financial hub countries[13]. The third criterion corresponded to the evolution of the wage share in EU countries from 1981 to 2021 (Figure 1) in a context in which we observed countries where wage share denoted a generally increasing trend and countries where wage share denoted a generally decreasing trend[14]. The fourth criterion is the general importance of the wage share in the EU countries in the last four decades, and we identified four groups of countries, namely countries where the wage share represents a higher importance in

[11] Long-term and short-term estimates of the jackknife analysis are available upon request.

[12] The euro area countries are Austria, Belgium, Croatia, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia and Spain. The non-euro area countries are Bulgaria, Czechia, Denmark, Hungary, Poland, Romania, Sweden and the United Kingdom.

[13] According to Gräbner *et al*. (2020), there are several marked differences among these countries. Core countries (Austria, Belgium, Denmark, Finland, Germany and Sweden) exhibit high levels of GDP per capita and low levels of unemployment due to the strong importance of industrial production and the production of more complex products. Peripheral countries (Cyprus, France, Greece, Italy, Portugal and Spain) denote lower levels of export shares, relatively high public debt, a tendency to current account deficits and relatively high levels of unemployment. Catching-up countries (Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) reveal relatively low levels of both GDP per capita and wages, a high degree of foreign ownership and a small service sector but partially important manufacturing sector. Financial hub countries (Ireland, Luxembourg, Malta, the Netherlands and the United Kingdom) are characterised by high debt levels of private corporations, a great importance of financial activities in terms of value added, high foreign investment inflows and large incomes from wealth taxes.

[14] Austria, Bulgaria, Czechia, Estonia, Greece, Latvia, Lithuania, Luxembourg, Malta, Poland, Slovakia, Slovenia and the United Kingdom are the countries where wage share denoted a generally increasing trend. Belgium, Croatia, Cyprus, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Portugal, Romania, Spain, Sweden are the countries where wage share denoted a generally decreasing trend.

relation to the average of around 54.4% (Table 3) of total national income, countries where the wage share represents a lesser importance in relation to that average, countries where the wage share represents more than 50% of the total national income and countries where the wage share represents less than 50% of the total national income[15]. The fifth criterion defined two additional groups according to the importance of exports on total aggregate demand, namely countries where exports of goods and services represent more than 50% of the total GDP on average from 1981 to 2021 and countries where exports of goods and services represent less than 50% of the total GDP on average during that time[16]. The long-term and short-term estimates for these fourteen subsamples are presented in Table 6.

All of them are produced by employing the PMG estimator, which is preferable in terms of consistency efficiency and efficiency vis-à-vis the MG estimator according to the Hausman's (1978) specification test[17]. Once again, estimates for these subsamples corroborated the robustness of our results and their homogeneity because the majority of variables did not expressively change in terms of statistical significance and signs in comparison to the short-term and long-term estimates for all the EU countries.

Five different conclusions are drawn. First, the error correction term remains statistically significant by exhibiting a negative coefficient that lies between -2 and 0 for all subsamples, which confirms the existence of a cointegration relationship and the respective convergence of our model. Second, the non-price competitiveness remains statistically insignificant in the majority of subsamples. Third, the negative effect of both credit and public spending are confirmed for the majority of subsamples. Fourth, property prices and financial asset prices

[15] Countries where the wage share represents a higher importance in relation to the average of around 54.4% (Table 3) of total national income are Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Italy, the Netherlands, Portugal, Slovenia, Spain and the United Kingdom. Countries where the wage share represents a lesser importance in relation to that average are Bulgaria, Cyprus, Czechia, Estonia, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Poland, Romania, Slovakia and Sweden. Countries where the wage share represents more than 50% of the total national income are Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Latvia, Luxembourg, the Netherlands, Portugal, Slovenia, Spain and the United Kingdom. Countries where the wage share represents less than 50% of the total national income are Hungary, Ireland, Lithuania, Malta, Poland, Romania, Slovakia and Sweden.

[16] Belgium, Cyprus, Estonia, Hungary, Ireland, Lithuania, Luxembourg, Malta, the Netherlands, Slovakia and Slovenia are the countries where exports of goods and services represent more than 50% of the total GDP on average from 1981 to 2021. Austria, Bulgaria Croatia, Czechia, Denmark, Finland, France, Germany, Greece, Italy, Latvia, Poland, Portugal, Romania, Spain, Sweden and the United Kingdom are the countries where exports of goods and services represent less than 50% of the total GDP on average during that time.

[17] The only exception pertains to the subsample of countries in which the wage share represents, on average, less than 50% of total national income, according to which Hausman's (1978) specification test suggests that the MG estimator is preferable via-à-vis the PMG estimator. Nonetheless, we also estimated our long-term and short-term results with the PMG estimator for this specific group of countries in order to obtain fully comparable results with the results for all the EU countries and for all the remaining subsamples of countries. The results produced by the MG estimator are available upon request, albeit the majority of variables did not radically change in terms of statistical significance and signs in comparison to the results produced by the PMG estimator.

maintain their statistical significance by exerting a positive impact on economic growth in all subsamples. In all of them, the positive impact of property prices on economic growth is also considerably higher than that exerted by financial asset prices. Fifth, the wage share is also statistically significant in all of these fourteen subsamples by positively influencing economic growth in all of them. This corroborates our previous result that EU countries are indeed classified by a wage-led growth model instead of a profit-led growth model.

The economic effects of our long-term estimates are shown in Table 7. For all EU countries, we concluded that the growth of property prices and financial asset prices were the main growth drivers from 1981 to 2021. During that time, the rise in property prices of around 2.5 per cent on average per year and the rise of financial asset prices of around 7.8 per cent on average per year favoured an acceleration of economic growth in EU countries of about 3.9 per cent on average per year and 1.7 per cent on average per year, respectively. The growth of both property prices and financial asset prices also represented the main growth triggers from 1981 to 2021 for all the different groups of countries. The effect caused by the growth of property prices was more pronounced on the economic growth of the euro area countries, financial hub countries, countries that registered an increase in the wage share, countries with a wage share less than the average and countries with greater exports. In these countries, the rise of property prices sustained an acceleration of economic growth by about 4.8, 4.0, 6.1, 5.4 and 6.3 per cent on average per year, respectively. The effect instigated by the surge of financial asset prices was stronger on the economic growth of the catching-up countries, financial hub countries, countries that registered a decrease in the wage share and countries with lesser exports. In these countries, the growth of financial asset prices benefited an acceleration of economic growth by around 2.4., 2.0, 2.0 and 1.8 per cent on average per year, respectively.

The expansion of both credit and public spending by around 1.5 per cent on average per year and 0.2 per cent on average per year, respectively, prevented a higher economic growth in the EU countries over these four decades. During that time, the economic growth in EU countries would effectively have been greater by about 0.2 per cent on average per year if there had not been an increase in both credit and public spending. The deleterious effects of credit and public spending presented a greater magnitude in peripheral countries, catching-up countries, countries that registered a decrease in the wage share, countries with a wage share higher than the average, countries with a wage share higher than 50% of the total national income and countries with lesser exports. Economic growth in these countries would have been greater by around 0.7, 1.2, 0.3, 0.3, 0.3 and 0.3 per cent on average per year, respectively, if credit and public spending had not risen in the last four decades.

The fall of the wage share by 0.4 per cent on average per year represented the main constrainer of economic growth in EU countries from 1981 to 2021. During these decades, the economic growth in EU countries would have been higher by about 0.3 per cent on average per

year if there had not been a decline in the wage share during these years. The drop in wage share was also the main growth restrainer in the case of euro area countries, countries that registered a decrease in the wage share, countries with a wage share less than the average, countries with a wage share less than 50% of the total national income and countries with lesser exports. In these countries, the decline in wage share prevented a higher economic growth by around 0.3, 0.3, 0.4, 0.6 and 0.3 per cent on average per year, respectively.

Summing up, we identified that wage share positively impacts economic growth in EU countries, which sustains that these countries are labelled by a wage-led growth model. The fall of the wage share in the last decades was even one of the main constraints on economic growth in EU countries, which urges the need to abandon wage restraint policies that if not reverted, will only contribute to consolidate a prolonged period of sluggish growth in EU countries.

7. CONCLUSION

We assess the relationship between functional income distribution and economic growth by performing a panel data econometric analysis of all EU countries from 1981 to 2021.

During these four decades, the wage share registered a sustained fall and the economic growth was rather dismal in the majority of EU countries. These two stylised facts have fed the belief that a decline in the wage share could potentially cause the consolidation of a prolonged period of sluggish growth, but this does not corroborate the theoretical predictions of mainstream economics on the positive role wage restraint policies play in economic growth (Naastepad and Storm, 2006). According to heterodox economics and, particularly, post-Keynesian economics, the proliferation of wage restraint policies based on Reaganomics and Thatcherism is detrimental to economic growth because the disruptive effects such policies have on private consumption do not counterbalance the supportive effects they have on private investment and net exports (Jungmann, 2021; Alcobia and Barradas, 2023).

We estimated a growth model by taking into account six different post-Keynesian growth drivers, namely wage share, property prices, financial asset prices, credit, public spending and non-price competitiveness. Estimates were produced using a panel autoregressive distributed lag econometric methodology by relying on the PMG estimator due to the existence of a mixture of variables that are stationary in levels and stationary in the first differences (Pesaran and Smith, 1995; Pesaran, 1997; Pesaran *et al*., 1997, 1999).

Our estimates indicate that wage share, property prices and financial asset prices exert a positive influence on economic growth in EU countries, whilst credit and public spending exert a negative influence. These estimates are quite robust to different proxies and/or resampling. These estimates also show that the EU countries follow a wage-led-growth model in a context in which

the decline of the wage share has represented one of the main growth constrainer in all EU countries and, particularly, in the euro area countries.

Our estimates also suggest that the policymakers in EU countries should adopt pro-labour policies instead of pro-capital policies in order to revert the decreasing (increasing) trend of the labour (profit) share and to avoid the consolidation of a prolonged period of sluggish growth in Europe. This should involve the abandonment of Reaganomics and Thatcherism by refocusing their policies on demand-side economics and full employment goals.

Some examples of public policies that could be adopted in the near future to revert the decreasing trend of the wage share include the re-regulation and de-flexibilisation of the labour market at the level of unemployment benefits, employment protection, employment rights and minimum wage; the promotion of the recuperation of the general workers' bargaining power at the level of collective bargaining for both public and private sector workers; the reinforcement of trade unions and unionisation levels; and the promotion at the level of participation of workers on the board of directors of most state-owned and private corporations.

Some examples of public policies that could be adopted in the near future to revert the increasing trend of the profit share include an increase in taxes on large corporations, on wealth and on capital gains with financial assets; the creation of a new tax on financial transactions; and/or the rise of taxation related to inheritances and large fortunes.

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