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The impact of wage share on domestic demand in the European Union

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Abstract The wage share has been falling across most countries and regions for more than three decades. A decrease in the wage share is expected to have a negative effect on private consumption expenditures because propensity to consume out of labor income is higher than out of capital income. The impact on investment expenditures is contradictory. The decrease in wage share makes a positive impact on investment because of increase in profits and negative impact because of decrease in demand. If the total effect is positive the domestic demand regime is called profit led and wage led otherwise. The aim of this research – to assess the impact of the changes in wage share on domestic demand in the European Union (EU) countries. Our results are based on a panel of 28 European Union countries covering the period 1995–2014. For the EU, the average demand regime is found to be wage led, as both consumption and investment found to be negatively affected by wage share decline.

Keywords: aggregate demand, demand regimes, income distribution, wage share

JEL classifications: E20, E21, E22, E25

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1. Introduction

For many years there was an agreement in constancy of labor and capital share in national income, that's why research interest has shifted from functional to personal income distribution. Though research revealed that in most countries the labor share has been falling for many years (Bassanini and Manfredi, 2014; Guerriero, 2012; Sweeney, 2013). This fact attracted the interest of scholars, international organizations and politics all over the world and remains actual problem in nowadays. It should be mentioned, that in recent years the interest has been centered more on the reasons for the decline in labor share than on the consequences of this decline.

This paper investigates the impact of changes of wage share on domestic demand in the European Union (EU) countries. The decrease in wage share has a positive effect on profit and investment; it also lowers labor costs which in turn makes a positive effect on export. But consumption is expected to decrease, because the marginal propensity to consume out of capital

income is lower than out of labor income. If the overall effect on aggregate demand is positive, the demand regime is called profit-led, and wage-led, if effect is negative.

Consumption is the largest part of EU countries' GDP, it also can be seen as great part of demand, which affects investment. So decline in wage share can make a positive effect on investment due to increase in profits, but in turn, it can make negative effect due to decrease in demand (consumption). In case of the EU countries the positive significant effect of declining wage share on export is doubtable, as much greater proportion of a Member States' total trade in goods (over 60 %) is with partners within not outside the EU-28. If wage share declines simultaneously in a large number of trading partners, competitive gains of decreasing labor costs will cancel out and the wage share decline will lead to a depression of domestic demand.

The aim of this research – to assess the impact of the changes in wage share on domestic demand in the European Union countries.

The novelty of this paper is that most of the researches in this field center on the effects of changes in the functional income distribution on demand, but pay little attention to other important factors, such as saving rate or debt. So the first contribution of this paper is that we follow Stockhammer and Wildauer (2015) and extend Bhaduri-Marglin model for measures of private debt. The second contribution is that our regression estimates are based on the panel of 28 EU countries covering the period 1995–2014, whereas most of the researches in this field rely on time series analysis for individual countries (i.e. Onaran, Galanis, 2014; Stockhammer et al., 2011; Stockhammer, Ederer, 2008). To the best of our knowledge, Hartwig (2014), Stockhammer and Wildauer (2015) were the first to develop empirical model for panel of OECD countries. Hartwig (2014) uses a panel of 31 OECD countries from 1970 to 2011 and finds that decline in wage share has a negative impact on demand. Stockhammer and Wildauer (2015) made the same conclusion for panel of 18 OECD member countries from 1980 to 2013.

We found that for the European Union the average demand regime is wage led, as both consumption and investment found to be negatively affected by wage share decline. The impact of wage share on investment decreases if debt of non-financial corporations is controlled for.

The remainder of the paper is organized as follows. Section 2 takes a look at the main reasons for the decline in wage share. Section 3 describes what impact wage share decline can make on private domestic demand. Section 4 presents data sources and research methods and Section 5 presents the findings of the study. Section 6 compares our results with the previous findings in the literature and a final section concludes.

2. Causes of decline in wage share

The renewed interest around functional income distribution arise as it became clear that in most countries, especially in developed, the aggregate labor share has been declining for many years. The decline in labor's share of income has been less noticeable as due to economic growth real labor income increased and workers were on average better off (Bassanini and Manfredi, 2014).

The reasons for the decline in wage share are complex. One explanation is related to the role of capital accumulation and capital-augmenting technical change. According to Bassanini and Manfredi (2014) negative effect of technical change and capital accumulation on the wage share can be explained by diffusion of information and communication technologies. Innovation and invention of new capital goods and production processes, has boosted productivity but also allowed extensive automation of production and substitution between capital and labor has increased. Raurich et al. (2012) has pointed the role of non-unitary elasticity of substitution between capital and labor. High elasticity of substitution will reduce the labor income share, because firms will respond to the rise of wages (in efficiency units) by substituting labor for capital more than proportionally with respect to the wage rise. On the contrary, the low elasticity of substitution allows a lager labor income share, as higher wages (in efficiency units) generate a less than proportional response by firms.

Another strand of literature has pointed to the role of openness on factor shares. This literature maintains that globalization have decreased the bargaining power of labor since current wave of globalization makes capital more mobile than labor (Maarek and Orgiazzi, 2013). Studies that link movements in labor's share and globalization present quite similar conclusion, that increasing trade and foreign investment inflows are associated with a fall in the wage share (Lee and Jayadev, 2005, Guscina, 2006). Another factor explaining the aggregate decline of the wage share is the global competition. Increased import competition has raised competitive pressure on businesses located in the richest countries and the need for them to contain labor costs (Bassanini and Manfredi, 2014).

Besides globalization, labor market institutions can be held accountable for the decline in labor's share of income. The deregulation of labor markets is associated with weakening of labor's bargaining position (Blanchard and Giavazzi, 2003).

Numerous studies have analyzed the reasons for the decline in wage share, but only few have linked it to the increase in financialization (Dunhaupt, 2013). Financialization refers to the increased influence of financial motives, financial markets, and financial institutions on the operation of non-financial sector. Financial deregulation has empowered shareholders relative to workers and has weakened the bargaining position of labor. Dunhaupt (2013) found a relationship between increasing dividend and interest payments of non-financial corporations and the decline of the share of wages in national income. Stockhammer (2009) and ILO (2011) find a negative correlation between financial globalization and the wage share. Stockhammer (2013) concluded that financialisation has been the main cause of the decline in the wage share.

3. The impact of wage share on consumption and investment

Most macroeconomic models pay little attention to the effects of income distribution on consumption and investment. Neoclassical macroeconomic models emphasize that income distribution pays no impact on consumption, as marginal propensities to consume out of wages and profit are equal. In classical closed economy Kaleckian model the decline in wage share always results in decline of aggregate demand (Blecker 1989), because marginal propensity to consume out of wages is higher than that out of profits. Wage income is concentrated in lower income households that have a relatively higher propensity to consume, while rich people get major part of capital income and save relatively large part of it (ILO, 2013). Bhaduri and Marglin (1990), Bowles and Boyer (1995) Stockhammer et al. (2009) estimated that difference between marginal propensity to consume out of wages and out of profits is around 0.4. The decrease in wage share has a negative impact on consumption as a major part of profits are retained by firms and hence cannot be consumed (Stockhammer et al., 2011).

Despite declining wage share, the consumption was growing in many economies. This fact is explained that consumption was fueled in large part by increasing household debt rather than by rising wages. Stock market and housing price booms in addition to changing financial norms and new financial instruments made increasing amounts of credit available to low-income households and debt thus became a substitute for higher wages as a source of demand and consumption (ILO, 2013).

The negative impact of wage share's decline on consumption can be outweighed by positive impact on investment. Investment is expected to increase when the wage share falls because future profits may be expected to rise. In addition to that, it is often argued that retained earnings are a source of finance and may thus influence investment expenditures (Stockhammer et al., 2011).

The Kaldorian branch of post-Keynesian economics doesn't agree that investment should be positively affected by a decrease in the wage share. Kaldorian models place the emphasis on the accelerator rather than profitability, believing that firms would not invest more if profits went up, if there is no increase in demand. The level of investment is determined by the adjustment of capacity to exogenous demand (Caldentey and Vernengo, 2013).

4. Data and methodology

Domestic demand (DD) is the sum of consumption (C), investment (I), and government expenditures (G). Government expenditures can react to income distribution, however as a rule this is ignored in the studies on the impact of income distribution on demand.

Our dataset covers 28 European Union member countries from 1995 to 2014 on an annual basis. All variables are in real terms. The variables and data sources are provided in in the Appendix: Data definitions and sources.

Consumption (C) and investment (I) are estimated as a function of income (Y), the wage share (WS), and some other control variables (summarized as z). Domestic demand then is:

$$DD = C(Y, WS, Z_C) + I(Y, WS, Z_I)$$

Panel data models have been used in this study. The advantage of the application of the panel models is that both cross-section and time-series variation in the data are used. In order to find out whether the non-stochastic and time-unvarying unobservable effects do not correlate with the independent variables the first differencing method (FD) was applied in this study. This method was chosen because the number N of the surveyed objects (groups) is small, while T (time period) is large, so the analyzed data is more similar to the time series, what in this case is more suitable for the FD method, because the long time series would likely have been non-stationary.

In assessing the impact of wage share on the consumption and investment the following issues have been verified:

- whether the parameter coefficients and symbols of the model are compatible with economic logic,
- whether the model errors are in compliance with the underlying assumptions, i.e. the autocorrelation and heteroscedasticity absence was checked (autocorrelation set has been tested for raising the assumption H_0:ρ ($\Delta Y_{i,t}$; $\Delta u_{i,t-1}$) = 0. To define the heteroscedasticity the White test has been applied. In order to avoid possible model defects arising from the fragmentation of the regression errors variances in space and time, the WLS (Weighted Least Squares) method was used,
- whether the model-based estimates are consistent with the calculation of the basic statistical significance and reliability criteria,
-whether the assumption of data distribution normality is satisfied (Chi square statistics were used),
- whether there are no factors or multicollinearity problems (VIF statistics were used to deal with the multicollinearity problems).

In this study, designing the weighted least squares regression model the weights were applied. Weights were based on over-the-unit error variances. Weight size is inversely proportional to the size of per-unit error variance (the weights were set according to the OLS regression estimates error variation: a weight is equal to $1/\sqrt{squared\ residual}$).

Calculating marginal effects we follow Stockhammer and Wildauer (2015) methodology. The marginal effect of the wage share on domestic demand (DD) is computed in the following way:

$$\frac{\partial DD}{\partial WS}\frac{1}{Y} = \beta_{C,WS}\left(\emptyset\frac{C}{Y}\right)\frac{1}{\emptyset WS} + \beta_{I,WS}\left(\emptyset\frac{I}{Y}\right)\frac{1}{\emptyset WS}$$

$\beta_{C,WS;}\ \beta_{I,WS}$ are estimated elasticities of consumption and investment spending with respect to the wage share.

$\emptyset\frac{C}{Y}$ and $\emptyset\frac{I}{Y}$ represents GDP-weighted average (based on PPPs) of C/Y and I/Y of the 28 countries included in the panel. First we compute GDP weighted averages of C/Y and I/Y for each year. In a second step, simple averages of these yearly averages are computed.

The change in wage share will lead to the changes in consumption and investment spending. The total effect of the change in the wage share depends on the relative size of the reactions of consumption and investment to changes in income distribution. If $\partial DD/\partial WS>0$, the demand regime is called wage led. If the effect is negative, that is $\partial DD/\partial WS<0$, it is called profit led.

5. Empirical results

5.1. The impact on consumption

Consumption (C) is estimated as a function of income (Y), wage share (WS), household debt (HD) and saving rate (SR). The function takes the following form:

$$\Delta\ln(C_{i,t})=\alpha+\delta_3 td1997_t+...+\delta_{20} td2014_t+\beta_1\Delta\ln(WS_{i,t}) + \beta_2\Delta\ln(Y_{i,t}) + \beta_3\Delta\ln(SR_{i,t}) + \beta_4\Delta\ln(HD_{i,t}) + u_{i,t}$$

The estimates are presented in Table 1.

Table 1. Consumption function, dependent variable: $\Delta\ln(C_{i,t})$

	(1)	(2)	(3)
α	0.004***	-0.01***	0.004**
	(0.001)	(-6.370)	(0.002)
dt1997			-0.010***
			(0.003)
dt1998		0.008***	-0.002
		(0.002)	(0.003)
dt1999	-0.000	0.014***	-0.002
	(0.002)	(0.002)	(0.002)
...			
dt2014	-0.002	0.012***	-0.002
	(0.001)	(0.002)	(0.002)
$\Delta\ln(WS_{i,t})$	0.146***	0.185***	0.185***
	(0.015)	(0.012)	(0.020)
$\Delta\ln(Y_{i,t})$	0.837***	0.844***	0.862***
	(0.018)	(0.017)	(0.018)
$\Delta\ln(SR_{i,t})$		-0.272***	-0.284***
		(0.018)	(0.020)
$\Delta\ln(HD_{i,t})$			0.043***
			(0.003)
AR(1)	0.173***	0.170***	
	(0.013)	(0.015)	
AR(2)	-0.08***		
	(0.013)		
n	476	465	373
Adjusted R^2	0.95	0.97	0.96
p-value of testing H_0: errors are not serially correlated	0.7117	0.7109	0.3168

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; standard errors presented in brackets

As it was expected, the decrease in wage share has a negative impact on consumption with an elasticity in rage 0.146 – 0.185. For comparison, Stackhammer and Wildauer (2015) estimated that 1% decrease in the wage share has a negative effect on consumption of about 0.14% in OECD countries. In our case the 1% decrease in wage share lowers consumption about 0.15% if we don't take the saving rate and household debt into account. However, this model can underestimate the effect of wage share, as decrease in consumption due to falling wages can be compensated by

increase in household debt and decrease in saving rate. If we take latter into account 1% increase in wage share lowers consumption about 0.19%.

5.2. The impact on investment

Private investment is modeled as a function of income or output (Y), wage share (WS), real interest rate (RIR) and debt (D). As variables of debt we use CD or PD. CD represents the debt of non-financial corporations and PD is the total private debt of both non-financial corporations and households. The investment function takes the following form:

$$\Delta\ln(I_{i,t})=\alpha+\delta_3 td1997_t+...+\delta_{20} td2014_t+\beta_1\Delta\ln(WS_{i,t}) + \beta_2\Delta\ln(Y_{i,t}) + \beta_3\Delta\ln(RIR_{i,t}) + \beta_4\Delta\ln(CD_{i,t}) + u_{i,t}$$

The estimates are presented in Table 2.

Table 2. Investment function, dependent variable: $\Delta\ln(I_{i,t})$

	(1)	(2)	(3)
α	−0,01***	-0.025***	-0.025***
	(0.002)	(0.004)	(0.003)
dt1997	−0.02***		
	(0.004)		
dt1998	−0.006	0.017***	0.003***
	(0.006)	(0.005)	(0.005)
dt1999	−0.011*	-0.009*	-0.0065
	(0.0065)	(0.005)	(0.006)
...			
dt2014	−0.002***	0.008	0.007***
	(0.003)	(0.003)	(0.005)
$\Delta\ln(WS_{i.t})$	0.193***	0.1945***	0.170***
	(0.05)	(0.05)	(0.054)
$\Delta\ln(Y_{i.t})$	2.05***	2.366***	2.275***
	(0.05)	(0.051)	(0.0575)
		-0.157***	-0.159**
$\Delta\ln(Y_{i.t-1})$		(0.058)	(0.066)
$\Delta\ln(RIR_{i.t})$	−0.424***		
	(0.077)		
$\Delta\ln(CD_{i.t})$		0.037***	
		(0.014)	
$\Delta\ln(PD_{i.t})$			0.052***
			(0.020)
n	451	453	375
Adjusted R^2	0.92	0.97	0.95
p-value of testing H_0: errors are not serially correlated	0.2040	0.4930	0.4247

Notes: *p < 0.1, **p < 0.05, ***p < 0.01; standard errors presented in brackets

First model confirms the assumption that real interest rate has a negative impact on investment. The elasticity is similar to that estimated by Stackhammer and Wildauer (2015) – 1% increase in real interest rate has a negative effect on investment 0.424%. In all model specification income has a very strong impact on investment spending with an elasticity above 2. These results come in line with those of Onaran and Galanis (2012), Stackhammer and Wildauer (2015), Hein and Vogel (2008).

We obtain a negative impact (0.17 – 0.19%) of wage share decrease on investment spending, contrary to theoretical assumptions of Kaleckian models which emphasize that decrease in wage share means increase in profits and thus stimulates future investments (Stockhammer and Stehrer, 2011). Our findings support Kaldorian approach which places the emphasis on the demand rather than profitability, believing that firms would not invest more if profits went up, if there is no increase in demand. If the corporate and household debt is added (specification 3) the wage share's impact on investment is reduced from 0.19 to 0.17%.

5.3. The total effect of changes in wage share on private domestic demand

Table 3 summarizes the partial effects of a 1 percentage point increase in the wage share on consumption and investment, based on coefficients from specification (3) in Tables 1 and 2 and reports the total effect in column 3.

Table 3. Marginal effect of 1 percentage point increase in WS on private domestic demand, (in % of GDP)

C/Y	I/Y	Short run effect on domestic demand
(A)	(B)	(A + B)
0.168	0.056	0.225

The negative effect of a decrease in the wage share by one percentage point on private consumption is 0.168 %-points of GDP. The effect is substantially larger than that on investment (0.056 %-points of GDP). The domestic sector of the economy is thus clearly wage led. Our results suggest that a 1 %-point decrease of the wage share (assuming no changes in government expenditures and income) leads to a decrease of private domestic demand by 0.225 %-points in GDP.

6. Comparison with the literature

Our results come in line with most studies concluding that domestic demand is wage led, i.e. the effect of a pro-capital redistribution of income on domestic demand is negative. Hartwig (2014), Stockhammer and Wildauer (2015) estimate the average demand regime in the panel of OECD countries and find it to be wage led. Researches covering several individual OECD countries also find wage led domestic demand regimes for most countries. Naastepad and Storm (2007) use data on eight OECD countries, Hein and Vogel (2008) analyze six OECD countries, Stockhammer and Stehrer (2011) use data on 12 OECD countries and results of these studies show that most OECD countries have wage led demand regimes. But Naastepad and Storm (2007) results show that two major nations, Japan and the US, are domestically profit led. Nevertheless these results can be considered as exception among many others confirming wage led nature of domestic demand in Japan (Bowles and Boyer, 1995; Stockhammer and Stehrer, 2011; Onaran and Galanis, 2012; Onaran and Galanis, 2014) and the US (Bowles and Boyer, 1995; Hein and Vogel, 2008; Stockhammer and Stehrer, 2011; Onaran and Galanis, 2012; Onaran and Galanis, 2014).

The results for the European Union countries also conclude that domestic demand regime in most countries is wage led. The Euro area in aggregate is wage led (Onaran and Galanis, 2012; Stockhammer et al., 2009) as well as EU 15 countries (Onaran and Obst, 2015).

As regards investment, our results are in alignment with those of Onaran and Galanis (2014), Onaran and Obst (2015), who conclude that private investment is not very sensitive to the increase in profits, but responds strongly to demand. We do not find evidence that decrease in wage share has a positive impact on investment, contrary the effect is negative. These results come in line

with Stockhammer and Wildauer (2015) evidences for panel of OECD countries. Hein and Vogel (2008) also concluded that in few countries under investigation, there was insignificant and/or negative effects of the profit share increase on investment.

7. Conclusions and discussion

We analyzed the impact of changes in income distribution on private domestic demand. The analysis was based on panel data for 28 EU countries and inspired by Bhaduri and Marglin (1990) model, which allows for profit- or wage-led demand regimes. Our results clearly shows that domestic sector, on the whole, has a wage led nature in the European Union. Most of the studies reviewed in our paper also find that domestic demand in most of the countries under investigation is wage led. In this paper we focus on domestic demand for two reasons. First, the consumption is an engine of economic growth and constitutes a major part of countries' GDP. Due to wage share decrease, consumption decreases as well, and thus can make a negative impact on investment, which are sensitive to demand. We found that output (or demand) has a very strong impact on investment spending in the EU. Another problem arising from decrease in wage share is that consumption becomes debt-led instead of wage-led and economy may turn to unsustainable growth pattern based on debt growth.

The demand regime can change to profit led when the effects of distribution on foreign trade are taken into account. The conclusions from other researches indicate that this is only true for small open economies, but not for larger, less open economies. The second reason, why we want to make an emphasis on domestic demand, is that the European Union, as a single entity, is a large relatively closed economy. Much greater proportion of the Member States' total trade in goods (over 60 %) is with partners within the EU-28. If wage share declines simultaneously in a large number of trading partners, no one gets competitive advantage due to decrease in labor costs, but domestic demand is depressed. The recent studies, however, present mixed results when the effect of distribution on net exports is considered. Before drawing economic policy conclusions further investigations should be done for each EU member state to gain a more complete understanding how wage share decline effects aggregate demand in that country. Taking into consideration the results of this paper it looks like wage led strategies are more promising.

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Appendix: Data definitions and sources

Variable	Full variable name	Unit	Source
C	Real private final consumption expenditure	At 2010 prices, billion units of national currency	AMECO
CD	Non-financial corporations debt (loans)	Million units of national currency	EUROSTAT (own calculation: deflated by the GDP deflator)
HD	Households debt (loans)	Million units of national currency	EUROSTAT (own calculation: deflated by the consumption price deflator)
I	Real gross fixed capital formation	At 2010 prices, billion units of national currency	AMECO
PD	Private sector debt (loans)	Million units of national	Own calculation: HD + CD

		currency	
RIR	Real long-term interest rates	%	AMECO
SR	Gross saving rate (households and not profit institutions serving households)	Percentage of gross disposable income	AMECO
WS	Adjusted wage share	Compensation per employee as percentage of GDP at factor cost per person employed	AMECO
Y	Gross domestic product	At 2010 reference levels, billion units of national currency	AMECO