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Wage-Led vs. Profit-Led Growth: A Comprehensive Empirical Analysis

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Abstract

This study investigates the impact of various economic factors in determining the relationship between functional income distribution and economic growth. Inspired by the seminal paper of Bhaduri and Marglin (1990), we base our analysis on a demand-driven distribution and growth model for an open economy that allows for either profit-led or wage-led growth. To this end, we use a cross-country panel dataset consisting of 41 countries from 1961 to 2011. In the first step of the empirical analysis, we first estimate whether growth regime is wage-led or profit-led in each country. Next, in the second step, using probit and meta-regression approaches with cross-country data, we analyse the effects of various macroeconomic variables on the nature of economic growth. Our results strongly reflect that a higher level of trade openness is associated with a lower probability of being wage-led. Moreover, we find evidence that lower wage inequality would make an economy more wage-led and that countries with a greater private credit-to-GDP ratio are more likely to be profit-led.

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Distribution, demand, economic growth, trade openness, Keynesian economics

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1. Introduction

This paper aims to investigate the structural factors that would determine the relationship between economic growth and income inequality. For our analysis, we follow a neo-Kaleckian framework depicted by Marglin and Bhaduri (1990) in which economic growth is demand-driven. In this framework, the overall impact of changes in wage share on growth determines whether the regime is profit-led or wage-led. The rising wage share can stimulate economic growth because workers have a larger marginal propensity to consume compared to capitalists (e.g., Keynes, 1936; Hein and Vogel, 2007; Onaran and Galanis, 2014). However, higher wage shares can also create disincentives for private investment as it also means squeezing the profit share. Moreover, higher wage shares driven by higher wages can reduce the international competitiveness of domestic firms. Whichever effect is larger is an empirical question that is widely investigated in the literature (e.g., Naastepad, 2006; Onaran, Stockhammer and Grafl, 2011; Onaran and Galanis, 2014; Alarco, 2016; Obst, Onaran and Nikolaidi, 2017).

Despite the recent increasing emphasis on the empirical analysis of the relationship between wage share and economic growth, the empirical discussion on the factors that determine this relationship is very limited. Several theoretical papers (e.g., von Armin, Tavani and Carvalho, 2014; Palley, 2015, 2017; Kapeller and Schütz, 2015) discuss the factors that would determine the impact of the wage share on economic growth. Carvalho and Rezai (2016) empirically show that rising wage inequalities make the US economy more profit-led. In addition, Stockhammer and Ederer (2008) for Austria and Stockhammer, Hein and Grafl (2011) for Germany discuss the impact of globalisation through showing their estimates on wage share's impact on economic growth. This paper aims to fill in the gap in the literature by conducting a comprehensive empirical analysis on the structural factors behind the growth regime by using a wide cross-section of economies.

In our analysis, we first estimated the impact of wage share on GDP using Vector Error Correction Model (VECM) and Autoregressive Distributed Lag (ARDL) for 41 countries in which a long-run relationship between two variables exists. Next, we examined the impact of different characteristics on the probability of regime being wage-led or profit-led using probit analysis. Finally, we examined the factors that would affect the coefficient of the wage share's coefficient in our first stage analysis using meta-regression.

The paper specifically focuses on the impact of trade openness, wage inequality and private credit-to-GDP ratio in determining whether a regime is profit-led or wage-led. These are the three factors that rapidly evolved, particularly during the neoliberal era that emerged in the 1980s. The type of globalization that the world experienced led to a "race-to-the-bottom" in which wage competition between countries pushed simultaneous decline (Rodrik, 1997; Kiefer and Nada, 2016). Indeed, Onaran and Galanis (2014) note that globalization with wage policy coordination between countries could have improved growth and employment in all coordinating countries. However, as sufficient wage policy coordination has been lacking throughout the world, our results reflect that the countries that are more open to trade are more likely to be profit-led.

Starting from the 1980s, the wage inequality both in the OECD and non-OECD countries have also been rising (Galbraith, 2011). According to our estimates, this might also lead to a growth model in which it is harder for workers and capitalists to coordinate, our meta-regression analyses reveal that the countries with higher wage inequalities are more profit-led. Finally, a wide range of studies show that both developing and developed countries experienced a rise in financialisation during the neoliberal era, in which financial incomes compared to non-financial incomes, financial activities of non-financial firms and debt of non-financial sector and households significantly increased (Epstein and Jayadev, 2005; Demir, 2009; Jayadev, Mason and Schröder, 2018). We examined the impact of financialisation on determining the growth regime by using domestic credit to private sector as a percentage of GDP. Our results show that the countries with higher private credit-to-GDP ratios are

more likely to be profit-led. In an alternative meta-regression analysis with a more limited number of countries, we also show that the countries with greater household debt/GDP ratios are more profit-led.

The rest of the paper is organized as follows: In the next section, we present a theoretical model. In section 3, we present an empirical analysis. Finally, section four concludes.

2. Theoretical Background

In this section, after providing a background from the existing literature, we develop a full-fledged model and investigate which factors affect the wage-ledness of the economy.

2.1 Wage-led or Profit-led?

The earlier works of Rowthorn (1981) and Bowles and Boyer (1988) examine the impact of changing real wages on economic growth and show that higher real wages can either increase or reduce economic growth depending on the type of regime. Bhaduri and Marglin (1990) have a significant influence in forming the neo-Kaleckian approach on the relationship between wage shares and growth. According to the Bhaduri and Marglin model, capital accumulation is determined by profit share and the capacity utilisation rate. Assuming that the propensity to save is larger for capitalists than workers, a higher income share of workers would stimulate consumption, which might also raise capacity utilisation. Nevertheless, higher wage shares also have a negative direct impact on investments, since a squeeze in profit share might discourage capitalists from investing and also reduce capacity utilisation. If the direct negative effect of higher wage share on capacity utilisation is larger than the positive effect of wage share through consumption, a higher wage share would reduce capacity utilisation and total demand. In this case, the growth regime would be exhilarationist (profit-led). However, if higher wage share's positive effect through rising consumption is larger, the growth regime would be stagnationist (wage-led) in which the higher wage share would stimulate aggregate demand.

The type of growth rate in each country is empirically examined using different methodologies. The first group of the studies tests the relationship between capacity utilisation and profit shares by considering a two-way relationship of both variables. In their SVAR analysis, Stockhammer and Onaran (2004) estimate that profit share does not Granger cause capacity utilisation in the US, the UK and France. On the other hand, using VAR, Barbosa-Filho and Taylor (2006) and using TVAR, Carvalho and Rezai (2015) find that the US economy is profit-led. Moreover, Nikiforos and Foley (2012) show that the US economy has multiple equilibrium points- an equilibrium with higher wage share and capacity utilisation and an equilibrium with lower wage share and capacity utilisation. Nikiforos and Foley refuse the conventional understanding of wage-led growth. They conclude that the US economy is wage-led because a distributive or technological change that favours the wage share would lead the US economy to the equilibrium with higher capacity utilisation, although the initial impact of this change on capacity utilisation would be negative.

The second group of studies estimates the impact of wage (or profit) shares on GDP by decomposing GDP into its components (consumption, investment, exports, and imports). These studies first estimate the impact of the wage share on each component and then predict the overall impact of the wage share on GDP using the estimated coefficients. In the earlier version of this approach, Bowles and Boyer (1995) test the impact of wages on each component of GDP for five developed economies. Later, a significant number of studies examine the effect of wage share on each component of GDP and predict the overall impact on GDP for various country cases. These studies mainly implement time-series analysis techniques. The results of these studies for the countries examined in this paper are listed in Appendix 1. Moreover, Stockhammer, Onaran and Ederer (2009) find that the Euro area as a

whole is wage-led, and Hartwig (2014) using panel data analysis estimates that OECD countries are on average wage-led.

2.2 A simple model on wage-led/profit-led growth

We use a simple model to demonstrate the relationship between profit share (π) and total output (Y). Using this model, we also aim to discuss the structural conditions that would make a country more likely to be wage-led or profit-led. In accordance to the previous theoretical and empirical work, we define total output (Y) as a sum of consumption (C), investment (I), government expenditures (G), exports (X), and imports (M):

$$Y = C(W, R) + I(Y, \pi, b) + X(Y_W, \pi, e) - M(Y, \pi, e) \quad (1)$$

where W is the total wage payments, R is the total profits, b is the business confidence, and Y_W is the world demand. e is the real exchange rate. An increase in e shows real depreciation. The government expenditures are omitted for simplicity. The workers earn wages and the capitalists earn profits. The total income (Y) is shared by workers and capitalist based on the profit share. Therefore, total wage payments (W) and total profits (R) are

$$W = Y(1 - \pi), \qquad R = Y\pi \quad (2)$$

Following this, the consumption function can be defined as

$$C = c_0 + c_W Y(1 - \pi) + c_R Y\pi, \qquad c_0 > 0, c_W > 0, c_R > 0 \quad (3)$$

where c_W and c_R are the marginal propensities to consume by workers and capitalists, respectively. In *the General Theory of Employment, Interest and Money,* Keynes (1936) notes that the marginal propensity to consume is larger for the poorer part of the population, which in our model is represented by the workers. Keynes's argument is strongly consistent with the empirical findings on the impact of the profit share on consumption (e.g., Hein and Vogel, 2007; Onaran and Galanis, 2014; Onaran and Obst, 2016; Alarco, 2016; Obst, Onaran and Nikolaidi 2017)[1]. Following this, we assume that the propensity to consume is larger for workers ($c_W > c_R$). Hence, redistribution of incomes from capitalists to workers increases consumption.

We define the investment function similar to Blecker's (2002) and Naastepad's (2006) investment functions:

$$I = \phi_0 (Y)^{\phi_1} (\pi)^{\phi_2} (b)^{\phi_3} \quad (4)$$

ϕ_1 and ϕ_2 are the elasticities of investment with respect to total output and profit share, respectively. Greater total demand would increase capacity utilisation and stimulate investments ($\phi_1 > 0$). Higher profit shares would have a direct positive effect on investments ($\phi_2 > 0$), and the improving business confidence (b) would also raise investments ($\phi_3 > 0$).

[1] For 6 OECD economies, Hein and Vogel (2007), for the EU-12 area and 15 separate countries, Onaran and Galanis (2014); for 16 Latin American economies, Alarco (2016) and for 15 EU countries, Obst, Onaran and Nikolaidi (2017) estimate the impact of wage share on consumption. They all find that higher wage share also increases consumption in all of the countries estimated. This supports the argument that the propensity to consume is larger for workers than capitalists.

Next, we define the exports (X) as a function of world demand (Y_W), profit share (π) and real exchange rate (e):

$$X = \alpha_0 (Y_W)^{\alpha_1} (\pi)^{\alpha_2} (e)^{\alpha_3} \tag{5}$$

where

$$\alpha_0 > 0, \quad \alpha_1 > 0, \ \ \alpha_2 > 0, \quad \alpha_3 > 0 \tag{6}$$

An increase in e represents real depreciation of the currency. We assume $\alpha_2 > 0$, since an increase in profit share reduces international competitiveness by increasing the unit cost of labour relative to the unit cost of labour in the trading partner (Naastepad, 2006; Hein and Tarassow, 2010; Onaran and Obst, 2016; Obst, Onaran and Nikolaidi 2017). We define the import function (M) similarly except that the imports are dependent on domestic income (Y) rather than the world income (Y_W)[2]:

$$M = \gamma_0 (Y)^{\gamma_1} (\pi)^{\gamma_2} (e)^{\gamma_3} \tag{7}$$

where

$$\gamma_0 > 0, \quad \gamma_1 > 0, \ \ \gamma_2 < 0, \quad \gamma_3 < 0 \tag{8}$$

Following the equations above, we find the impact of profit share on the percentage change in output (θ_1) as

$$\theta_1 = \frac{\left(\frac{dY}{d\pi}\right)}{Y} = \frac{-(c_W - c_R) + \phi_2 \frac{I}{R} + \alpha_2 \frac{X}{R} - \gamma_2 \frac{M}{R}}{\psi_1} \tag{9}$$

where

$$\psi_1 = 1 - c_W (1 - \pi) - c_R \pi - \phi_1 \frac{I}{Y} + \gamma_1 \frac{M}{Y} \tag{10}$$

We assume that the Keynesian stability condition holds ($\psi_1 > 0$). The growth regime in an economy will be wage-led if the rising profit share's negative impact through gap in marginal propensities to consume ($c_W - c_R$) is larger than its positive effect through investment, exports and imports. The regime is profit-led in the reverse case.

2.3. Factors affecting the wage-ledness/profit-ledness

The growth regime in an economy is dependent on structural factors that are specific to each country. In this section, we will theoretically discuss the structural factors that determine whether the growth regime in an economy is profit-led or wage-led. We will focus on the influence of three factors: trade openness, wage inequality and credit availability.

[2] Unlike our work, Naastepad (2006) assumes that the imports are solely dependent on domestic output. Similarly, in Hein and Tarassow's (2010) model, the negative impact on net exports comes only from capacity utilisation. Nevertheless, changes in profit share and real appreciation would also affect imports, since it changes the relative competitiveness of domestic goods also in the home market.

2.3.1 Trade openness

The impact of international trade on the relationship between wage share and economic growth was examined starting from the earlier neo-Kaleckian work. Blecker (1989) and Bhaduri and Marglin (1990) show that greater wage shares reduce the international competitiveness of economies through increasing real production costs. Therefore, a growth regime becomes less likely to be wage-led when the net exports are considered. Using a neo-Kaleckian two country model, von Armin, Tavani and Carvalho (2014) show that an increase in wage share in the home country would decrease the home country's global demand share and also lead to a decline in the home country's aggregate demand unless the wage share in the foreign country also rises. In another neo-Kaleckian two-country model, Rezai (2015) shows that trade openness make the home economy more profit-led under the conditions that currency depreciation in the home country increases the output in the home country.

The empirical studies following the neo-Kaleckian framework strongly support the argument that the net exports component of aggregate demand in the majority of the economies are profit-led (e.g., Naastepad and Storm, 2006; Onaran and Galanis, 2014, Onaran and Obst, 2016)[3]. Similarly, using panel data analysis for a sample of 20 countries, Behringer and van Treeck (2013) estimate that a higher wage share affects the current account balance negatively. These results hint that trade openness would make a country more profit-led through expanding the share of profit-led components of aggregate demand.

Several studies estimate the possible impact of trade openness on the link between the wage share and aggregate demand. For Austria, Stockhammer and Ederer (2008) and for Germany, Stockhammer, Hein and Grafl (2011) conclude that globalisation weakened the positive impact of the wage share on aggregate demand in Germany through expanding the influence of net exports on aggregate demand. Moreover, Onaran and Galanis (2014) showed that Australia, Canada, Mexico, Argentina, India, China, and South Africa have wage-led domestic demand and are profit-led economies when the net exports are also considered.

In the more globalized world, the pressure of international competitiveness and wage share's negative effect on net exports weakens the labour movements and leads to policies that would change the distribution in favour of the capital owners (Rodrik, 1997, Onaran, 2009, Oyvat, 2011). This leads to a *race to the bottom* in which wage shares are simultaneously reduced in a large number of countries. These countries cannot stimulate economic growth through lower wage shares, since net exports in every country by definition cannot simultaneously increase.

Kiefer and Rada (2015) test the *race to the bottom* arguments and conclude that the wage shares in a panel of thirteen OECD countries are on average following a downward trend due to international competition between countries for high profits. Moreover, they find that both capacity utilisation rates and wage shares simultaneously fall in the thirteen OECD countries due to the *race to the bottom*. Similarly, Onaran and Galanis (2014) estimate the effect a simultaneous increase of wage shares in the Euro-area 12 and 12 other economies. They find all of the economies estimated would be more wage-led if these economies jointly expanded their wage shares through international coordination. They also conclude that the G-20 as a whole is wage-led.

However, in a world in which the international coordination of wages is weak, greater trade openness would enlarge the contribution of GDP's profit-led component and would increase the

[3] To our knowledge, none of the empirical work examining the growth regime of net exports finds that the net exports component of GDP is wage-led. For all 15 countries and the EU-15 area estimated, Onaran and Galanis (2014) find that net exports are profit-led. Similarly, Onaran and Obst (2016) find that the net exports in 14 of 15 EU countries are profit-led and that the impact of net exports on aggregate demand in Luxembourg is insignificant. Similarly, Naastepad and Storm (2006) find that the impact of wage growth on export growth is negative in 6 OECD countries and is negligible in the Netherlands and the US.

likelihood of a country being profit-led. The influence of rising trade openness on the growth regime can also be shown in our model. If exports/output and imports/output ratios were higher due to exogenous reasons (e.g., greater concentration of production in specific sectors, trade agreements), α_0 and γ_0 would be higher. For the given Y and π, an economy with higher α_0 and hence greater share of exports in GDP would be more likely to be profit-led.

$$\frac{d\theta_1}{d\alpha_0} = \frac{\alpha_2 X}{\alpha_0 \psi_1 R} > 0 \tag{11}$$

The impact of γ_0 and hence the greater share of imports in GDP are conditional on the profit-ledness of an economy, as shown in equation (12). The sign of equation (12) depends on γ_0's effect on θ_1 through, γ_0's direct effect on the sign of change in GDP-profit share relationship ($\frac{M}{\gamma_0}\frac{\gamma_2}{R\psi_1}$) and its effect through changing the GDP multiplier ($\frac{M}{\gamma_0}\frac{\gamma_1\theta_1}{Y\psi_1}$).

$$\frac{d\theta_1}{d\gamma_0} = -\frac{\frac{M}{\gamma_0}\left(\frac{\gamma_2}{R} + \frac{\gamma_1\theta_1}{Y}\right)}{\psi_1} \tag{12}$$

If the growth regime were wage-led ($\theta_1 < 0$), a greater γ_0 would push the economy towards a more profit-led regime ($\frac{\partial\theta_1}{\partial\gamma_0} > 0$). If the growth regime were weakly profit-led in the way that γ_0's impact on the numerator of θ_1 were stronger than its effect through multiplier ($\frac{\gamma_2}{R} < \frac{\gamma_1\theta_1}{Y}$), then a greater γ_0 would still make the growth regime more profit-led. However, if γ_0's effect through the multiplier were stronger, the greater γ_0 would push the regime toward being less profit-led. Therefore, the ambiguity of $\frac{\partial\theta_1}{\partial\gamma_0}$'s sign affects only the magnitude of profit-ledness; greater openness to imports (γ_0) still increases the likelihood of being profit-led. In summary, the economies that are more open to trade are more likely to be profit-led.

2.3.2 Wage inequality

The income distribution within workers is another factor that would influence the wage-ledness of an economy. The distribution between workers would affect the average propensity to consume of workers, since the workers with lower wages are expected to have higher propensity to consume following the Keynesian view that the propensity to consume is lower for a poorer population. The lower propensity to consume (and a higher savings rate) in higher income quartiles is demonstrated in Carvalho and Rezai (2016) for the US. Based on this, Carvalho and Rezai assume that an increase in wage inequality would increase the savings rate of workers and make the demand regime more profit-led. Carvalho and Rezai also empirically support their argument, by demonstrating that the regime in the US is less profit-led when the wage inequality in the US is lower. Similarly, using three class analyses (capitalists/top management; managers/middle managers; workers), Palley (2015, 2017) shows that reducing the share of managers (or middle managers) in the wage bill would shift the economic regime from profit-led to wage-led[4].

[4] Palley uses different terminologies in his theoretical models in Palley (2015) and Palley (2017). In Palley (2015), he assumes that capitalists and top management class receive the profits and that the middle management class receives higher wages compared to the worker class. In Palley (2017), the three classes listed are rather named as capitalists, managers and workers. In this paper, the capitalists again receive a larger share of profits, and managers receive higher wages than do workers.

The impact of wage inequality on wage-ledness can be observed using a consumption equation that includes two types of agents receiving higher and lower wages. The agents receiving higher wages could be either managers and/or very-skilled workers, which we consider to constitute the smaller part of the population receiving wages.

$$C = c_0 + \big(c_H\sigma + c_L(1-\sigma)\big)Y(1-\pi) + \ c_R Y\pi\ , \tag{13}$$

$$c_0 > 0, c_H > 0, c_L > 0, c_R > 0 \tag{14}$$

where c_H and c_L are the propensity to consume values for those receiving higher and lower wages, respectively. σ is the share that workers with higher wages receive of total wage payments. Following this, we can show the impact of rising profit share on the percentage change in total output (θ_2) as

$$\theta_2 = \frac{\left(\frac{dY}{d\pi}\right)}{Y} = \frac{-(c_H\sigma + c_L(1-\sigma) - c_R) + \phi_2\frac{I}{R} + \alpha_2\frac{X}{R} - \gamma_2\frac{M}{R}}{\psi_2} \tag{15}$$

where

$$\psi_2 = 1 - (c_H\sigma + c_L(1-\sigma))(1-\pi) - c_R\pi - \phi_1\frac{I}{Y} + \gamma_1\frac{M}{Y} \tag{16}$$

We assume that the Keynesian stability condition holds and $\psi_2 > 0$. Overall, the effect of rising share of higher wages in profit-ledness is

$$\frac{d\theta_2}{d\sigma} = \frac{(c_L - c_H)(1-(1-\pi)\theta_2)}{\psi_2} \tag{17}$$

which will be positive when

$$1 > (1-\pi)\theta_2 \tag{18}$$

According to Alarco's (2016), Hein and Vogel's (2008), Obst, Onaran and Nikolaidi's (2017) and Onaran and Galanis's (2014) estimates, which are studies considering a group of countries, all of the countries examined satisfy the condition above[5]. Similarly, according to our estimates in Section 3.1.1, the condition (18) is satisfied for all countries in our sample except Italy and Norway.

In summary, the rising wage inequality would push a wage-led country ($\theta_2 < 0$) towards being more profit-led. Higher wage inequality also increases the profit-ledness of a profit-led economy ($\theta_2 > 0$) unless the negative impact of a higher wage share on total output is exceptionally high. The ambiguity that we highlight for the profit-led economies is similar to the outcome in Carvalho and Rezai (2016).

[5] According to Alarco (2016), Hein and Vogel (2008), Obst, Onaran and Nikolaidi (2017) and Onaran and Galanis's (2014) estimates, a percentage point increase in profit share does not increase the total output by more than 1% in any of the countries except the China case estimated by Onaran and Galanis. Nevertheless, using Onaran and Galanis's average wage share data for China, we can show that the condition $1 > (1-\pi)\theta_2$ still holds for China.

2.3.3 Household borrowing and debt

The impact of household borrowing and debt was examined by several studies in line with Kaleckian-Steindlian framework. Using a Steindlian model of consumer debt, Dutt (2006) shows that consumer borrowing simulates short-run growth through rising consumer demand, while in the long-run, its effect is ambiguous due to increasing consumer debt and redistribution of income in favour of higher income group. In their empirical analysis, Stockhammer and Wildauer (2015) show that the OECD economies were debt-driven prior to 2007 crisis. Similarly, Kim, Setterfield and Mei (2015) empirically find that household borrowing has a significant positive effect on consumption in the post-1980 US.

However, the impact of borrowing and debt on the wage-ledness of a country was first examined in Kapeller and Schütz (2015). Kapeller and Schütz highlight that if lower income workers sufficiently borrow consumer credits to keep up their consumption with higher income workers, the growth regime could shift from wage-led to "consumption-driven profit-led demand regime". However, the rising debt would make the influence of consumer borrowing on the type of regime ambiguous, since the lower wage share can also increase indebtedness and withhold workers' consumption due to interest payments and instalments. Vasudevan (2017) also reflects on the ambiguity of the finance sector's influence on the type of growth regime. According to Vasudevan's model, the finance-led regimes tend to be profit-led, whereas the finance-burdened regimes tend to be wage-led.

Setterfield and Kim (2016) and Setterfield, Kim and Rees (2016) show that the economies are in the short run more profit-led when workers' savings and net borrowing are considered. This is because rising profit share would increase workers' borrowing and rentier income and consequently rentiers' consumption, which both would lead to a condition in which the higher profit share raises consumption. However, a debt-led growth regime might not be sustainable in the long run. Higher profit share could also lead to an economic crisis, if it pushed the household debt to an unsustainable level.

We can show the impact of household borrowing and debt by modifying our simple model in section 2.1.1. For simplicity, we assume that the economy is closed ($X = 0, M = 0$). Following Kapeller and Schütz (2015), Setterfield and Kim (2016) and Setterfield, Kim and Rees (2016), we assume that the workers do not save and that they tend to borrow for "keeping up" with the consumption of higher income agents, which in our case are the capitalists. The capitalists save and lend to workers and receive an interest income on top of their profits. Therefore, the capitalists' consumption (C_R) is a function of their profit and interest revenues,

$$C_R = c_R(\pi Y + iD) \tag{19}$$

where *i* is the rate of interest and *D* is the debt stock

A consumption function similar to Kapeller and Schütz (2015) would reflect workers' consumption[6]

$$C'_W = \beta(C_R/N_R)N_W + (1-\beta)C_W \tag{20}$$

where N_W is the number of workers, N_R is the number of capitalists, and β is a term that reflects households' desire and capability to borrow. C_W is the consumption of workers when the workers do not borrow ($\beta = 0$) and still face the debt burden:

[6] In Kapeller and Schütz (2015), lower income workers borrow to keep up with the consumption of higher income workers. Unlike their model, we have two agents, namely, capitalists and workers, in our simple model, and workers borrow to keep up with the consumption of capitalists.

$$C_W = c_W((1-\pi)Y - iD) \tag{21}$$

C_R/N_R is the average consumption of a capitalist, and an average worker consumes as much as a capitalist with the help of borrowing if $\beta = 1$.

Considering that λ is the ratio between the number of capitalists (N_R) and number of workers (N_W),

$$\lambda = N_R/N_W \tag{22}$$

This would make the consumption of workers

$$C'_W = \frac{\beta}{\lambda}(c_R(\pi Y + iD)) + (1-\beta)C_W \tag{23}$$

Following this the total consumption function is

$$C = c_R\left(1+\frac{\beta}{\lambda}\right)(\pi Y + iD) + (1-\beta)c_W\big((1-\pi)Y - iD\big) \tag{24}$$

From (1), (4) and (24), we can conclude that the short-run impact of the rising profit share on the percentage change on total output (θ_3) is

$$\theta_3 = \frac{\frac{dY}{d\pi}}{Y} = \frac{c_R\left(1+\frac{\beta}{\lambda}\right) - (1-\beta)c_W + \phi_2\frac{I}{R}}{\psi_3} \tag{25}$$

where

$$\psi_3 = 1 - c_R\pi\left(1+\frac{\beta}{\lambda}\right) - (1-\beta)c_W(1-\pi) - \phi_1\frac{I}{Y} \tag{26}$$

Considering the Keynesian stability condition holds ($\psi_3 > 0$), we can show the impact of changing borrowing behaviour of workers on short-run profit-ledness as

$$\frac{d\theta_3}{d\beta} = \frac{\left(\frac{c_R}{\lambda} + c_W\right) - \theta_3\left(c_W(1-\pi) - \frac{c_R\pi}{\lambda}\right)}{\psi_3} \tag{27}$$

A positive sign for $\frac{d\theta_3}{d\beta}$ is likely as $c_W > c_W(1-\pi)\theta_3$ is likely to be observed based on the coefficients previously estimated for θ_3[7]. Hence, households' higher consumer borrowing is expected to make a regime more profit-led, when the increases in overall indebtedness are not considered. This is because the workers still tend to consume at higher levels through borrowing, even when their share of income declines.

However, the household debt also increases in each period by the sum of the gap between workers' consumption and workers' net income after their interest payments:

[7] According to Alarco (2016), Hein and Vogel (2008), Obst, Onaran and Nikolaidi (2017) and Onaran and Galanis's (2014) estimates, a percentage point increase in profit share does not increase the total output by more than 1% in any of the countries except the China case estimated by Onaran and Galanis. Nevertheless, using Onaran and Galanis's average wage share data for China, we can show that the condition $1 > (1-\pi)\theta_3$ still holds for China. This condition similarly holds for all countries except Norway and Italy in our estimations in Section 3.1.1.

$$\frac{dD}{dt} = \dot{D} = C'_W - \big((1-\pi)Y - iD\big) = c_R\left(\frac{\beta}{\lambda}\right)(\pi Y + iD) - (1-c_W)\big((1-\pi)Y + iD\big) \quad (28)$$

Higher profit share would lead to faster accumulation of consumer debt with the given constant parameters:

$$\frac{d\dot{D}}{d\pi} = \left(c_R\frac{\beta}{\lambda} + (1-c_W)\right)Y > 0 \quad (29)$$

Moreover, workers' higher capacity and willingness to borrow (β) would increase the magnitude of profit share's effect on the rise in debt:

$$\frac{\partial^2\dot{D}}{\partial\pi\partial\beta} = c_R\frac{Y}{\lambda} > 0 \quad (30)$$

The effect of debt on output is ambiguous as in (31):

$$\frac{dY}{dD} = c_R\left(1+\frac{\beta}{\lambda}\right)i - (1-\beta)c_W i \quad (31)$$

This shows that the higher level of borrowing might also increase the negative impact of the profit share on output, since at the higher level of borrowing, an increase in the profit share can also restrict the workers' consumption through leading to high levels of debt. Hence, similar to Kapeller and Schütz (2015) and Setterfield, Kim and Rees (2016), we show that the impact of household borrowing on wage-ledness is ambiguous when household debt is considered.

3. Empirical Analysis

Based on the simple model that we have developed in the previous section, we construct three empirically testable hypotheses. Specifically, we will test whether

1. a higher level of trade openness
2. a higher level of wage inequality
3. a higher level of private credit to GDP ratio

make a growth regime more wage-led or profit-led.

In this section, following the description of the empirical methodology and the dataset employed in the analysis, we present the estimation results.

3.1 Methodology

Our empirical methodology uses a two-step estimation approach: First, we conduct a time-series analysis for each country in our sample to establish the type of the growth regime of each country. Specifically, for each country, we aim to find out whether the growth regime is wage-led or profit-led. Then, in the second-step, using the findings from the first step, we run cross-country regressions to understand what factors account for classifying a country as being wage-led or profit-led.

3.1.1. Time-Series Analysis

In the time-series analysis, for a particular country, we aim to establish a robust relationship between the wage-share (ratio of total wage bill to GDP) and the natural logarithm of aggregate real GDP. Unlike the previous work following the GDP decomposition approach (e.g., Onaran and Galanis, 2014; Hein and Vogel, 2007) in which the relationship in each component of GDP is separately estimated, we estimated a single regression for each country. This is, because the meta-regression analyses require the use of a single coefficient and standard deviation for each country. Moreover, for providing greater consistency in our estimations, we aimed to only use coefficients from long-run equations of cointegrating vectors. This would be harder to satisfy when the GDP decomposition approach is followed.

We suspect that government expenditures (as a percentage of GDP) and the real exchange rate might affect the relationship between wage share and GDP in some of the countries. Therefore, similar to Obst, Onaran and Nikolaidi (2017), we included government expenditures as a percentage of GDP and also the real exchange rate in the time-series regressions, whenever we find cointegrating vectors with these variables. Finally, we also have checked the presence of a trend using different trend specifications.

More specifically, for each country, we use three different models. In the first and most general one (Model Type 1), we estimate the relationship between the wage share, natural logarithm of GDP, government spending share in GDP and the real exchange rate. For this, we first check the order of integration of all the four variables using the Augmented Dickey-Fuller (ADF) test. If the order of integration of all the variables is 1 and the Johansen cointegration test at 5% significance level indicates the presence of integration between the variables, we estimate a vector error correction model (VECM), where the number of lags is determined according to the Akaike Information Criterion (AIC). We estimated VECMs in the following form:

$$\begin{aligned}\Delta \log(GDP)_t = {} & a_1(b_1 \log(GDP)_{t-1} - b_2 ws_{t-1} - b_3 G_{t-1} - b_4 RER_{t-1} - \mu_1 - \rho_1 t) \\ & + a_2(c_1 G_{t-1} - c_2 ws_{t-1} - c_3 \log(GDP)_{t-1} - c_4 RER_{t-1} - \mu_2 - \rho_2 t) \\ & + a_3(d_1 RER_{t-1} - d_2 ws_{t-1} - d_3 \log(GDP)_{t-1} - d_4 G_{t-1} - \mu_3 - \rho_3 t) \\ & + \sum_{i=1}^{n} \Gamma_i \Delta \log(GDP)_{t-i} + \sum_{i=1}^{n} \Lambda_i \Delta G_{t-i} + \sum_{i=1}^{n} \Upsilon_i \Delta RER_{t-i} + v + rt + \varepsilon_t\end{aligned} \tag{32}$$

where

$$\log(GDP)_t = \left(\frac{b_2}{b_1}\right) ws_t + \left(\frac{b_3}{b_1}\right) G_t + \left(\frac{b_4}{b_1}\right) RER_t + \frac{\mu_1}{b_1} + \left(\frac{\rho_1}{b_1}\right) t \tag{33}$$

is our long-run relationship for the logarithm of GDP ($\log(GDP)$). *ws* is the wage share, *G* is the share of government expenditures in GDP, *RER* is the real exchange rate, and *t* is the time trend. $a_3 = 0$ if the Johansen cointegration test suggests 2 cointegrating vectors, and $a_2, a_3 = 0$ if the Johansen cointegration test suggests only 1 cointegrating vector. For each country, we checked for the cases of VECMs with unrestricted trend, restricted trend, unrestricted constant and restricted constant in order and preferred the models in which cointegrating vectors exist.

If at least one of the variables has an order of integration other than 1 (such as 0 or 2) or the four variables are not cointegrated according to the results of the Johansen cointegration test, we checked cointegration using an autoregressive-distributed lag (ARDL) bounds approach. If the variables are cointegrated, we estimate an autoregressive-distributed lag (ARDL) model in the error correction form where the number of lags is again determined using the AIC. ARDL analysis also allows us check for the presence of a structural break using the Gregory-Hansen test with different trend or regime shifts. Hence, our ARDL models be expressed as

$$\begin{aligned}\Delta \log(GDP)_t = a(b_1 \log(GDP)_{t-1} - b_2 ws_{t-1} - b_3 G_{t-1} - b_4 RER_{t-1} - \mu - \rho t) \\ + \sum_{i=1}^{n_1} \Gamma_i \Delta \log(GDP)_{t-i} + \sum_{i=1}^{n_2} \Lambda_i \Delta G_{t-i} + \sum_{i=1}^{n_3} \Upsilon_i \Delta RER_{t-i} + v + r_1 t + r_2 s \\ + \varepsilon_t\end{aligned} \quad (34)$$

where *s* is the dummy variable on the years after the structural change and

$$\log(GDP)_t = \left(\frac{b_2}{b_1}\right) ws_t + \left(\frac{b_3}{b_1}\right) G_t + \left(\frac{b_4}{b_1}\right) RER_t + \frac{\mu}{b_1} + \left(\frac{\rho}{b_1}\right) t \quad (35)$$

is our long-run relationship for the logarithm of GDP ($\log(GDP)$).

If using both procedures does not yield significant estimates in the first model, then we use the second model (Model Type 2) without the presence of the real exchange rate and again repeat the same procedure with the VECM and ARDL approaches. Finally, if the second model yields non-significant estimates, we use a third model (Model Type 3) with only wage share and the natural logarithm of real GDP. The countries in which a long-run relationship, a cointegration between wage share and logarithm of real GDP or a significant effect of wage share are not detected are eliminated from our sample.

3.1.2. Cross-Sectional Analysis

Once the time-series analysis indicates the presence of wage or profit-led growth, we next create a cross-sectional dummy variable, which for a given country takes the value of 1 if the growth regime is wage-led and 0 if the regime is profit-led. That is,

$$\Pr(Y = 1|X) = \varphi(X^T \beta) \quad (34)$$

Here, Pr denotes the probability, φ is the cumulative distribution function, and X represents the control variables of the regression. Then, a maximum likelihood estimation is performed where the estimated coefficients indicate the effects of changes in the independent variables on the relative place of standard normal distribution; therefore, they cannot be interpreted as marginal effects.

Considering the binary nature of our dependent variable constructed as explained above in the

cross-sectional analysis, we then run a probit regression where we regress this dummy variable on a number of independent variables. We controlled the structural characteristics of each country by the average values of our independent variables through the period in which the time-series analysis was conducted. The impact of trade openness is controlled by the ratio of the sum of exports and imports to GDP. We use the University of Texas Inequality Project's (2018) industrial pay inequality data, UTIP-UNIDO, for testing the influence of wage inequality on a country's wage-ledness. UTIP-UNIDO data measure industrial pay inequality by the Theil index.

The datasets on household debt or credit are insufficient for covering the period in our time-series analysis (1961-2011) for 41 developed and developing economies. Therefore, we instead preferred domestic credit to private sector as a percentage of GDP, which would measure the level of financialisation in an economy[8]. We compared the average domestic credit to private sector as a percentage of GDP values with post-1989 average household debt as a percentage of GDP from BIS (2018) for 25 countries with data available. Although the periods covered by the two variables are different, the two variables are strongly correlated with a correlation coefficient of 0.803.

The impacts of GDP per-capita, population growth rate, government spending as a percentage of GDP, average years of schooling and time trend are our other independent variables. We also controlled for the structure of our models by a dummy variable on the use of the ARDL model, dummy variables for the type of model used for each country (Model Types 1, 2 or 3) and a dummy variable on whether our wage share data are industrial labour share coming from UNIDO's (2014) INDSTAT2, Industrial Statistics Database or adjusted wage share for the entire economy coming from AMECO and Onaran and Galanis (2014). The probit regression will allow us to estimate the nature of the effects of several factors on the probability of an economy being wage-led.

Moreover, we also run a random-effects meta-regression where for each country, the estimated coefficient of wage share in the time-series analysis as well as its standard deviation is used in the analysis. The meta-regression analysis uses the estimated coefficient of the wage share in the time-series analysis as well as its standard deviation. We use the method of moments estimator in the random-effects setting, as we also allow for the existence of between-country variation.

3.2 Data

Table 1 presents the descriptive summary statistics of the entire dataset. In total, we have data for 41 developing and developed countries. Although the largest span is from 1961 to 2011, the time-series dimension of each country is different due to the limited availability of the wage share series. Our source of the data for GDP and GDP per-capita is Penn World Tables 8.1. Government spending as a share of GDP (%), real effective exchange rate index (2010=100), population growth (%), and trade as a share of GDP (%) are obtained from the World Development Indicators (2018). The real effective exchange rate index is defined as the nominal effective exchange rate against a weighted average of several foreign currencies over a price deflator or index of costs. Average years of schooling is obtained from Barro and Lee (2013)[9], whereas wage inequality series is acquired from UTIP's (2017) industrial pay inequality dataset based on UNIDO Industrial Statistics. For the wage share series, we used AMECO's adjusted wage share and UNIDO's (2014) INDSTAT2 databases. The AMECO database represents adjusted wage share for the entire economy, whereas the UNIDO database is only

[8] Among the alternative datasets, OECD's (2018) household debt percentage of net disposable income dataset starts from 1995 and mainly covers OECD countries only. Similarly, Büyükkarabacak and Valev (2010)'s dataset on household credit to GDP is for 1990-2016. BIS's (2018) "total debt of households as a % percentage of GDP" data covers the pre-1980s for only 11 countries and covers the pre-1990s for only 16 countries in our dataset. Although BIS's data is restricted, we use the averages in this data for robustness analysis.

[9] Barro and Lee's (2013) dataset exhibits average years of schooling for each 5 years. The gaps between 5 years are filled with linear interpolation.

for the manufacturing industry. For the adjusted wage share of some specific economies, we also utilize Onaran and Galanis (2014)[10] and OECD (2017) (Appendix 1).

Table 1. Descriptive Summary Statistics

	Mean	Std. Dev.	Minimum	Maximum
Wage Share (%)	47.01	18.01	3.33	87.68
GDP (thousand USD)	582.3	147.5	1.1	13379.3
Government Expenditures (% GDP)	18.2	8.9	6.1	79.8
Real Exchange Rate (national currency/USD)	139.56	769.58	0.00	10616.30
Average Years of Schooling	7.49	2.60	1.09	13.18
Domestic Credit to Private Sector (% GDP)	58.65	47.43	4.18	221.29
GDP per capita (USD)	14944	11922	700	72528
Household Debt (% GDP)	51.53	28.47	0.10	139.40
Income Inequality (Gini)	35.34	10.01	17.76	71.18
Population Growth (%)	1.40	1.03	-0.38	5.74
Trade to GDP (%)	77.21	70.83	7.53	447.06
Wage Inequality (Theil)	0.0312	0.0270	0.0009	0.2720

3.3. Estimation Results

The results of our Vector Error Correction Model (VECM) and Autoregressive Distributed Lag (ARDL) model estimations are reported in Table 2 and Table 3, respectively, for each country. Here, for each country, we report which model type we use (Model Types 1, 2 or 3 as explained in the first subsection), the trend type if included, and the estimated coefficient of real GDP in the time-series regression as well as its standard deviation. Note that a positive (negative) estimated coefficient here implies a wage-led (profit-led) growth. We observe from Table 2 and Table 3 that of 41 countries, 21 of them have wage-led growth, whereas the remaining 20 are of a profit-led growth regime. A comparison of our results with the existing literature is provided in Appendix 1.

Figure 1 provides information on the structural characteristics of wage-led and profit-led countries that we estimated. The box-plot diagrams reflect the average trade/GDP (%), industrial pay inequality (Theil), and domestic credit to private sector/GDP (%) for each country for the periods of our estimations. Figure 1 reflects that the countries with higher values of average trade/GDP (%) are mainly profit-led. The third quartile for average trade/GDP is 92.8% for profit-led economies, which is larger than 72.6%, the third quartile for wage-led economies. Moreover, the profit-led countries include countries with higher outlier values of trade openness (Singapore, Luxembourg, and Malta).

Figure 1 also shows that the profit-led economies on average are countries that have larger industrial pay inequalities. The median, first quartile and third quartile values of industrial pay inequalities are higher in the group of profit-led economies. An exceptional case for the wage-led

[10] If the wage share data had a one or two year gap, we filled the gap with linear interpolation. In the case of gaps longer than two years, we preferred the part of the dataset that provides us longer data. In addition, we observed unrealistic breaks in the wage share data from UNIDO's (2014) INDSTAT2. We treated the wage share data that changed more than 5 percentage points between two observations as a change in methodology, unless an economic crisis, war or catastrophe was observed in the period of change. We preferred the longer part and dropped the rest of the dataset under these conditions.

countries is Jordan, which has a Theil value of 0.093 for wage inequality. Finally, Figure 1 mainly reflects higher values of average domestic credit to private sector /GDP (%) for wage-led economies.

Table 2. Estimated Results in Vector Error Correction Models (VECM) – *Dependent variable – Log(GDP)*

Country	Model Type	Trend	LR coefficient for wage share	LR std. dev. for wage share	Estimation Period
Argentina	3	Restricted Constant	0.066*	0.011	1972-2007
Austria	1	Unrestricted Trend	0.143*	0.037	1965-2011
Belgium	2	Unrestricted Trend	0.020*	0.008	1961-2011
Canada	1	Restricted Trend	-0.071*	0.023	1961-2011
Chile	1	Unrestricted Trend	-0.025*	0.010	1967-1994
China-Macao	1	Unrestricted Trend	0.146*	0.030	1980-2011
Ecuador	1	Unrestricted Trend	0.018*	0.003	1964-2008
Egypt	1	Unrestricted Trend	-0.012*	0.002	1966-1998
Greece	2	Unrestricted Trend	-0.060*	0.016	1962-2011
Hong Kong	2	Unrestricted Constant	0.209*	0.065	1975-2011
Iceland	1	Unrestricted Trend	0.077*	0.012	1972-1996
India	1	Unrestricted Trend	-0.092*	0.015	1964-2011
Indonesia	1	Unrestricted Trend	-0.122*	0.023	1971-2011
Iran	1	Unrestricted Trend	0.223*	0.066	1981-2011
Ireland	3	Unrestricted Trend	-0.049*	0.010	1962-2011
Italy	1	Unrestricted Trend	296.101*	50.656	1962-2011
Jordan	1	Restricted Constant	0.056*	0.019	1975-2011
Kenya	1	Unrestricted Trend	-0.086*	0.015	1964-2011
Luxembourg	2	Unrestricted Trend	-0.162*	0.032	1961-2011
Malta	1	Unrestricted Trend	-0.019*	0.004	1965-2008
Mexico	1	Restricted Constant	-0.077*	0.016	1972-2009
Netherlands	1	Unrestricted Trend	0.036*	0.004	1962-2011
Norway	1	Unrestricted Trend	2.724*	0.515	1962-2011
Pakistan	1	Unrestricted Trend	-0.008**	0.004	1965-1991
South Africa	2	Unrestricted Trend	0.138*	0.024	1972-2007
South Korea	2	Restricted Trend	0.695*	0.140	1964-2011
Spain	2	Unrestricted Trend	0.011*	0.003	1965-2011
Sweden	1	Unrestricted Trend	0.052*	0.008	1962-2011
Syria	2	Unrestricted Trend	0.032*	0.012	1967-1995
Turkey	1	Unrestricted Constant	0.066**	0.030	1964-2009
UK	1	Unrestricted Trend	0.051*	0.009	1962-2011
US	2	Unrestricted Trend	0.072*	0.016	1962-2011
Venezuela	1	Unrestricted Constant	-0.042***	0.022	1964-1998

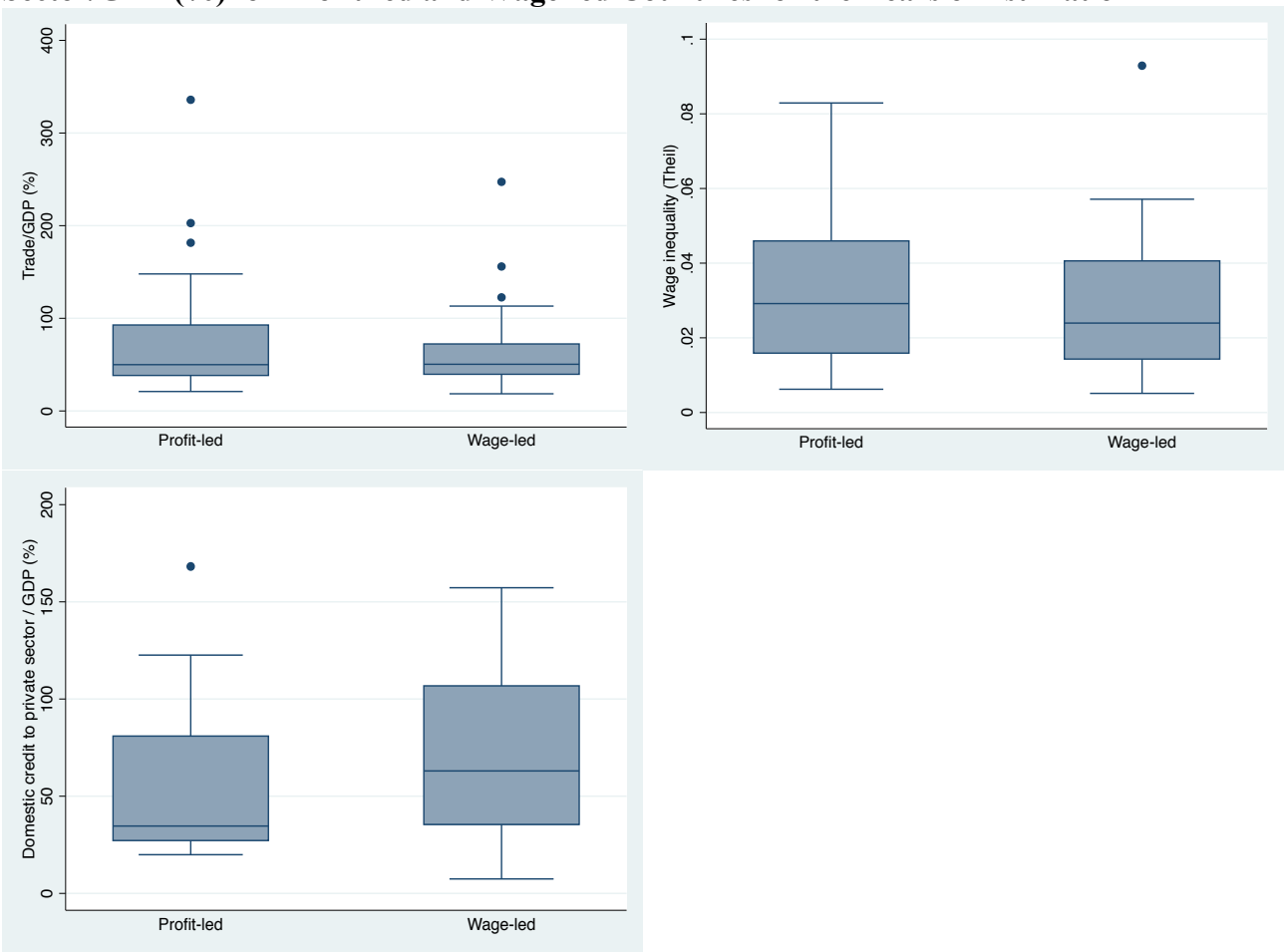
Notes: *, **, *** denote 1, 5 and 10% significance levels. Model 1 includes wage share, share of government expenditures in GDP (%) and real exchange rate, Model 2 includes wage share, share of government expenditures in GDP (%) and Model 3 includes wage share only. Trend column reflects different uses of trend in different models. When unrestricted trend is preferred, there are no restrictions on the trend parameters. In models with unrestricted constants, $\rho_1 = 0$ and $r = 0$; in models with unrestricted constants $\rho_1 = 0$, $r = 0$ and, $\mu_1 = 0$ and in models with unrestricted constants $\rho_1 = 0$, $r = 0$, $\mu_1 = 0$ and $\nu = 0$ in equations (32) and (33).

Table 3. Estimated Results in Autoregressive Distributed Lag (ARDL) Models – *Dependent variable – Log(GDP)*

Country	Model Type	Trend	Structural change dummy	LR coefficient for wage share	LR std. dev. for wage share	Estimation Period
Australia	1	Yes	Yes	-0.005**	0.002	1967-1991
Colombia	3	Yes	N/A	-0.056**	0.027	1967-2011
Denmark	2	N/A	N/A	-0.097**	0.039	1964-2011
Finland	1	Yes	Yes	-0.019*	0.006	1967-2011
Japan	2	N/A	N/A	0.084***	0.047	1967-2010
Malaysia	1	Yes	N/A	-0.061**	0.026	1972-2011
Singapore	3	Yes	Yes	-0.040**	0.016	1967-2011
Uruguay	3	N/A	N/A	-0.034*	0.005	1967-2008

Notes: *, **, *** denote 1, 5 and 10% significance levels.

Figure 1. Average Trade/GDP (%), Wage Inequality (Theil) and Domestic Credit to Private Sector/GDP (%) for Profit-led and Wage-led Countries for the Years of Estimation



The cross-sectional estimation results for the factors that would make an economy profit-led or wage-led are reported in Table 4 and Table 5. Table 4 reports the results of the probit regression using

the wage-led dummy as the dependent variable. According to the results of our probit regression, the countries where the levels of trade openness are higher are more likely to be profit-led, which is consistent with our section 2.3.1. Table 4 also shows that the countries with higher domestic private credit ratios tend to be profit-led. Moreover, countries with higher GDP per-capita and government spending to GDP ratios are more likely to be wage-led. Finally, we fail to find a significant effect of industrial pay inequality in our probit regression.

Table 4. Cross-Sectional Probit Regression Results (Profit-led = 0, Wage-led = 1)

	Coefficient	**Marginal effects**
Log (Trade openness)	-1.966*	-0.781*
	(0.686)	(0.271)
Wage inequality	49.811	19.794
	(45.027)	(17.841)
Log (Credit-to-GDP)	- 1.101***	-0.438***
	(0.630)	(0.248)
Log (GDP per-capita)	4.291**	1.705**
	(1.861)	(0.736)
Population Growth	0.323	0.128
	(0.607)	(0.241)
Government Sp. (% GDP)	0.042*	0.167*
	(0.163)	(0.065)
Average years of schooling	0.414	0.164
	(0.392)	(0.155)
Time	0.731*	0.291*
	(0.229)	(0.091)
Observations	41	
Pseudo R-square	0.65	
Wald Test	36.76	

Notes: Robust standard errors are reported in parentheses. *, **, *** denote 1, 5 and 10% significance levels. Dummy variables for the type of models (Model 1, 2 or 3), a dummy variable for estimates with ARDL models, a dummy variable on the use of adjusted wage share in the estimates (as opposed to industrial wage share from UNIDO (2014)) are also controlled.

Next, our meta-regression analyses in Table 5 reveal that the level of the estimated coefficient in the time-series analysis also depends on several variables. Consistent with Table 4, our baseline regression (1), which includes all 41 countries in our analysis, reflects that countries with greater trade openness are significantly more profit-led at the 5% significance level. Moreover, the countries with greater wage inequality are also more profit-led. However, our baseline regression (1) fails to reflect a significant impact of domestic credit to private sector/GDP (%) on wage-ledness at the 10% significance level. This might be due to the ambiguities discussed in section 2.3.3.

To test the robustness of our analysis, we performed four extra meta-regression analyses. The long-run coefficients of wage share for Italy and Norway in Table 2 are over 1.00, which is significantly higher than for other countries. This might lead to a bias in our meta-regression analysis. Therefore, in regression (2), we excluded Italy and Norway from our analysis. However, the magnitudes and significance of trade/GDP (%), wage inequality and credit/GDP's (%) coefficients are

very similar to the coefficients in regression (1). In regression (3) in Table 5, we included only countries with coefficients coming from Model 1 in which all wage shares, government expenditures/GDP (%) and real exchange rates are controlled. However, our meta-regression includes only 25 countries, and the coefficients for trade/GDP (%) and wage inequality are still significant at 5%, with both being more negative.

Table 5. Meta-Regression Estimation Results – *Dependent variable: Long-run coefficient for wage share*

	All countries	***Norway and Italy excluded***	***Estimates from Model 1 only***	***With income inequality***	***With household debt***
	(1)	(2)	(3)	(4)	(5)
Log (Trade openness)	-0.034**	-0.033**	-0.090**	-0.036**	-0.035
	(0.016)	(0.015)	(0.039)	(0.016)	(0.038)
Wage inequality	-1.369**	-1.333**	-2.315**		-5.701**
	(0.661)	(0.624)	(0.897)		(2.891)
Log (Credit-to-GDP)	-0.008	-0.008	0.059	-0.001	
	(0.019)	(0.018)	(0.039)	(0.022)	
Log (GDP per-capita)	0.044	0.043	0.060***	0.058**	-0.048
	(0.029)	(0.028)	(0.033)	(0.028)	(0.086)
Population Growth	0.032**	0.032**	0.051**	0.026***	0.056
	(0.015)	(0.014)	(0.021)	(0.015)	(0.052)
Government Sp. (% GDP)	0.001	0.001	0.001	0.002	0.009
	(0.002)	(0.002)	(0.002)	(0.002)	(0.008)
Average years of schooling	0.017**	0.017**	0.017	0.016***	0.067*
	(0.008)	(0.008)	(0.012)	(0.008)	(0.023)
Time	0.009*	0.009*	0.011*	0.006**	0.013
	(0.003)	(0.003)	(0.004)	(0.003)	(0.008)
Income inequality, personal				-0.000	
				(0.001)	
Log (Household debt-to-GDP)					-0.093**
					(0.046)
Observations	41	39	25	39	25
I-sq	94.01%	93.61%	92.55%	93.65%	94.02%
Chi-sq Test	0.000	0.000	0.001	0.001	0.006

Notes: Standard errors are reported in parentheses *, **, *** denote 1, 5 and 10% significance levels. Dummy variables for the type of models (Model 1,2 or 3), a dummy variable for estimates with ARDL models, and a dummy variable on the use of adjusted wage share in the estimates (as opposed to industrial wage share from UNIDO (2014)) are also controlled.

In regression (4) in Table 5, we used personal income inequality as a proxy for wage inequality following Carvalho and Rezai (2016). For measuring income inequality, we used average standardized market income Gini coefficient measures from Solt (2018). However, the coefficient for the income Gini is close to zero and insignificant at 10%. This might be because the personal income inequality might not be a good proxy for wage inequality in emerging economies with widespread self-employment and subsistence sector. Finally, in regression (5), we controlled for the impact of

household debt/GDP. We checked the impact of this measure for greater consistency with the model in section 2.3.3 that specifically focuses on the impact of household credit and debt. We used BIS's (2018) household debt/GDP (%); however, these data are very limited for pre-1990 and include post-1989 data for only 25 of the countries in our sample. Therefore, household debt/GDP (%) measures are averages from post-1989. Consistent with Table 4, our regression (5) shows that higher household debt significantly decreases the wage-ledness of an economy at the 5% significance level. Moreover, higher wage inequality's impact on wage-ledness is also significantly negative. The trade openness's impact on wage-ledness becomes insignificant at the 10% level in regression (5). However, trade openness' coefficient size is similar to our baseline regression and might be insignificant due to a very small number of observations.

4. Conclusions

This paper analyses the structural factors that would make an economy profit-led or wage-led. Our results show that the economies with greater trade openness are more likely to be profit-led. Moreover, we demonstrate that higher wage inequality makes an economy more wage-led. We also find that the countries with private higher credit-to-GDP ratios are more likely to be profit-led and that the countries with higher household debt/GDP are more profit-led.

If the policymakers aim to reach an egalitarian growth path, they should reconsider altering the structural factors that would determine the relationship between inequality and growth. Globalization with greater wage policy coordination between countries along with lower wage inequality would create a setting in which a simultaneous rise in wage shares along with higher growth rates would be more possible. Moreover, taming financialisation should also be considered by the policymakers for achieving labour-friendly economic growth.

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Appendix 1

Table A1. Comparison of our Estimates with the Previous Work

Our Estimations				*Previous work*	
Country	**Growth Regime**	**Estimation Period**	**Data Source**	**Growth Regime**	**Source**
Argentina	Wage-led	1972-2007	Onaran and Galanis (2014)	Profit-led Wage-led	Onaran and Galanis (2014) Alarco (2016)
Australia	Profit-led	1967-1991	UNIDO	Profit-led	Onaran and Galanis (2014)
Austria	Wage-led	1965-2011	UNIDO	Profit-led Profit-led Profit-led Wage-led	Hein and Vogel (2007) Stockhammer and Ederer (2008) Onaran and Obst (2016) Obst, Onaran and Nikolaidi (2017)
Belgium	Wage-led	1961-2011	AMECO	Profit-led Profit-led	Onaran and Obst (2016) Obst, Onaran and Nikolaidi (2017)
Canada	Profit-led	1961-2011	AMECO	Profit-led	Onaran and Galanis (2014)
Chile	Profit-led	1967-1994	UNIDO	Profit-led	Alarco (2016)
China-Macao	Wage-led	1980-2011	UNIDO		
Colombia	Profit-led	1967-2011	UNIDO	Wage-led Wage-led Wage-led	Charpe ,Lee, Arias and Bridji (2014) Alarco (2016) Loaiza, Tobon and Hincapie (2017)
Denmark	Profit-led	1964-2011	AMECO	Profit-led Wage-led	Onaran and Obst (2016) Obst, Onaran and Nikolaidi (2017)
Ecuador	Wage-led	1964-2008	UNIDO	Wage-led	Alarco (2016)
Egypt	Profit-led	1966-1998	UNIDO		

Our Estimations				*Previous work*	
Country	**Growth Regime**	**Estimation Period**	**Data Source**	**Growth Regime**	**Source**
Finland	Profit-led	1967-2011	UNIDO	Wage-led	Onaran and Obst (2016)
				Wage-led	Obst, Onaran and Nikolaidi (2017)
Greece	Profit-led	1962-2011	AMECO	Wage-led	Onaran and Obst (2016)
				Wage-led	Obst, Onaran and Nikolaidi (2017)
Hong Kong	Wage-led	1975-2011	UNIDO		
Iceland	Wage-led	1972-1996	UNIDO		
India	Profit-led	1964-2011	UNIDO	Profit-led	Onaran and Galanis (2014)
Indonesia	Profit-led	1971-2011	UNIDO		
Iran	Wage-led	1981-2011	UNIDO		
Ireland	Profit-led	1962-2011	AMECO	Profit-led	Kinsella (2013)
Italy	Wage-led	1962-2011	AMECO	Wage-led	Naastepad and Storm (2006)
				Wage-led	Onaran and Galanis (2014)
				Wage-led	Onaran and Obst (2016)
				Wage-led	Obst, Onaran and Nikolaidi (2017)
Japan	Wage-led	1967-2010	UNIDO	Profit-led	Bowles and Boyer (1995)
				Profit-led	Naastepad and Storm (2006)
				Wage-led	Onaran and Galanis (2014)
Jordan	Wage-led	1975-2011	UNIDO		
Kenya	Profit-led	1964-2011	UNIDO		
Luxembourg	Profit-led	1961-2011	AMECO	Wage-led	Onaran and Obst (2016)
				Wage-led	Obst, Onaran and Nikolaidi (2017)
Malaysia	Profit-led	1972-2011	UNIDO		
Malta	Profit-led	1965-2008	UNIDO		

Our Estimations				*Previous work*	
Country	**Growth Regime**	**Estimation Period**	**Data Source**	**Growth Regime**	**Source**
Mexico	Profit-led	1972-2009	OECD	Profit-led	Onaran and Galanis (2014)
				Profit-led	Charpe ,Lee, Arias and Bridji (2014)
				Wage-led	Alarco (2016)
Netherlands	Wage-led	1962-2011	AMECO	Wage-led	Naastepad (2006)
				Wage-led	Naastepad and Storm (2006)
				Profit-led	Hein and Vogel (2007)
				Wage-led	Onaran and Obst (2016)
				Wage-led	Obst, Onaran and Nikolaidi (2017)
Norway	Wage-led	1962-2011	AMECO		
Pakistan	Profit-led	1965-1991	UNIDO		
Singapore	Profit-led	1967-2011	UNIDO		
South Africa	Wage-led	1972-2007	Onaran and Galanis (2014)	Profit-led	Onaran and Galanis (2014)
				Wage-led	Strauss and Isaacs (2016)
South Korea	Wage-led	1964-2011	UNIDO	Wage-led	Onaran and Stockhammer (2005)
				Wage-led	Onaran and Galanis (2014)
Spain	Wage-led	1965-2011	UNIDO	Wage-led	Naastepad and Storm (2006)
				Wage-led	Onaran and Obst (2016)
				Wage-led	Obst, Onaran and Nikolaidi (2017)
Sweden	Wage-led	1962-2011	AMECO	Wage-led	Onaran and Obst (2016)
Syria	Wage-led	1967-1995	UNIDO		

Our Estimations				*Previous work*	
Country	**Growth Regime**	**Estimation Period**	**Data Source**	**Growth Regime**	**Source**
Turkey	Wage-led	1964-2009	UNIDO	Wage-led	Onaran and Stockhammer (2005)
				Wage-led	Onaran and Galanis (2014)
				Profit-led	Yılmaz (2015)
UK	Wage-led	1962-2011	AMECO	Wage-led	Bowles and Boyer (1995)
				Wage-led	Naastepad and Storm (2006)
				Wage-led	Hein and Vogel (2007)
				Wage-led	Onaran and Obst (2016)
				Wage-led	Obst, Onaran and Nikolaidi (2017)
US	Wage-led	1962-2011	AMECO	Wage-led	Bowles and Boyer (1995)
				Profit-led	Barbosa-Filho and Taylor (2006)
				Profit-led	Naastepad and Storm (2006)
				Wage-led	Hein and Vogel (2007)
				Wage-led	Nikiforos and Foley (2012)
				Wage-led	Onaran, Stockhammer and Grafl (2011)
				Profit-led	Carvalho and Rezai (2016)
Uruguay	Profit-led	1967-2008	UNIDO	Wage-led	Alarco (2016)
Venezuela	Profit-led	1964-1998	UNIDO	Profit-led	Charpe ,Lee, Arias and Bridji (2014)
				Wage-led	Alarco (2016)