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Wage- or Profit-Led Regime? The Case of Poland

Wzrost gospodarczy napędzany przez płace czy zyski? Przypadek Polski

Abstract

This study aims to investigate whether the Polish economy operates under a wage-led or profit-led economic regime. By analysing how changes in income distribution affect consumption, investment, and net exports, insights are gained into the nature of the economic regime, facilitating evidence-based policy formulation and fostering sustainable economic development in the country. The long-term impact of an increase in the profit share on economic growth is found to be significantly negative, giving rise to the conclusion that the Polish economy was in a wage-led regime from 2001 to 2022. The estimated total marginal effect of an increased profit share on output, including multiplier mechanisms, is –0.22.

Keywords:
wage-led growth, Bhaduri-Marglin model, post-Keynesian economics, neo-Kaleckian model

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Streszczenie

Badanie ma na celu ustalenie, czy polska gospodarka działa w ramach reżimu opartego na płacach czy na zyskach. Analizując to, jak zmiany w rozkładzie dochodów wpływają na konsumpcję, inwestycje oraz eksport netto, można wnioskować o naturze reżimu gospodarczego Polski, co ułatwia formułowanie polityk opartych na dowodach, a także wspiera zrównoważony rozwój gospodarczy kraju. Długoterminowy wpływ zwiększenia udziału zysków na wzrost gospodarczy okazuje się istotnie negatywny, dając podstawy do wniosku, że Polska gospodarka w okresie 2001–2022 funkcjonowała w reżimie opartym na płacach. Szacunek całkowitego wpływu krańcowego zwiększenia udziału zysków na produkt, z uwzględnieniem mechanizmów mnożnikowych, wynosi –0,22.

Słowa kluczowe:
wzrost oparty na płacach, model Bhaduriego–Marglina, ekonomia postkeynesowska, neokaleckianizm

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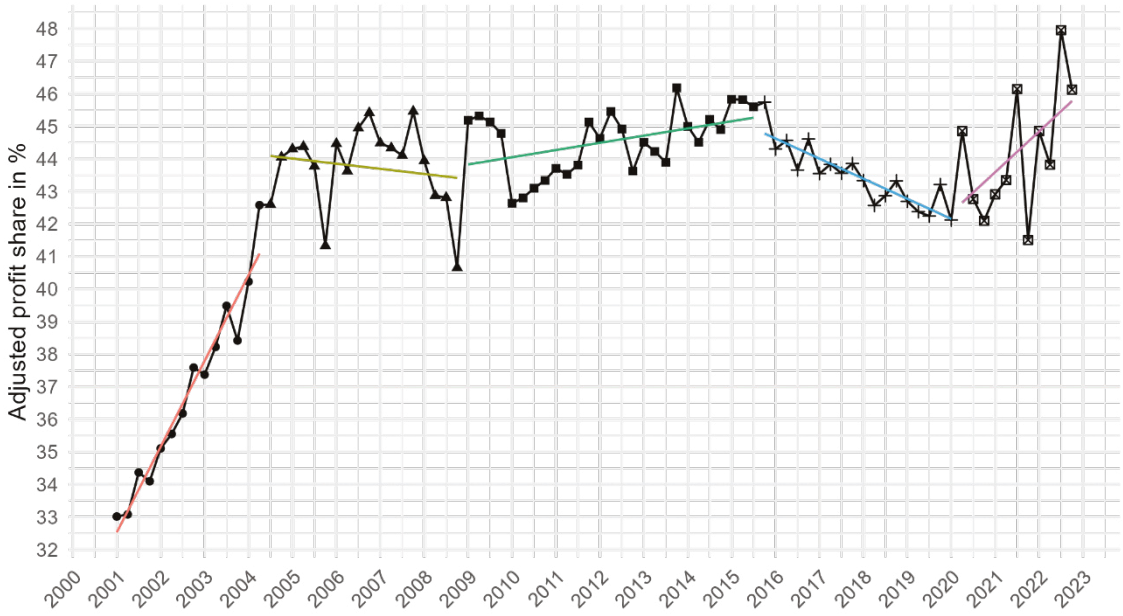
Introduction

The majority of empirical literature on wage-led growth indicates that aggregate demand in large economies tends to be wage-led, whereas small open economies may be profit-led due to international trade effects [**Onaran, Obst, 2016**]. Poland has a significant domestic market but it is not a large economy. Moreover, the period under investigation (2001–2022) was marked by dynamic growth in the Polish economy, with real GDP more than doubling (it expanded by 117% in total on the back of impressive 3.7% average yearly growth). Therefore Poland presents an interesting case for studying the impact of functional income distribution on growth.

Simultaneously, the profit share in the Polish economy was subject to interesting temporal variations (Figure 1). Before it joined the EU in 2004, Poland reported high unemployment rates. In February 2004, three months before accession, Polish unemployment hit a record 21%.[1] As highlighted by Michał **Kalecki** in his foundational *Political Aspects of Full Employment* [**1943**] and widely acknowledged in the neo-Kaleckian literature (e.g. **Stockhammer and Onaran** [**2004**]), higher unemployment undermines labour's bargaining position (the "reserve army" effect). This, in turn, led to a large increase in the profit share in the Polish economy from 2000 to 2004 (subperiod 1).

The period following Poland's EU accession until the Global Financial Crisis (subperiod 2) was marked by a significant drop in unemployment, from around 19% in 2005 to around 7% in 2008, supported by large economic emigration to more advanced EU economies. Labour became a scarcer resource (or, in other words, the Kaleckian "reserve army" decreased in size), allowing workers to regain some of their bargaining power. Between 2009 and 2015 (subperiod 3), the profit share partly regained its growth dynamics, which could in part be attributed to a combination of higher unemployment and the pro-capital policies of the neoliberal government of the time.

Figure 1. Adjusted profit share in the Polish economy, 2001–2022



The coloured trend lines and shape of data points refer to the five subperiods described above.
Source: Author's own elaboration.

In 2016, a new ruling party came to power, one that embraced a more pro-labour mix of policies, including welfare benefits, minimum wage increases, and a more progressive tax system with less room for corporate tax

[1] Source: Eurostat.

avoidance. This, along with lower unemployment, helped to bring the profit share down, with the downward trend in subperiod 4, lasting until the global COVID-19 pandemic. The resulting global turmoil with strong inflationary pressures was not an environment in which the labour share of income was easy to defend, especially given the low levels of unionisation in Poland and the growing corporate profits of the time, so during and after COVID-19 the profit share started to rise once again (subperiod 5).

This article relies on a post-Keynesian and, particularly, neo-Kaleckian framework to investigate the impact of the profit share on economic growth in Poland. The original model developed by Michał **Kalecki** [**1954**] was based on the simplifying assumption that workers consumed all of their wages (they did not save). Moreover, in his models and their interpretations (e.g. by **Steindl** [**1952**]), economies have persistent spare capacities, so additional aggregate demand can be met with a volume adjustment without a price adjustment. Capitalist firms tend to concentrate, giving rise to oligopolies with pricing power and the ability to increase profit margins. In such circumstances, rising margins increase the share of profits in national income, leading to lower consumer demand and overall economic stagnation. Therefore, as noted by **Stockhammer** [**2017**], the original Kaleckian models for the closed economy were always wage-led.

However, most of the studies in this strand of empirical research are based on the pioneering work of **Bhaduri and Marglin** [**1990**]. Their neo-Kaleckian approach differs from the standard Kaleckian model in that it notes that variations in wages can have two contradictory effects. The effect of higher wages on employment and output is ambiguous: wages increase the costs of production, but also provide more demand. A lower profit share may lead to lower incentives to invest and thus a decrease in aggregate demand. The negative or positive impact of an increase in the profit share on aggregate demand depends on the relative responses of investment, savings and capacity utilisation to such changes. Therefore, the net impact of changes in the functional income distribution on economic performance is ambiguous. The empirical research conducted within this framework classifies economies as either wage- or profit-led, depending on how they respond to such changes.

Blecker [**2002**] noted that the pioneering work of Bhaduri and Marglin showed the possibility of an outcome where a higher profit share stimulates aggregate demand and output through higher investment ("exhilirationist" regime). It is made more likely when savings out of wages and international trade are taken into account by the model. On the other hand, the "stagnationist regime" occurs when saving is more responsive than investment to changes in the utilisation of capacity, leading to a negative impact of the profit share on aggregate demand [**Bhaduri, Marglin, 1990**].

Setterfield [**2002**] describes the central question of this neo-Kaleckian framework in terms of whether a higher profit share of income boosts growth, given its negative effect on consumption spending but possible positive impact on investment. He notes that the low degree of capacity utilisation makes higher investment unlikely even in the case of high profit margins/rates. Conversely, increasing capacity utilisation stimulates investment as the relationship between the expected sales and capacity improves (less unused capacity).

However, **Blecker** [**2002**] argues that the conceptual breakthrough made by Bhaduri and Marglin is about noticing that it is likely that capital owners might be more concerned with profitability than with capacity utilisation. If this was the case, a higher profit share could increase investment, and this increase could offset the lower consumption demand, leading to higher output. He further notes that even if the increase in investment due to a higher profit share is not large enough to offset the reduction in consumption spending, it could still lead to higher economic growth in the longer term. Such an economic regime is known as a "conflictive stagnationist" case, i.e. a case of wage-led demand regime but a profit-led growth regime.

The classification of specific economies as either wage- or profit-led regimes has been the subject of empirical investigation in a number of studies, including **Stockhammer and Onaran** [**2004**]; **Hein and Vogel** [**2007**]; **Stockhammer et al.** [**2011**]; **Onaran and Galanis** [**2013**]; **Onaran and Obst** [**2016**]; and **Oyvat et al.** [**2020**]. So far the literature lacked such a study for Poland, the homeland of the late Michał Kalecki, who provided theoretical ground for this research. I will try to fill this gap and investigate empirically whether Poland's economic regime has been wage- or profit-led.

The concepts of wage- and profit-led economic regime should not be confused with "growth models" as used in the recent political-economy literature. The attempt by **Baccaro and Pontusson [2016]**, among others, to link political economy theory with post-Keynesian research should be appreciated. However, as noted by **Hein et al. [2021]**, the wage- or profit-led division in neo-Kaleckian literature describes the structural parameters of an economic regime that determine the response of demand and growth to changes in functional distribution (as described above), while the political-economic perspective concentrates on actual distributional and economic policies that were followed in a certain time period. For example, Germany is described as a "straightforward case of an export-led economy" from the late 1990 s onward by **Baccaro and Pontusson [2016]**, based on the actual policies implemented (repression of wages and consumption in order to boost export competitiveness) and their effects (large contribution of exports to actual GDP growth), while most of the neo-Kaleckian empirical research finds Germany to be a structurally wage-led economic regime (**Hein, Vogel [2007]**; **Stockhammer et al. [2011]**; **Onaran, Galanis [2013]**), based on the negative impact of an increase in the profit share on aggregate demand.

Furthermore, in later work [**Baccaro, Hadziabdic, 2023**], the political economists appreciate this distinction and point out that an economy based on a wage- or profit-led regime (in a post-Keynesian/neo-Kaleckian sense) is not the same as the actual growth caused by changes in the profit share. Thus, their finding that Poland was a "strongly export-led" economy from 2009 to 2018 is not of particular relevance to the subject and findings of this study. The same can be said for the finding of another political economist study by **Akcay and Jungmann [2022]** that Poland was a domestic demand-led regime between 1999 and 2008, but then transitioned to a "weakly export-led regime" between 2009 and 2020.

There were also some less common empirical approaches to estimating the causal relationship between the wage share and growth. In a recent study by **Lupu et al. [2022]**, 11 Eastern European economies were explored using wavelet coherency methodology. For Poland, a positive correlation was found between the wage share and GDP growth. However, the study's methodology indicated that it was GDP that drove the wage share and not the other way around. In a study by **Shin [2019]**, a significantly negative coefficient was found for the impact of the minimum wage on GDP growth for Poland, but it can hardly be interpreted as decisive since the minimum wage is an imperfect proxy for the wage share.

There is also a need to acknowledge studies that did not present econometric estimates of whether the Polish economy is in a wage- or profit-led regime, but, based on other reasons, discussed the need for a more demand-oriented growth policy (**Disoska, Toshevska-Trpcevska [2016]**; **Holko [2017]**; **Koronowski [2018]**). These inputs are especially valuable given the current dominance of the neoclassical perspective in the Polish economic debate. I believe that the presented study may provide additional quantitative support for the claims made therein.

I present the model in section 2 and the econometric results of this investigation in section 3, and then discuss them in section 4. Section 5 brings the conclusions about the nature of Poland's economic regime and possible insights for policymakers.

The model

The estimation strategy used in this study follows the structural approach as classified by **Blecker [2016]**. It operates under the assumption of an open economy with no economic activity of the state. Thus, GDP can be equalled to private aggregate demand, which, in turn, can be decomposed into its respective components:

$$Y = C + I + NX, \tag{1}$$

where Y is the real GDP (without government spending), C is the consumption expenditure, I is the investment expenditure, and NX is the net exports.

The rate of change of GDP in a given period can then be expressed as $\frac{\Delta Y}{Y}$, which can also be decomposed into its components:

$$\frac{\Delta Y}{Y} = \frac{\Delta C + \Delta I + \Delta NX}{Y} = \frac{\Delta C}{Y} + \frac{\Delta I}{Y} + \frac{\Delta NX}{Y} \,. \tag{2}$$

Thus, the marginal effect (partial derivative) of a change in the profit share (Δh) on the rate of change of GDP $\left(\frac{\Delta Y}{Y}\right)$ can be conveyed as $\frac{\frac{\Delta Y}{Y}}{\Delta h}$.[2] Based on the above, the approach is to separately estimate the marginal effects of a change in the profit share on the respective components of GDP. The marginal effects can then be added to obtain the total effect of the change in the profit share:

$$\frac{\frac{\Delta Y}{Y}}{\Delta h} = \frac{\frac{\Delta C}{Y}}{\Delta h} + \frac{\frac{\Delta I}{Y}}{\Delta h} + \frac{\frac{\Delta NX}{Y}}{\Delta h}. \tag{3}$$

However, one of the shortcomings of this approach, as pointed out, among others, by **Blecker [2016]** and **Onaran and Obst [2016]**, is the lack of interaction between the marginal effect of the profit share on output $\left(\frac{\frac{\Delta Y}{Y}}{\Delta h}\right)$ and the impact the change in output has on investment and net exports. This limitation is addressed by explicitly including those indirect, multiplier effects in the calculation of the total effect, which is further described in the remainder of this section.

Consumption

The Neo-Kaleckian framework puts emphasis on the different marginal propensities to consume of capital owners and workers. Therefore, a higher profit share is likely to bring decreased consumption expenditures. Consumption is thus modelled as a function of profits and wages. According to the regression formula (as used by, e.g., **Onaran, Galanis [2016]**), the log of consumption (C) is regressed on the log of profits (Π), the log of wages (W) and a constant term:

$$\log C = c_0 + c_\Pi \log \Pi + \; c_W \log W. \tag{4}$$

The marginal effect of a change in the profit share on consumption can therefore be found by multiplying the estimated coefficients c_Π and c_W representing the marginal propensities to consume out of profits (Π) and wages (W) respectively by the mean vales of the sample ratios of consumption expenditure and the respective aggregate:

$$\frac{\frac{\Delta C}{Y}}{\Delta h} = c_\Pi \frac{C}{\Pi} - c_W \frac{C}{W}. \tag{5}$$

The effect is expected to be negative because of the difference between the propensities mentioned above ($c_\Pi < c_W$).

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[2] It is a matter of convention whether those relationships are presented as marginal effects $\left(\frac{\frac{\Delta Y}{Y}}{\Delta h}\right)$ (as in, e.g., **Onaran, Obst [2016]**) or as partial derivatives $\left(\frac{\frac{\partial Y}{Y}}{\partial h}\right)$ (as in, e.g., **Hein, Vogel, [2007]**).

Investment

Investment is assumed to be a function of output (accelerator effect), the profit share (indicator of the expected profitability of investment outlays and the availability of internal funds to finance them), and the long-term interest rate (monetary conditions). As subsequent estimations have shown no statistical significance of the interest rate,[3] the investment function was modelled without this regressor. Investment is thus modelled as a function of output and profit share: the log of investment (I) is regressed on the log of output (Y), profit share (h)[4] and a constant term:

$$\log I = i_0 + i_Y \log Y + i_h h \ . \tag{6}$$

As noted by **Blecker [2016]** and **Onaran and Obst [2016]**, the marginal effect of a change in the profit share on investment should also take into account the indirect impact of the change in the profit share on output, which in turn affects investment. Therefore, the total effect on investment could be calculated as follows:

$$\frac{\frac{\Delta I}{Y}}{\Delta h} = \left[\frac{\frac{\Delta Y}{Y}}{\Delta h} i_Y \frac{I}{Y} + i_h \frac{I}{Y} \right], \tag{7}$$

where i_Y and i_h represent the coefficients for the output and the profit share respectively, with the former adjusted by the total effect of the change in the profit share on the output represented by term $\frac{\frac{\Delta Y}{Y}}{\Delta h}$. Both coefficients are multiplied by the mean vales of the sample ratio of investment expenditure to output. As a result, substituting the right side of equation (5) for $\frac{\frac{\Delta C}{Y}}{\Delta h}$ and the right side of equation (7) for $\frac{\frac{\Delta I}{Y}}{\Delta h}$ in equation (3), the total effect of a change in the profit share can now be derived as:

$$\frac{\frac{\Delta Y}{Y}}{\Delta h} = \frac{c_\Pi \frac{C}{\Pi} - c_W \frac{C}{W} + i_h \frac{I}{Y} + \frac{\frac{\Delta NX}{Y}}{\Delta h}}{1 - i_Y \frac{I}{Y}}. \tag{8}$$

As investment is expected to be a positive function of output (accelerator effect), the total effect of the change in the profit share on output is likely to be increased (without affecting its sign).

Net exports

The net exports function used in this study follows a simpler approach of, e.g., **Hein and Vogel [2007]** rather than the stepwise approach taken by the likes of **Onaran and Obst [2016]**. Net exports are assumed to be positively affected by the real GDP of the main trading partners (indicator of foreign demand) and negatively affected by the domestic real GDP (indicator of domestic demand). These two are therefore included as exogenous variables. Net exports are modelled as a function of domestic and foreign outputs and the profit

[3] EMU convergence criterion bond yields were used as the nominal interest rate. They relate to interest rates for long-term government bonds denominated in national currencies, which is a category used as a risk-free rate for corporate finance purposes, including capital budgeting decisions made by firms.

[4] The profit share (h) was not subjected to log transformation as, in contrast to other variables, it does not exhibit exponential growth.

share: the ratio of change in net exports as a proportion of output $\left(\frac{\Delta NX}{Y}\right)$ is regressed on the log of domestic output (Y), the log of foreign output (Y^f),[5] the profit share (h) and a constant term:

$$\frac{\Delta NX}{Y} = x_0 + x_Y \log Y + x_{Y^f} \log Y^f + x_h h. \tag{9}$$

Equation (9) does not include the nominal exchange rate because, as argued by **Hein and Vogel [2007]**, its effect on the international competitiveness of domestic producers is already contained in the profit share.[6]

In order to incorporate the indirect effect acting through domestic output, an adjustment analogous to that with the investment function (equation 7) is made:

$$\frac{\frac{\Delta NX}{Y}}{\Delta h} = \left[\frac{\frac{\Delta Y}{Y}}{\Delta h} x_Y + x_h\right], \tag{10}$$

where, like in the case of the investment function, x_Y and x_h represent the coefficients for the domestic output and the profit share respectively, with the former adjusted by the total effect of the change in the profit share on the output represented by term $\frac{\frac{\Delta Y}{Y}}{\Delta h}$.

Total effect

As a consequence, equation (8) for the total effect of a change in the profit share can now be further derived as:

$$\frac{\frac{\Delta Y}{Y}}{\Delta h} = \frac{c_\Pi \frac{C}{\Pi} - c_W \frac{C}{W} + i_h \frac{I}{Y} + x_h}{1 - i_Y \frac{I}{Y} - x_Y}. \tag{11}$$

Such a specification is adjusted for the indirect effects of a change in domestic output on investment and net exports. However, as those effects are expected to go in opposite directions (positive on investment and negative on net exports), the final effect of those adjustments is an empirical question.

Under the presented framework, the total effect described by equation (11) will determine whether the Polish economy is considered wage-led (negative total effect of a change in the profit share) or profit-led (positive total effect of a change in the profit share). The empirical results presented in the next section support the former hypothesis.

Data

The research was based on data from Eurostat. The data describe the economic characteristics of Poland, except for the variable Y^f (a proxy for foreign demand), in which case data for the European Union as a whole (excluding Poland) are used. The data are of quarterly frequency, seasonally adjusted and cover the period

[5] The GDP of the European Union as a whole (excluding Poland) plus imports minus exports was used as a proxy for the foreign demand that could potentially be met by Polish exports. The possible alternative of using exclusively EU imports (not including Poland) would not be a good proxy for foreign demand. This is because these imports represent only the fraction of the "potentially imported" demand that was actually met through imports and not the total aggregate demand for goods and services that could potentially be imported.

[6] Their argument for such a position can be summarised by noting that there are three main ways in which an increase in the profit share can affect the international competitiveness of an economy: (i) an increase in mark-ups (negative impact), (ii) a relative decrease of unit labour costs in relationship to unit material costs (positive impact), (iii) nominal depreciation of the domestic currency (positive impact). Therefore, the nominal exchange rate is already taken into account (the third case) and including it explicitly alongside the profit share variable "suffers from theoretical problems," according to these authors.

from Q1 2001 to Q4 2022 (total number of observations, $t = 88$). A uniform deflator (Polish GDP deflator[7]) was used for all data expressed in (or converted into) PLN.

The table below provides a description of the variables.

Table 1. Description of variables

Variable	Abbr.	Eurostat code (table)	Description
Real GDP	Y	B1GQ (namq_10_gdp) nominal, PD15_NAC (namq_10_gdp) deflator	Nominal gross domestic product in national currency deflated by GDP deflator
Real foreign GDP	Y^f	B1GQ, P6, P7 (namq_10_gdp) nominal GDP, exports, imports, PD15_NAC (namq_10_gdp) deflator, AVG (ert_bil_eur_q) exchange rate	Nominal GDP in EUR plus imports minus exports for the whole European Union (excluding Poland) converted to PLN and deflated by Polish GDP deflator
Real consumption	C	P31_S14_S15 (namq_10_gdp) nominal, PD15_NAC (namq_10_gdp) deflator	Nominal household and non-profit institutions serving household final consumption expenditure in national currency deflated by GDP deflator
Real investment	I	P51G (namq_10_gdp) nominal, PD15_NAC (namq_10_gdp) deflator	Nominal gross fixed capital formation in national currency deflated by GDP deflator
Real net exports	NX	P6 (namq_10_gdp) nominal exports, P7 (namq_10_gdp) nominal imports, PD15_NAC (namq_10_gdp) deflator	Nominal exports minus imports of goods and services in national currency deflated by GDP deflator
Real profits	Π	B2A3G (namq_10_gdp) nominal, PD15_NAC (namq_10_gdp) deflator	Gross operating surplus and mixed income adjusted by Gollin (2002)[8] method and deflated by GDP deflator
Real wages	W	D1 (namq_10_gdp) nominal, PD15_NAC (namq_10_gdp) deflator	Compensation of employees adjusted by Gollin (2002) method and deflated by GDP deflator
Profit share	h	B2A3G (namq_10_gdp) nominal profits, D1 (namq_10_gdp) nominal wages	$1-\frac{w}{w+\pi}$ where w is compensation of employees and π is gross operating surplus and mixed income, both adjusted by Gollin (2002) method
Real interest rate	r	MCBY (irt_lt_mcby_q) nominal, PD15_NAC (namq_10_gdp) deflator	EMU convergence criterion bond yields minus four times quarterly change in GDP deflator

Source: Author's own elaboration.

All the variables and their first differences (in log form when appropriate) used in the estimations have been subjected to Augmented Dickey-Fuller Test in order to test their order of integration.

The table below provides descriptive statistics of the dataset.

Table 2. Descriptive statistics

Variable	*Abbr.*	Unit	Mean	St. dev.	Linear trend
Real GDP	Y	millions PLN	410,292	96,477	3,745
Real foreign GDP	Y^f	millions PLN	11,904,064	955,867	24,835
Real consumption	C	millions PLN	247,668	47,889	1,851
Real investment	I	millions PLN	78,586	16,176	592
Real net exports	NX	millions PLN	1,306	13,005	419

7 Such treatment is common in similar studies. For example, **Hein and Vogel [2007]** use the private consumption deflator for all variables, while **Stockhammer et al. [2011]** use the GDP deflator for domestic variables. There could be an argument for using specific price level indexes for certain aggregates (private consumption deflator for consumption, private investment deflator for investment etc.), but a potential problem would be a distortion of the original (nominal) relationship between those variables in a given period. Moreover, not all the macroeconomic aggregates used in the model have their specific deflators readily available (gross operating surplus and mixed income, compensation of employees).

8 **Gollin [2002]** argued that the usual approach of calculating factor shares underestimated the wage share by not recognising that part of the income in smaller firms is in fact income from labour. This observation is particularly relevant for economies such as Poland with a large number of self-employed. He proposed an adjustment whereby employee compensation for self-employed is imputed so that they are deemed to earn, on average, a labour income equal to the average employee compensation in the economy.

Variable	*Abbr.*	Unit	Mean	St. dev.	Linear trend
Real profits	Π	millions PLN	155,706	42,045	1,619
Real wages	W	millions PLN	204,097	44,343	1,691
Profit share	h	percent	42.9	3.11	0.068
Real interest rate	r	percent	1.80	5.20	–0.107

Source: Author's own elaboration.

As shown in Table 8 in the Appendix, all the variables turned out to be I (1) except for the foreign real GDP (Y^f) and the profit share (h), both of which are I (0).

Results

At the core of the empirical analysis presented in this study are three equations for the respective components of output: consumption (equation 2), investment (equation 4), and net exports (equation 7). They were estimated with a trend term included using the ARDL Bounds test approach as developed by **Pesaran et al. [2001]** and further implemented as a software package in R language by **Natsiopoulos and Tzeremes [2022]**.

The $ARDL(p,q_1,\ldots,q_k)$ model with k independent variables has the following general form:

$$y_t = c_0 + c_1 t + \sum_{i=1}^{p} b_{y,i} y_{t-i} + \sum_{g=1}^{k} \sum_{l=0}^{q_j} b_{j,l} x_{j,t-l} + \epsilon_t. \tag{12}$$

The part of the formula contained within the first sum describes the autoregressive part of the model, where the dependent variable y is explained by the weighted sum of its lags, while the part under the second sum concerns the part explained by the vector of the regressors and their lags ([**Natsiopoulos, Tzeremes, 2022**]). The method was developed to address the problem of testing the existence of a level relationship between a dependent variable and a set of regressors, when it is not known if the regressors are stationary.

Consumption

The consumption function was estimated with the preferred lag order (based on Akaike's Information Criterion) of one lag on log$C$ and log$W$, and no lags of logΠ. The Bounds test for such a specification made it possible to reject the null hypothesis of no cointegration. The long-run multipliers (c_Π and c_W) for logΠ and log$W$ were highly statistically significant. Their values can be interpreted as the long-term marginal propensity to consume out of profits and wages respectively, with the value for wages being, as expected, higher than for profits.

Table 3. Consumption – Estimation Results

Formula	Lag order	Bounds test (p-value)	Variable	Long-run multiplier (p-value)
log$C$ ~ trend + logΠ + log$W$	1 0 1	cointegration (<0.01)	trend logΠ log$W$	–0.004 (0.514) 0.311 (<0.01) 0.624 (<0.01)

Source: Author's own elaboration.

The marginal effect of a change in the profit share on consumption may be then found by multiplying those multipliers by the mean values of the sample of $\frac{C}{\Pi}$ and $\frac{C}{W}$ respectively, that is 1.63 and 1.22 (as in equation 3). As expected, the marginal effect of a change in the profit share on consumption is negative and equal to -0.255:

$$\frac{\frac{\Delta C}{Y}}{\Delta h} = 0.311 * 1.63 - 0.624 * 1.22 = -0.255. \tag{13}$$

Investment

Two specifications of the investment function were tested: one with the real interest rate (r) as the additional regressor and one without it. The lag orders were chosen based on Akaike's Information Criterion. However, neither specification allowed for rejecting the null hypothesis of the Bounds test of no cointegration.

Table 4. Investment – Estimation Results

Formula	Lag order	Bounds test (p-value)	Long-run multipliers (p-values)
$\log I \sim \text{trend} + \log Y + h + r$	3 1 0 0	no cointegration (0.633)	not estimated due to the lack of cointegration
$\log I \sim \text{trend} + \log Y + h$	3 1 0	no cointegration (0.455)	not estimated due to the lack of cointegration

Source: Author's own elaboration.

Therefore, an unrestricted error correction model with both I (0) and I (1) variables was not estimated, and the ARDL model based on first differences was used,[9] with the following **results:**

Table 5. Investment – I(0) Estimation Results

Formula	Lag order	Variable	Long-run multipliers (p-value)
$\log I \sim \Delta \log Y + h + \Delta r$	2 0 0 0	$\log Y$ h r	1.996 (<0.01) 0.012 (0.943) −0.007 (0.927)
$\log I \sim \Delta \log Y + h$	2 0 0	$\log Y$ h	1.989 (<0.01) 0.012 (0.945)

Source: Author's own elaboration.

In both cases, the preferred lag order based on AIC was 2 lags for $\Delta logI$ and no lags for other variables. Neither specification provided any significant estimate for the profit share long-run multiplier. The inclusion of the real interest rate had almost no effect on the results, therefore the estimates from the more sparse model without it will be used for the calculation of the total effect. However, given that the only significant estimate is the long-run multiplier for $logY$, the above results will only impact the total effect through the multiplier (accelerator effect) channel.

Net exports

The net exports function was estimated with the preferred lag order (based on Akaike's Information Criterion) of one lag of $\frac{NX}{Y}$, one lag for h and no lags for the other variables. The Bounds test for such a specification allowed the rejection of the null hypothesis of no cointegration. Therefore an unrestricted error correction model was estimated, and long-run multipliers were extracted from it.

Table 6. Net Exports – Estimation Results

Formula	Lag order	Bounds test (p-value)	Var.	Long-run multipliers (p-values)
$\frac{NX}{Y} \sim \text{trend} + \log Y + \log Y^f + h$	1 0 0 1	cointegration (<0.01)	trend $\log Y$ $\log Y^f$ h	0.024 (<0.01) −0.546 (<0.01) −0.005 (0.908) 0.054 (0.614)

Source: Author's own elaboration.

[9] The profit share (h) turned out to be I(0) according to the ADF test (p-value = 0.048), so it was not first-differenced for the purposes of this estimation.

The only significant multiplier concerns the negative relationship between $\frac{NX}{Y}$ and log$Y$. Therefore, the above results will only impact the total effect through the multiplier effect channel, which is done in the next subsection, where the total effect is calculated.

Total effect

The calculation of the total long-run effect of the change in the profit share on real output is not a mere sum of the direct effects of this change on the endogenous GDP aggregates (consumption, investment and net exports), but should also take into account the accelerator effects, i.e. the impact of a change in real output on investment (assumed to be positive) and net exports (assumed to be negative). Therefore the formula was derived as in equation 9. However, given that the estimation did not provide statistically significant effects of the change in the profit share on investment (i_h) and net exports (x_h), by assuming those parameters to be zero, the formula simplifies to the following:

$$\frac{\frac{\Delta Y}{Y}}{\Delta h} = \frac{c_{\Pi}\frac{C}{\Pi} - c_W\frac{C}{W}}{1 - i_Y\frac{I}{Y} - x_Y}. \tag{14}$$

Therefore, there are three significant effects: the negative impact of the change in the profit share on consumption, the positive impact of the change in output on investment, and the negative impact of the change in output on net exports. Given that the sign of the total effect is determined by the negative impact of the profit share on consumption, the outcome of the estimation is a wage-led regime. However, the magnitude of the total effect is moderated by the latter two effects working through the indirect, multiplier channel:

$$\frac{\frac{\Delta Y}{Y}}{\Delta h} = \frac{-0.255}{1 - 1.996 * 0.193 + 0.546} = -0.220. \tag{15}$$

Therefore, the marginal effect of a change in the profit share on the long-run output of the Polish economy is negative and amounts to -0.220. The summary of the estimated effects can be found in the table below.

Table 7. Summary of estimated effects

Affected aggregate	Long-run marginal effect of Δh
Consumption (C)	−0.255
Investment (I)	0 (non-significant)
Net exports (NX)	0 (non-significant)
Total direct effect (C + I + NX)	−0.255
Total effect including indirect multiplier effect	−0.220

Source: Author's own elaboration.

Structural change test

Given the fact that the 2001–2022 timeframe included significant events that could have caused significant structural changes for the economy (namely, the country's EU accession in 2004, the GFC in 2008, and the COVID-19 pandemic in 2020), the three final models for consumption, investment and net exports were tested for structural changes through Generalised Fluctuation Tests. As shown in Table 9 in the Appendix, neither of the tests allowed the rejection of the null hypothesis of no structural change.

Discussion

The estimated long-run consumption multipliers indicate that the propensity to consume out of wages (0.624) is significantly higher than the propensity to consume out of profits (0.311). This is in line with both the theoretical assumptions of the neo-Kaleckian framework and the existing empirical literature for other countries.

Investment, on the other hand, seems to be not significantly affected by changes in the profit share, while being highly sensitive to output growth (1.989), which is also in line with the findings for many other developed economies.[10] This suggests that the profitability of businesses relative to the employees' compensation, as represented by the profit share, was not a significant stimulus for investment in the Polish economy. Other factors, such as future demand for products or services driven by expected consumption growth, may have also have a more substantial impact on investment decisions.

The data provided evidence for a strong accelerator effect in the Polish economy. The research highlights that investment decisions are significantly influenced by current output levels, which can be seen as a measure of overall economic activity. When output is high, indicating higher capacity utilisation, businesses are more likely to invest in expanding their productive capacity. This finding emphasises the importance of current economic conditions in driving investment.

Net exports did not indicate any significant relationship with the profit share, but they showed a high negative sensitivity to domestic output (–0.546). This implies that changes in the profit share do not have a substantial direct impact on Poland's net exports. Also demand conditions in trading partners, as proxied by foreign real GDP, were not determined as a significant factor. The research indicates that domestic output, which reflects the overall level of domestic aggregate demand, has a significant negative impact on net exports. This implies that a strong Polish domestic market can lead to increased pressure to meet domestic demand through imports.

These outcomes (taking into account those that are statistically significant) translate into: (i) a direct total effect of a change in the profit share on output of –0.255; and (ii) a total effect of a change in the profit share on output of –0.220, including both the direct effect and the indirect multiplier effects (positive on investment and negative on net exports). Therefore, the results of the estimation show that the Polish economy was in a wage-led regime from 2001 to 2022. This indicates that increases in the profit share could have been detrimental to output levels over the long run. This finding aligns with similar observations for many large advanced economies with robust domestic markets.

The insights provided by this study shed light on the dynamics of the Polish economy and contribute to a broader understanding of the relationship between profit shares, consumption, investment, and net exports. The findings underscore the significance of domestic demand as a driver of economic growth and highlight the need for careful evaluation of the impact of profit share changes on long-term economic performance, which should enrich the debate in Polish economics on many important issues such as the progressivity of the tax system, welfare benefits, and labour market institutions (including the levels of unionisation). Policymakers and stakeholders can use these insights to implement such pro-labour policies and develop strategies that promote sustainable growth by balancing income distribution, consumption patterns, and investment decisions to support domestic demand and overall economic well-being.

Conclusion

This study aimed to investigate whether the Polish economy operated under a wage-led or profit-led economic regime from 2001 to 2022, by analysing the effects of changes in functional income distribution on consumption, investment, and net exports. The results indicate that increases in the profit share had a signifi-

[10] E.g. **Onaran and Obst [2016]** found coefficients in the range of 1.722 to 2.929 for EU15 member states; while **Onaran and Galanis [2014]** found coefficients in the range of 1.561 to 3.343 in their study of G20 countries.

cant negative long-term impact on economic growth in Poland from 2001 to 2022. This suggests that the Polish economy operated under a wage-led regime during this period of time. The findings highlight the importance of considering income distribution dynamics when formulating economic policies and underscore the potential consequences of profit-led economic regimes on long-term growth.

Future research could explore the interaction of additional factors such as debt, monetary aggregates or the exchange rate with income distribution to gain a more comprehensive understanding of economic dynamics in Poland. Moreover, future studies could take into account a possible feedback loop between pro-capital and pro-labour policies between different countries.

Moving forward, it is crucial to continue monitoring income distribution patterns and their implications for sustainable economic development in Poland and beyond. By promoting an equitable income distribution, policymakers can foster inclusive and sustainable economic growth for the years to come.

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Appendix

Table A1. Stationarity of variables

Variable	ADF test	p-value	Stationarity
$\log Y$	–2.806	0.492	non-stationary
$\Delta\log Y$	–3.493	<0.01	stationary
$\log Y_{foreign}$	–3.799	0.022	stationary
$\Delta\log Y_{foreign}$	–4.933	<0.01	stationary
$\log C$	–3.053	0.143	non-stationary
$\Delta\log C$	–5.044	<0.01	stationary
$\log I$	–2.839	0.230	non-stationary
$\Delta\log I$	–3.912	0.017	stationary
NX	–3.079	0.132	non-stationary
ΔNX	–4.593	<0.01	stationary
$\log\Pi$	–3.101	0.123	non-stationary
$\Delta\log\Pi$	–4.748	<0.01	stationary
$\log W$	–3.092	0.126	non-stationary
$\Delta\log W$	–3.970	0.014	stationary
h	–3.479	0.048	stationary
Δh	–4.312	<0.01	stationary
r	–1.970	0.588	non-stationary
Δr	–7.123	<0.01	stationary

Source: Author's own elaboration.

Table A2. Generalised Fluctuation Tests (structural changes)

Model	S-statistic	p-value
$\log C \sim \text{trend} + \log\Pi + \log W$	0.840	0.107
$\Delta\log I \sim \Delta\log Y + h$	0.361	0.908
$\frac{NX}{Y} \sim \text{trend} + \log Y + \log Y^r + h$	0.608	0.399

Source: Author's own elaboration.