AOSIS

Is growth in the South African economy profit-led or wage-led?

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Orientation: This article assessed the impact of functional income distribution on economic growth, and how it can characterise the growth regime as profit-led or wage-led.

Research purpose: This study investigated whether the problem of falling wage share as a percentage of gross domestic product (GDP) may have characterised growth as wage-led or profit-led between 1975 and 2019 in South Africa.

Motivation for the study: Economic growth in South Africa has been low post the 2008 financial crisis and employees complain about insufficient wages.

Research design/approach and method: This article used the Keynesian aggregate demand model and conducted an autoregressive distributed lag (ARDL) approach to assess the presence of a long-run relationship between changes in income distribution and aggregate demand.

Main findings: The study found that the profit rate, rate of capacity utilisation and the real exchange rate have an influence on net exports. Profit rate and rate of capacity utilisation influenced aggregate consumption. Investment was affected by business confidence, profit rate, foreign demand and rate of capacity utilisation. Demand formation was exhilarationist and growth was profit-led. The foreign sector amplified the extent of profit-ledness.

Practical/managerial implications: Government should create policies to reduce inequality in income shares. Institutions should consider reformulating labour dynamics to manage the extent to which the foreign sector amplified the economy to be profit-led.

Contribution/value add: The South African economy is profit-led, inconsistent with developed country literature, which suggests that economies are generally wage-led. The findings highlight the importance of the foreign sector in determining the demand formation and growth regimes in the economy.

Keywords: demand-led growth; wage-led; profit-led; consumption; investment; net exports; South Africa.

Introduction

Since the 2008 financial crisis, growth in the South African economy has been sluggish. The problem of low economic growth presents major constraints to the livelihoods of citizens and the growth of firms. This article intends to establish the impact of functional income distribution on growth in the economy. Many economists regard the tendency of the effective distribution of income between wages and profits to affect aggregate demand and the growth rate of an economy as an empirical matter.

In effect, the neoliberal era of the post-1980s, together with other financial crises, particularly the 2008 financial crisis, have led to low growth, both in South Africa and globally, increased inequality, a declining wage share, and a rise in debt-led and export-led growth (Galanis & Onaran 2012; Onaran & Stockhammer 2013). These macroeconomic events have necessitated research around functional income distribution dynamics and the impact of such dynamics on growth in the South African economy (Bhaduri & Marglin 1990; Blecker 2002, 2016; Vogel & Hein 2009).

The extent to which functional income distribution affects aggregate demand depends on the relative size of the reactions of consumption, investment and net exports, ceteris paribus. If the total effect is negative, then the demand formation is said to be stagnationist, otherwise it is regarded as exhilarationist. Correspondingly, if increases in the wage share led to increases in the

growth rate, the growth regime is regarded as wage-led; otherwise, it is regarded as profit-led (Yılmaz 2015).

From the neoclassical viewpoint, technological progress and globalisation are regarded as the leading determinants of falling real wages and growth rates globally (Onaran & Stockhammer 2013; Oyvat, Öztunalı & Elgin 2020). Neoclassicists argue that technological progress has led to the displacement of workers and the race to the bottom in the wage share. The neoclassical argument creates space for supply-side factors in functional income distribution as an explanation for the falling wage share and growth rates.

However, the neo-Kaleckian (and post-Keynesian) argument on growth and distribution offers the theoretical possibility that economic growth may be guided by the distribution of income in favour of workers or capitalists. In the classical tradition, growth is regarded as being demand driven, and the Kaleckian school of economic thought proclaims that a higher wage share will have expansionary effects in the economy (Onaran & Stockhammer 2013). In addition, classical economists argue that the demand regime in an economy also depends on structural factors such as trade openness, inequality and credit (Oyvat et al. 2020).

This present study is significant because it presents policymakers and researchers with the possibility that growth performance in the South African economy may be driven by the dynamics of functional income distribution.

The objective of this study is to establish whether the growth rate increases or decreases as a result of increases or decreases in the wage share in South Africa. This article contributes to the literature around wage-led and profit-led growth theory from the demand-led growth theory and the South African attempts to resolve low-growth problems. Furthermore, the addition of business confidence to the investment function emphasises its importance in determining investment dynamics in the South African context. This study is unique because no precise literature has previously made this contribution to the South African economy. The rest of the article is organised in four sections as follows: Section 'Literature review' provides an overview of the relevant literature, whilst Section 'Methodology' discusses the methodology applied to the present study. Section 'Data and discussion of estimation results' presents the data and discussion of the estimation results and Section 'Conclusion' provides the end result of this study.

Literature review
Wage-led versus profit-led growth theory

Economic growth in an open macroeconomy can either be wage-led or profit-led and the demand formation can either be exhilarationist or stagnationist. The demand formation determines whether the economy is wage-led or profit-led. The unresolved question is: how does the distribution of income between wages and profits affects the aggregate demand, and thus, the growth rate in the South African

economy? In answering this question, this article adopted the post-Keynesian approach, which provides clarity to the idea of wage-led versus profit-led regime 'according to the relative size of consumption differential between agents, the responsiveness of investments to profit dynamics and the elasticity of net exports to labour costs' (Yilmaz 2015:815).

In that respect, increases in the wage share can either decrease or increase economic growth, depending on the country's defined demand formation regime (Oyvat et al. 2020). For instance, the total effect of a decrease in the wage share on aggregate demand and growth depends, as Yılmaz (2015) and Onaran and Stockhammer (2013) pointed out, on the relative size of the reactions of consumption, investment and net exports to the changes in income distribution. Nonetheless, according to the original model presented by Kalecki (1938), increases in the wage share always lead to increases in aggregate demand.

Broadly speaking, there are two contesting schools of economic thought on this research area, namely the neoclassical and post-Keynesian. Neoclassical economists put forward that the wage share is mainly affected by supply-side factors such as technological progress, globalisation and financialisation; whereas, the post-Keynesian theory postulates that the wage share is affected by factors embedded in the country's aggregate demand. Accordingly, this section presents a critical discussion of the neoclassical and post-Keynesian theories.

Firstly, neoclassical models view wages as a cost item only. The view that wages are only a cost item postulate that a decrease in the wage share will make the domestic economy more competitive and, therefore, improve net exports, investment and profitability. In addition, they highlight technological progress as a key determinant of income distribution. This is because the literature argues that technological progress is skill-biased and rations the labour market.

Critics of neoliberalism contend that neoliberalism has seen great globalisation (in production and trade) and this move has negatively impacted the wage share (Onaran & Stockhammer 2013). According to the classical thinking, globalisation has increased the pool of unskilled labour and has resulted in major labour market distortions and labour mobility (Stirati 2011). These results have weakened the bargaining power of workers and subsequently led to a decrease in the wage share.

Furthermore, the critics argue that the greater financialisation of economies has resulted in growing consumer and public debt, and they further argue that indebtedness increases the fragility of the economy and depresses demand (Forslund 2013). In addition, welfare state retrenchments and changes in the labour market conditions are significant contributors to the global decline in wage share, which ultimately has a negative effect on growth (Dünhaupt 2013; Stockhammer

2013). Financialisation has compromised the bargaining position of workers because of firms' increased ability to diversify investments and production and has empowered shareholders.

Secondly, according to the post-Keynesian theory models, wages have a dual role as both a cost and a source of demand (Onaran & Stockhammer 2013). The wage share as a source of demand affects aggregate demand through consumption, investment and net exports. Consumption is a function of wages and profits, and it decreases when the labour share decreases because the consumption effects of a wage decrease are greater than the consumption effects of a profit decrease.

Many studies indicate that investment is a function of profits and demand and an increase in the profit share tends to increase investment. However, investor confidence has become a major driver of investment dynamics in emerging economies and improvement in the business confidence improves aggregate investment (Blecker 2002; Storm & Naastepad 2013). This article highlights the importance of business confidence in generating investment in the South African economy.

Net exports are a function of relative prices, which are a function of unit labour costs and, in turn, increases in unit labour costs (which are related to the labour share) will lead to a deterioration in net exports (Stockhammer & Onaran 2012). However, Razmi (2015) acknowledged that the consequences of distributional changes to long-run growth through the net exports channel remain largely unexplored. Interestingly, the profit-led regime is largely characterised by the trade channel in some countries, whilst it is led by the domestic investment function in others. Thus, the lack of theoretical consensus makes the dynamics of wage-led versus profit-led growth theory an issue for empirical investigation.

Studies on wage-led versus profit-led growth theory

Since Bhaduri and Marglin's (1990) seminal article, some economists have been investigating whether different economies are wage-led or profit-led. Several studies show that the global economy is mostly wage-led, even though the mainstream assumption is that economies are always profit-led (Onaran 2013).

Galanis and Onaran's (2012) investigation into the effects of a change in the wage share on the growth in several countries from 1960 to 2007 found that a decrease in the wage share led to lower growth in the Eurozone but stimulated growth in Canada, Australia, Argentina, Mexico, China, India and South Africa. As Galanis and Onaran (2012) attempted to model the global multiplier to assess the impact of simultaneous changes in the wage share on growth in different countries, explicit exchange rate estimation could reinforce the results of their study.

A study by De Oliveira and Souza (2021), using a panel data approach in which country-specific structural factors and possible endogenous relationships in net exports and investment function were explicitly assessed, found that growth was wage-led in developed countries and profit-led in developing countries (such as Latin American). Although it has been justified in De Oliveira and Souza's (2021) article, an explicit inclusion of the consumption function in their analysis would further enrich De Oliveira and Souza's (2021) study because consumption differentials are important in determining income distribution and the effects on growth. This presents a limitation for their study and, therefore, consumption dynamics have been included in this study.

A comprehensive analysis by Oyvat et al. (2020), using a cross-country panel data set consisting of 41 countries reflects those countries with a higher level of openness are likely to be profit-led, whilst countries with lower wage inequality are mostly wage-led and countries with greater private credit-to-gross domestic product (GDP) ratio are more likely to be profit-led. However, Aboobaker (2019) cautioned that the conclusions of the neo-Kaleckian models may not be robust in a developing country context where there is extreme inequality and where there are polarised consumption patterns. For example, the results of a causality test conducted by Ankabi (2016) showed that economic growth does not necessarily promote the equal distribution of income in society but as income distribution begins to equalise, economic growth rises. However, it remains difficult to establish the direction of the relationship between economic growth and income distribution. Furthermore, the Kaleckian arguments have less explanatory power in contexts where domestic production is oriented away from domestic consumption.

In a theoretical article comparing several Asian and Latin American economies, Fields and Wan (1989) argued that the rapid growth in newly industrializing countries (NICS) has been made possible by market wage determination. Notably, the relationship between demand and distribution is likely to involve two-way causality that creates significant identification challenges (Blecker 2016). Therefore, it is evident that the direction of the relationship between wages, demand and growth is not straightforward.

Interestingly, Gibson and Van Seventer (2000) introduced another matter of fiscal and monetary policy responsiveness to the dynamics of distribution and growth. Estimating a dynamic stochastic general equilibrium (DSGE) model, they showed that the employment and growth effects of nominal wage increases depend on induced monetary and fiscal policies when there is monetary policy dominance. Although Gibson and Van Seventer's (2000) study is comprehensive, small open economy DSGE modelling has the potential to further highlight policy effectiveness and the impact of monetary policy changes on employment, inequality and growth.

In addition, in the context of South Africa, Klein (2012) indicated that the link between real wage and labour productivity is substantially weaker than in other emerging markets. As a result, real wage increases may surpass productivity growth in some sectors.

In summary, the growing literature around wage-led versus profit-led growth fails to account for the specific country and cross-country dynamics in terms of consumption, investment and net exports. Differences in the consumption patterns between agents and within agents require further exploration. Even though there is a view that profit-ledness or wage-ledness is often driven by either the investment or net export's function, these have not been adequately explored by further looking at the short- and long-run implications of policy changes and the performance of macroeconomic indicators.

Furthermore, general equilibrium models have the potential to simplify the identification of a country as either being wage-led or profit-led. These models may also assist in identifying the contributors to the growth regime, and the required policy interventions to achieve stable growth. Apart from the work of Blecker (2002), Storm and Naastepad (2013) and Oyvat et al. (2020), many demand-side and supply-side growth models do not account for business confidence as an explanatory variable in investment dynamics.

Relatedly, structural factors that are under-researched and which may be contributing to the declining wage share and growth rates, include the market and bargaining power of firms, corruption, stagnating population growth and inequality, technological changes, balance of payment conditions, fiscal and monetary policy changes, tax policy changes, indebtedness and privatisation. This study did not venture into these factors but rather focused on wage-led versus profit-led growth estimation and analysis from the demand-side in the South African context.

Stylised facts regarding the factors affecting the wage-ledness or profit-ledness in South Africa

This section presents a discussion of stylised facts in the context of the South African economy about functional income distribution and related variables, such as wage share, economic growth, inequality, balance of payments, credit and technological progress and how these variables may provide indications of whether the South African economy was wage-led or profit-led during the period from 1975 to 2019.

An analysis of the data between 1975 and 1980 in terms of relationship between the growth rate and the labour share shows that the average decline in the labour share was accompanied by average increases in economic growth (See Appendix A No. 1), which is consistent with Kalecki's (1938) exposition. Furthermore, between 1980 and 2002 the labour

share remained above 50%, and in the same period, growth remained promising. The period from about 2002 leading up to the 2008 financial crisis was characterised by high levels of growth and a declining labour share. However, post the 2008 crisis growth has been sluggish and the labour share has been steadily increasing. This observation would suggest that the South African economy post the 2008 financial crisis is profit-led.

The World Bank (2018) confirmed that extreme inequality within labour classes has become a major constraint to economic growth in South Africa. The stylised facts on economic growth (see Appendix A No. 1) and the Gini coefficient (measure for inequality) in the South African economy (see Appendix A No. 2) show that there is no observable relationship between the two variables because neither period of low or high growth are necessarily associated with high or low inequality. Inequality has been high (ranging between 59.1% and 63.5%) from 1975 to 2019. However, this observation could mean that growth is not distributional in the South African economy, and this phenomenon may require further research.

Moreover, there seems to be no observable relationship between inequality and movements in the labour share as a percentage of GDP either (see Appendix A No. 3). Theoretically, it has often been argued that there is a negative relationship between the Gini coefficient and growth, even though this is not always observed (Niyimbanira 2017).

In the South African economy, there is no observable relationship between technical progress as measured by research and development, R&D, and the labour share (see Appendix A No. 4). In fact, technical progress as a percentage of GDP has been very low (close to zero). However, if there were increases in technical progress associated with increases in the labour share and growth, it would lead to the deduction that the economy is possibly wage-led.

In the South African context, the observed relationship between the labour share and the debt-to-GDP ratio (see Appendix A No. 5) shows that there is no generally significant relationship. Between 1975 and 1980 the increases in the labour share were associated with increases in the debt-to-GDP ratio. Between 1980 and 1990 debt remained relatively low (below 30%) and the labour share remained above 50%. The 1990s were characterised by high levels of the debt-to-GDP ratio, whilst the labour share saw an infinitesimal decline. The debt-to-GDP ratio sharply declined in the early 2000s leading up to the 2008 financial crises, whilst the labour share was steadily declining. After the 2008 financial crisis there has been a sharp rise in the debt-to-GDP ratio, whilst the labour share has also been steadily increasing. This observation would suggest that the South African economy is partially wage-led.

From the stylised facts in terms of the labour share, growth rate and current account balance as a percentage of GDP

(see Appendix A No. 6) it can be inferred that often when the labour share increases, the current account balance as a percentage of GDP tends to deteriorate. This phenomenon would imply that the South African economy is profit-led, as Oyvat et al. (2020) observed that trade openness is often associated with being profit-led. It is even more interesting to notice that movements in the current account have a substantial effect on growth as, at least as seen in the descriptive data, growth moves closely with the current account balance as a percentage of GDP.

Methodology

The theoretical model

This section of the article provides an open economy model with two agents (capitalists and workers), as inspired by the work of Bhaduri and Marglin (1990) and the study conducted by Yılmaz (2015) on the Turkish economy. One of the strengths of this model is that it allows for wage-led and profit-led regimes and lays the basis for the empirical analysis of the effects of the dynamics of functional income distribution on demand (Yılmaz 2015).

Regarding consumption, investment, government spending and net exports, the Keynesian aggregate demand model is expressed as follows:

$$AD = Y = C(Y) + I(Y, \pi, b) + G + NX(Y^f, z, r, e) \qquad \text{[Eqn 1]}$$

where AD, aggregate demand, Y, domestic national income, Y^f, foreign output, C, aggregate consumption, I, aggregate investment, G, government spending and NX, net exports. The parameters π, profit share, b, business confidence, z, rate of capacity utilisation, r, profit rate and e, exchange rate.

Consumption effect

In this case, the normal Keynesian consumption function is introduced. As there are two agents, namely capitalists and workers, where the capitalists earn profits and the workers earn wages and the two agents have different propensities to consume. Put differently, in the Kaleckian and Kaldorian tradition it is posited that savings propensities vary across social classes (Kohli 2018). Taking from Yilmaz (2015) and expanding from equation (1) the aggregate consumption behaviour is given by:

$$C(Y) = c_w W + c_\pi \Pi \qquad \text{[Eqn 2]}$$

where W = total wages, Π = total profits and ($c_w > 0$) and ($c_\pi > 0$) is the marginal propensity to consume of workers and the marginal propensity to consume of capitalists, respectively. The assumption is that workers have a higher propensity to consume than capitalists do. In other words, income redistribution from capitalists to workers increases consumption (Oyvat et al. 2020).

As:

$$Y = W + \Pi \qquad \text{[Eqn 3]}$$

We can rewrite (2) as:

$$C = c_w Y + (c_\pi - c_w) \Pi \qquad \text{[Eqn 4]}$$

As per a structuralist approach, divide equation (4) by the total capital stock (K) to normalise and get:

$$\frac{C}{K} = c_w z + (c_\pi - c_w) r \qquad \text{[Eqn 5]}$$

where z is the rate of capacity utilisation and r is the profit rate. We divide by the capital stock to get the variables' effective rate.

Investment effect

Expanding on equation (1), investment is a function of domestic income, profit share and business confidence. In addition to the model developed by Yılmaz (2015), this article includes business confidence because in South Africa, investment is often said to be affected by the business climate and investors' attitude. Moreover, capital accumulation (investment) demand is determined by the profit rate and the rate of capacity utilisation. The assumption is that the profit share is related to the mark-up set by firms over their unit labour costs. Furthermore, it is assumed that there are static expectations and that the South African Reserve Bank (SARB) has maintained inflation within target.

As Kaldor (1957) proposed, slightly modify the investment function by adding business confidence and endogenously define the investment function as:

$$I = \phi_0 Y^{\phi_1} \pi^{\phi_2} b^{\phi_3} \qquad \text{[Eqn 6]}$$

Let us assume that investment positively depends on these variables. Then, as per the structural approach divide equation (6) by the total capital stock and we get:

$$\frac{I}{K} = I(z, r, b_k) = \phi_0 + \phi_1 z + \phi_2 r + \phi_3 b_k \qquad \text{[Eqn 7]}$$

Given that $\phi_1 > 0$ is the accelerator effect, $\phi_2 > 0$ is the profit effect and $\phi_3 > 0$ implies that improving business confidence raises investment. Invariably, increases in the wage share led to the squeezing of profits, which ultimately decreases aggregate investment and capacity utilisation (Oyvat et al. 2020). Furthermore, a high profit share is associated with a higher rate of capacity utilisation at equilibrium (Bhaduri & Marglin 1990) and that at the centre of investment formation is profitability (Kohli 2018). However, it is noteworthy that the financial sector is not explicitly recognised in this model.

Net exports effect

Net exports depend primarily on domestic and foreign income, profit rate, rate of capacity utilisation and the exchange rate. Concisely, net exports rely on the development of foreign and domestic demand because if domestic demand increases, as captured by the rate of capacity utilisation, net exports deteriorate (Kohli 2018).

Expanding on equation (1), net exports are given by:

$$NX = \alpha_0 Y^{\alpha_1} \prod^{\alpha_2} \left(\frac{EP^f}{P}\right)^{\alpha_3} Y^{f^{\alpha_4}}$$ [Eqn 8]

where E = nominal exchange rate, P^f = price of foreign goods and P = price of domestic goods. As the real exchange rate is given by $e = \frac{EP^f}{P}$, it is used to measure international competitiveness. That is, increases in the real exchange rate means improvements in the domestic competitiveness (Oyvat et al. 2020). Divide equation (8) by the total capital stock as per the structural approach and get:

$$\frac{NX}{K} = NX\left(z, r, e, y^f\right) = \alpha_0 + \alpha_1 z + \alpha_2 r + \alpha_3 e + \alpha_4 y^f$$ [Eqn 9]

Given that ($\alpha_1 < 0$) increases in capacity utilisation increases imports, ($\alpha_2 > 0$) increases in the profit share tend to improve exports, ($\alpha_3 > 0$) because a depreciation improves net exports (as per the Marshall–Lerner condition) and ($\alpha_4 > 0$) increases in world income improves domestic exports. More precisely, ($\alpha_2 > 0$) because increases in domestic unit labour costs relative to unit labour costs in the trading partners reduce international competitiveness (Oyvat et al. 2020).

Total effect

The assumption is that government spending does not respond to functional income distribution, $\bar{G}$ and the marginal effect of wage share on consumption is positive and negative for investments and net exports (Kohli 2018). Considering equilibrium in the goods market and the effects of dynamism in functional income distribution on this equilibrium, it follows that:

$$\frac{Y}{K} = \frac{C}{K} + \frac{I}{K} + \frac{\bar{G}}{K} + \frac{NX}{K}$$ [Eqn 10]

Recall that $r = \pi z$ and substitute equations (5), (7) and (9) into equation (10) to get the following:

$$z^* = \frac{\phi_0 + \phi_3 b_k + \alpha_0 + \alpha_3 e + \alpha_4 y^f + \bar{g}}{\left(1 - c_w - \phi_1 - \alpha_1\right) + \left(c_w - c_\pi - \phi_2 - \alpha_2\right)\pi}$$ [Eqn 11]

The economy is exhilarwationist if $\frac{\partial z^*}{\partial \pi} > 0$ and it is stagnationist otherwise. Alternatively, the economy is exhilarationist, if $((c_w - c_\pi) + \phi_2 + \alpha_2 > 0)$, and stagnationist otherwise. This means that the economic response of a regime depends on the sensitivity of consumption, investment and net exports to the profit rate.

At equilibrium, an economy is said to be profit-led if $\frac{\partial Y^*}{\partial \pi} > 0$, otherwise it is wage-led. Therefore:

$$\frac{\partial Y^*}{\partial \pi} = \frac{\phi_2\left(1 - c_w - \phi_1 - \alpha_1\right) - \phi_1\left(1 - c_w - c_\pi - \phi_2 - \alpha_2\right)}{\left(1 - c_w - \phi_1 - \alpha_1\right) + \left(c_w - c_\pi - \phi_2 - \alpha_2\right)\pi} Z^* > 0$$ [Eqn 12]

If the economy is exhilarationist, an increase in π increases z^* and that, in turn, spurs investment (accelerator effect). In that case, the two effects are positive and the economy is

necessarily profit-led. However, if the economy is stagnationist, the two effects have opposite signs, so that the economy may be either wage-led or profit-led (Yılmaz 2015).

Estimation technique

The estimation used a single equation approach for consumption, investment and net exports, namely equations (5), (7) and (9), respectively. The study used the autoregressive distributed lag (ARDL) technique because of its ability to capture the long- and short-run cointegrating relationship amongst variables and because it has been used by scholars conducting similar studies, such as Oyvat et al. (2020), Vogel and Hein (2009) and Blecker (2016).

Expanding on the given theoretical equations, the cointegration format of the respective equations is as follows:

Equation (5)*:

$$\Delta\left(\frac{C}{K}\right)_t = \lambda_0 + \lambda_1\left(\frac{C}{K}\right)_{t-1} + \lambda_2 c_w z_{t-1} + \lambda_3\left(c_\pi - c_w\right)r_{t-1} +$$
$$\lambda_4\Delta\left(\frac{C}{K}\right)_{t-i} + \lambda_5 c_w \Delta z_{t-i} + \lambda_6\left(c_\pi - c_w\right)\Delta r_{t-i} + \eta ECM_{t-1} + \varepsilon_t$$ [Eqn 5]

Equation (7)*:

$$\Delta\left(\frac{I}{K}\right)_t = \delta_0 + \delta_1\left(\frac{I}{K}\right)_{t-1} + \delta_2 z_{t-1} + \delta_3 r_{t-1} + \delta_4 b_{kt-1} + \delta_5\Delta\left(\frac{I}{K}\right)_{t-i} +$$
$$\delta_6\Delta z_{t-i} + \delta_7\Delta r_{t-i} + \delta_8\Delta b_{kt-i} + \zeta ECM_{t-1} + \varepsilon_t$$ [Eqn7]

Equation (9)*:

$$\Delta\left(\frac{NX}{K}\right)_t = \mu_0 + \mu_1\left(\frac{NX}{K}\right)_{t-1} + \mu_2 z_{t-1} + \mu_3 r_{t-1} + \mu_4 e_{t-1} + \mu_5 y^f_{t-1} +$$
$$\mu_6\Delta\left(\frac{NX}{K}\right)_{t-i} + \mu_7\Delta z_{t-i} + \mu_8\Delta r_{t-i} + \mu_9\Delta e_{t-i} +$$
$$\mu_{10}y^f_{t-i} + \rho ECM_{t-1} + \varepsilon_t$$ [Eqn 9]

for $t = 1, \ldots T$ and $i = 1, \ldots N$

In these equations, Δ captures the first-order differences, and the coefficients, such as δ in equation (5)*, capture the long-run and short-run effects. The F-test static is used to establish the existence of a cointegration relationship in each equation. To continue to conduct an ARDL estimation, the variables must be cointegrated of order one or zero, that is, I (1) or I (0). Thereafter, as per Granger (1988), the error correction term (ECT) is assessed to establish the presence of long-run causality between the variables. The error correction mechanism (ECM) for each respective equation is modelled as follows:

$$\Delta\left(\frac{C}{K}\right)_t = \beta_0 + \beta_1\Delta\left(\frac{C}{K}\right)_{t-i} + \beta_2 c_w\Delta z_{t-i} +$$
$$\beta_3\left(c_\pi - c_w\right)\Delta r_{t-i} + \eta ECM_{t-1} + \varepsilon_t$$ [Eqn 5]**

$$\Delta\left(\frac{I}{K}\right)_t = \gamma_0 + \gamma_1\Delta\left(\frac{I}{K}\right)_{t-i} + \gamma_2\Delta z_{t-i} +$$
$$\gamma_3\Delta r_{t-i} + \gamma_4\Delta b_{kt-i} + \zeta ECM_{t-1} + \varepsilon_t$$ [Eqn 7]**

$$\Delta(\frac{NX}{K})_t = \theta_0 + \theta_1\Delta(\frac{NX}{K})_{t-i} + \theta_2\Delta z_{t-i} + \theta_3\Delta r_{t-i} +$$

$$\theta_4\Delta e_{t-i} + \theta_5\Delta y^f_{t-i} + \rho ECM_{t-1} + \varepsilon_t$$

[Eqn 9]**

for $t = 1, ... T$ and $i = 1, ... N$

The coefficient in front of ECM in the respective equations must be significant, negative and between 0 and –1 to signal the presence of a long-run causal relationship Yildirim (2017).

To test for stationarity amongst all the variables, unit root tests using the standard augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests were performed. To determine the optimal lag for each of the three equations, we specified a standard Vector Autoregressive (VAR) technique because choosing the lag length arbitrarily may lead to multicollinearity and statistically non-significant coefficients in the model Ngozi (2018). The Akaike information criterion (AIC), Schwarz information criterion (SIC) and Hannan–Quinn criterion (HQC) were used to determine the optimal lags and stability conditions. Thereafter, the three ARDL equations were estimated to assess the effect of income distribution on consumption, investment and net exports. To assess the presence of serial correlation, the study conducted the Breusch–Godfrey serial correlation test. Thereafter, robustness tests for heteroscedasticity, normality of the residuals and model specification were conducted for all three equations.

Data and discussion of estimation results

Data and limitations

The study used aggregate quarterly data that are seasonally adjusted, starting from 1975 to 2019 and available from the SARB, for consumption, investment, net exports, GDP, nominal exchange rate and import and export price indices. The data for capital stock and profits were collected from the SARB but as it is published in yearly intervals, EViews was used to convert the data from low to high frequency data by means of quadratic interpolation method. The Organisation for Economic Co-operation and Development (OECD) total GDP by expenditure approach was used as a proxy for world income (Y^f). Data for business confidence were collected from the Bureau of Economic Research at Stellenbosch University. The period of analysis was chosen on the basis that the data for business confidence were available from 1975 onwards.

The limitations of the data include the EViews conversion, as the software does not give the exact data but estimated averages. All the data utilised are susceptible to accounting and aggregation errors. The use of proxies may introduce instrumental variable bias to the regression analysis. Moreover, as this is a growth model, it follows that the results may suffer from unobserved heterogeneity and the results of this study should be interpreted as indicative. Although Ankabi (2016) attempted to conduct a duality test between growth and income distribution, the unobserved heterogeneity that arises from such dual causality remains difficult to account for, which is also a limitation of this study.

Results

Table 1 shows that all variables are found to be stationary after first differencing at the 5% level of significance when using PP. When using the ADF only, consumption is nonstationary, even after first differencing, as it contains a trend and when the trend is included, consumption is stationary after first differencing. Effectively, all the variables are integrated of order one, I (1), at the 5% level of significance and an ARDL approach can be conducted.

Equations (5), (7) and (9) have optimal lags of 2, 1 and 2, respectively. For equations (5) and (9), the study used the AIC and HQC, whilst for equation (7), it used the SIC and HQC. These optimal lags all satisfy the stability condition.

The effect of a change in income distribution on aggregate consumption is estimated by equation (5)*. An ARDL model was estimated, and a Wald test was conducted on the nonsignificant coefficients. The p-value of the Wald test is 0.5154 (above 5%), indicating that indeed the real exchange rate and business confidence are individually redundant in the consumption equation. Then, as ARDL is being estimated by the Ordinary Least Squares (OLS) technique, we estimate the parsimonious model of equation (5)* and the results are presented in Table 2.

Foreign income (y^f), exchange rate (e) and business confidence (b_k) have no effect on domestic consumption because their coefficients are statistically equal to zero as seen in Table 2. The constant term is insignificant.

To be certain about the presence of a long-run relationship between the dependant variable and the regressors, a long run form and bounds test was estimated. The F-statistic of the bounds test is 13.6239, which is greater than 2.62 and 3.79, consistent with I (0) and I (1), respectively, at a 5% level of significance. This implies that a long run relationship exists amongst the variables.

TABLE 1: Unit root test results.

Variable	Variable at level		Variable at first difference	
	ADF	PP	ADF	PP
C / K	0.5477	0.7246	0.0009	0.0000**
I / K	0.5442	0.6911	0.0000**	0.0000**
NX / K	0.0020**	0.0000**	0.0001**	0.0000**
r	0.9610	0.9998	0.0000**	0.0000**
z	0.8076	0.7879	0.0000**	0.0000**
e	0.5159	0.5512	0.0000**	0.0000**
y^f	0.7981	0.6558	0.0000**	0.0000**
b_k	0.0027**	0.0159**	0.0000**	0.0000**

ADF, augmented Dickey–Fuller; PP, Phillips–Perron.
**, 5% level of significance.

TABLE 2: Short-run and long-run autoregressive distributed lag model results for *C/K*, *I/K*, and *NX/K*.

Variable	C / K		I / K		NX / K	
	Coefficient	p	Coefficient	p	Coefficient	p
ΔECM_{t-1}	-0.0162	0.0000**	-0.1762	0.0000**	-0.2706	0.0000**
Short-run effects						
$\Delta(\frac{C}{K})_{t-1}$	-0.1965	0.0040**	-	-	-	-
$\Delta(\frac{I}{K})_{t}$	-	-	-0.1762	0.0000**	-	-
$\Delta(\frac{I}{K})_{t-1}$	-	-	-0.1944	0.0027**	-	-
$\Delta(\frac{NX}{K})_{t}$	-	-	-	-	-0.2706	0.0000**
$\Delta(\frac{NX}{K})_{t-1}$	-	-	-	-	-0.2855	0.0004**
$\Delta(\frac{NX}{K})_{t-2}$	-	-	-	-	-0.2066	0.0069**
Δr_t	-	-	0.0321	0.0031**	1.1025	0.0005**
Δr_t	0.3524	0.0141**	-	-	-	-
Δz_t	0.1220	0.0009**	0.0612	0.0000**	-0.0358	0.0348**
Δe_t	-	-	-	-	-0.9503	0.0196**
Δy_t^f	-	-	0.0182	0.0001**	-	-
Δb_k	-	-	1.7221	0.0001**	-	-
Long-run effects						
r	3.6558	0.0000**	0.1822	0.0001**	-	-
z	-	-	0.3473	0.0000**	-0.1322	0.0261**
e	-	-	-	-	1.0627	0.0248**
y^f	-	-	-0.0176	0.0215**	-	-
b_k	-	-	9.7746	0.0057**	-	-
Constant	-	-	-0.0569	0.0028**	0.0563	0.0092**
R-squared	0.5685	-	0.4399	-	0.6648	-
Adjusted *R*-squared	0.5505	-	0.4336	-	0.6403	-

**, 5% level of significance.
ECM, error correction mechanism.

Diagnostic tests were conducted for this model, and it was found that the normality histogram indicates that the residuals are normally distributed. To assess if the model is correctly specified, a Ramsey RESET test was conducted and the *p*-value is 0.4314, which is above 5%, indicating that the model is correctly specified. The results of the Breusch–Godfrey test for serial correlation show that the model does not suffer from serial correlation because the *p*-value is 0.2437, which is above 5%. To test if the residuals are homoscedastic, a white test (with HAC Newey–West coefficient covariance matrix and without cross terms) was conducted and the *p*-value was 0.0679, which was above 5% indicating that the model is homoscedastic. After log transformation, the *p*-value increases to 0.1274, which is substantially above 5%.

The effect of a change in income distribution on aggregate investment is estimated by equation (7)*. An ARDL model was estimated and a Wald test was conducted on the insignificant coefficient. The *p*-value of the Wald is 0.6689 (above 5%), indicating that the real exchange rate is

redundant. Then, as ARDL was being estimated by the OLS technique, we estimated the parsimonious model of equation (7)* and the results are presented in Table 2.

To confirm the presence of a long run relationship between the dependent variable and the regressors, a long run form and bounds test was conducted. The *F*-statistic is 18.0575, which is greater than 2.62 and 3.79, consistent with I (0) and I (1), respectively, at 5% level of significance. This confirms the presence of a long run relationship amongst the variables.

Some diagnostic tests were conducted to establish the credibility of the results. The normality histogram indicates that the residuals are normally distributed. The Ramsey Regression Equation Specification Error Test (RESET) provides a *p*-value of 0.8574, which is above 5%, indicating that the model is correctly specified. The Breusch–Godfrey test shows that the model does not suffer from any serial correlation because the *p*-value is 0.7125, which is above 5%. For heteroscedasticity, the Harvey test after log transformation and choosing the HQC info criterion and Heteroscedasticity and Autocorrelation Consistent (HAC) (Newey-West) coefficient covariance matrix was conducted, the *p*-value is 0.1774, which is above 5%, suggesting that the residuals are homoscedastic.

The effect of a change in income distribution on net exports is estimated by equation (9)*. In Table 2, the results of an estimated ARDL model are presented, and a Wald test was conducted on the non-significant coefficients. The *p*-value of the Wald test is 0.2224 (above 5%), indicating that foreign demand and business confidence are redundant in the short-run.

To ascertain the presence of a long-run relationship, a long run form and bounds test was conducted. The *F*-statistic of the bounds test is 4.0743, which is greater than 2.62 and 3.79, consistent with I(0) and I(1), respectively, at a 5% level of significance. This implies that a long-run relationship exists amongst the variables.

To assess the credibility of the model, some diagnostic tests were conducted. The normality histogram indicates that the residuals are normally distributed. The Ramsey RESET test for model specification gives a *p*-value of 0.0749, which is above 5%, indicating that the model is correctly specified. The Breusch–Godfrey test shows that the model does not suffer from serial correlation because the *p*-value is 0.3496, which is above 5%. To test for the presence of heteroscedasticity, the ARCH (autoregressive conditional heteroskedasticity) test was conducted because net exports have periods of negative records, using AIC and HAC (Newey-West) coefficient covariance matrix specification, the *p*-value is 0.1114, which is above 5% and therefore the residuals are homoscedastic.

Discussion
Consumption
Looking at Table 2, it is expected that foreign income and business confidence do not affect domestic consumption.

However, it is noteworthy to see that exchange rate movements have no effect on the country's imports. The demand effect z has the expected sign and is statistically significant ($p < 0.05$), which means that increases in domestic income would increase aggregate consumption. However, the profit rate effect has an unexpected sign and is statistically significant ($p < 0.05$). This suggests that a redistribution from wages to profits would increase aggregate consumption.

In the short run, the marginal propensity to consume out of wages on average is, $c_w = 0.8780$, and the marginal propensity to consume out of profits is $c_\pi = 0.52565$. This means that agents consume on average about 0.8780 out of their wages and 0.5256 out of their profits (see Appendix A No. 7). The marginal propensities greatly differ from each other, which not only confirms the hypothesis of varying propensities (Kohli 2018) but also indicates the polarisation in consumption patterns in South Africa. Furthermore, the positive sign in front of the r coefficient indicates that the marginal propensity to consume out of profits is lower than the marginal propensity to consume out of wages. Thus, a rise in the profit share leads to an increase in consumption and this finding is inconsistent with that of Yılmaz (2015) and Oyvat et al. (2020). However, in the long-run, it is shown that aggregate consumption is driven by profitability in the South African economy.

Investment

As seen in Table 2, in the short run the demand accelerator effect (z) is positive and significant. This suggests that giving more to household consumption may give more impulse to invest. The investor confidence (b_k) coefficient is large, positive and statistically significant at a 5% level of significance. This asserts that investment in the South African economy is largely driven by investment confidence. The profit rate (r) has the expected sign and is significant. This means that investment in the South African economy is determined by profitability, which is inconsistent with the finding of Galanis and Onaran (2012), Yılmaz (2015) and Vogel and Hein (2009) but is consistent with the Keynesian literature. Foreign demand (y^f) is positive in the short run but negative in the long run, although it is significant at both times. Whilst improvements in the world income may improve South African investment in the short run, it may negatively affect it in the long run. However, the real exchange rate (e) is insignificant and possibly has no effect on investment dynamics in South Africa.

Net exports

In the short run, capacity utilisation (z), profitability and the real exchange rate have an effect on net exports, whilst foreign demand and business confidence have no effect on net exports dynamics. In both cases, the exchange rate has the expected sign, and is statistically significant, which means currency depreciation would decrease net exports in the short-run but improve net exports in the long-run as per the well-known Marshall-Lerner condition.

The demand relation (negative z) implies that increases in domestic demand led to an increase in imports and worsening of the net exports account. However, the coefficient for the profit rate effect r has a positive sign and is statistically significant. This means that a redistribution from wages to profits would increase net exports because of a fall in labour costs (Yılmaz 2015). In the long run, the real exchange rate and domestic demand influence net exports, all the rest being constant.

Net effect

As $(c_w - c_\pi) + \phi_2 + \alpha_2 = 0.7822 > 0$, demand formation in the South African economy is exhilarationist because an increase in the profit share increases aggregate demand. This implies that the South African economy was necessarily profit-led from 1975 to 2019 supporting Vogel and Hein (2009) and Stockhammer's (2013) finding that small open economies are likely to be profit-led. If an economy is exhilarationist then it is necessarily profit-led because increases in the profit share (π) spurs demand z*, and that, in turn, improves investments. Importantly, the coefficient in front of ECM in all three equations is significant, negative and between 0 and –1, signalling the presence of a long run causal relationship between the dependant and explanatory variables Yildirim (2017).

Importantly, in the South African economy, consumption is not negatively affected by the profit rate. However, looking domestically (without the inclusion of the foreign sector) would suggest that the economy is wage-led because the sum of only the effect on domestic private demand is negative and small. This suggests that the negative effect of a rise in the profit share on consumption outweighs its positive effect on investment. The effect becomes positive and larger when including the foreign sector. Therefore, the foreign sector plays a crucial role in determining whether the South African economy is wage-led or profit-led, and this result is consistent with Oyvat et al. (2020) and Galanis and Onaran's (2012) assertion that openness in the economy is likely to be associated with being profit-led.

Conclusion

The objective of this study was to establish whether the growth rate increases or decreases as a result of increases or decreases in the wage share in South Africa. Consequently, this article examined demand formation in the South African economy and whether growth is profit-led or wage-led, based on the post-Keynesian analysis.

The first finding of this article suggests that demand formation in the South African economy is exhilarationist and growth is necessarily profit-led because the sum of the marginal propensities and the coefficients of the profit effect on investment and profit share on net exports is greater than zero. In effect, this means that distribution of income towards profits tends to lead to economic growth. The second finding of this article suggests

that the foreign sector plays a crucial role in determining if growth in the South African economy is wage-led or profit-led. The third finding of this study clearly indicates that consumption is significantly polarised between agents. Finally, this article shows that investment is largely and significantly affected by business confidence in South Africa.

Given the stylised facts on inequality, openness and credit that were analysed here and the estimation results of this article, a powerful implication is that South Africa can improve its growth rate if it successfully implements policies that resolve the labour and capital income distribution nexus. If policymakers wish to reach a more stable and egalitarian growth path (Oyvat et al. 2020), they should advise government and firms to embark on policies that improve the share of wages as a percentage of national income because such a policy position will improve aggregate consumption and provide an impulse to invest in the domestic economy. Government and firms can do so by implementing an effective wage for various skills and sectors in society and instituting a policy related to inflation-adjusted yearly wage increases. An expansion of goods and services will complement the SARB attempts to keep both consumer and producer inflation within target, whilst the government formulates policies aimed at improving the wage share as a percentage of GDP.

Future research should assess the different economic sectors and their contribution towards determining whether the economy is wage-led or profit-led. Such research will assist firms to ramp up their efforts in contributing towards inclusive growth and decreasing inequality and unemployment. It will also assist firms to resolve the conflict that arises between managers and organised labour and assist in resolving the outcomes of such conflict, which is often characterised by protests and economic instability.

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Competing interests

Author's contributions

Mzwanele Ntshwanti has contributed solely and fully to the inception and completion of this research work.

Ethical considerations

This article followed all ethical standards for research without direct contact with human or animal subjects.

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Data availability

The data are available at the South African Reserve Bank: https://www.resbank.co.za/en/home/what-wedo/statistics/releases/online-statistical-query And OECD stat: https://stats.oecd.org/ CORRESPONDING AUTHOR TO COMPLETE Electronic Signature (Automatically Populated) X Mzwanele Ntshwanti v.July2020 7 and Bureau of Economic Research at Stellenbosch University: https://www.ber.ac.za/home/

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References

Aboobaker, A., 2019, 'Disarticulation' as a constraint to 'wage-led growth' in dual-economies, UMass Amherst Economics Working Papers, 269.

Ankabi, O.A., 2016, 'The growth, poverty and inequality nexus in South Africa: Cointegration and causality analysis', Development Southern Africa 33(2), 166–185. https://doi.org/10.1080/0376835X.2015.1120654

Bhaduri, A. & Marglin, S., 1990, 'Unemployment and the real wage: The economic basis for contesting political ideologies', Cambridge Journal of Economics 14(4), 375–393. https://doi.org/10.1093/oxfordjournals.cje.a035141

Blecker, R., 2002, 'Distribution, demand and growth in neo-Kaleckian macro-models', in M. Setterfield (ed.) The economics of demand-led growth: Chapter 8, pp. 154–192, Edward Elgar Publishing, Cheltenham.

Blecker, R., 2016, 'Wage-led versus profit-led demand regimes: The long and the short of it', Review of Keynesian Economics 4(4), 373–390. https://doi.org/10.4337/roke.2016.04.02.

De Oliveira, G. & Souza, E.P., 2021, 'Wage- and profit-led growth regimes: A panel data approach', Review of Keynesian Economics 9(3), 394–412. https://doi.org/10.4337/roke.2021.03.05

Dünhaupt, P., 2013, 'Determinants of functional income distribution: Theory and empirical evidence', Global Labour University working paper, no. 18, International Labour Organization (ILO), Geneva.

Fields, G.S. & Wan, H.J., 1989, 'Wage-setting institutions and economic growth', World Development 17(9), 1471–1483. https://doi.org/10.1016/0305-750X(89)90087-9

Forslund, D., 2013, 'Mass unemployment and the low-wage regime in South Africa', in New South Africa Review 3, pp. 96–114, Wits University Press, Johannesburg.

Galanis, G. & Onaran, Ö., 2012, Is aggregate demand wage-led or profit-led?: National and global effects. Conditions of Work and Employment Series No. 40, International Labour Organization, Geneva.

Gibson, B. & Van Seventer, D., 2000, 'Real wages, employment and macroeconomic policy in a structuralist model for South Africa', Journal of African Economies 9(4), 512–546. https://doi.org/10.1093/jae/9.4.512

Granger, C. W., 1988, 'Causality, cointegration, and control', Journal of Economic Dynamics and Control 12(2-3), 551–559.

Kaldor, N., 1957, 'A model of economic growth', The Economic Journal 67(268), 591–624. https://doi.org/10.2307/2227704

Kalecki, M., 1938, 'The determinants of distribution of the national income', Econometrica 6(2), 97–112. https://doi.org/10.2307/1907142

Klein, N., 2012, 'Real wage, labor productivity, and employment trends in South Africa: A closer look', Working paper no. 12/92, International Monetary Fund, Washington, DC.

Kohli, V., 2018, 'Functional income distribution and effective demand in India: An applied post Keynesian model', Journal of Post Keynesian Economics 41(3), 399–429. https://doi.org/10.1080/01603477.2018.1431795

Ngozi, A., 2018, Estimate and interpret vector error correction model [Recorded by A. Ngozi], YouTube, Nigeria.

Niyimbanira, F., 2017, 'Analysis of the impact of economic growth on income inequality and poverty in South Africa: The case of Mpumalanga province', International Journal of Economics and Financial Issues 7(4), 254–261.

Onaran, O., 2013, 'How to create more and better jobs via a wage-led recovery in Europe?', paper prepared for the Euromemo conference, EuroMemo Group, London, September, 20–21, 2013.

Onaran, O. & Stockhammer, E., 2013, 'Wage-led growth: Theory, evidence, policy', Review of Keynesian Economics 1(1), 61–78. https://doi.org/10.4337/roke.2013.01.04

Oyvat, C., Öztunalı, C. & Elgin, O., 2020, 'Wage-led vs. profit-led growth: A comprehensive empirical analysis', *International Review of Economics* 71(3), 458–486. https://doi.org/10.1111/meca.12284

Razmi, A., 2015, 'The limits to wage-led growth in a low-income economy', *International Review of Economics* 66(4), 740–770. https://doi.org/10.1111/meca.12092

Stirati, A., 2011, 'Changes in functional income distribution in Italy and Europe', in E. Brancaccio & G. Fontana (eds.), *The global economic crisis: New perspectives on the critique of economic theory and polic*y, pp. 121–141, Routledge, London.

Stockhammer, E., 2013, *Why have wage shares fallen? A panel analysis of the determinants of functional income distribution,* International Labour Office, Geneva.

Stockhammer, E. & Onaran, Ö., 2012, 'Rethinking wage policy in the face of the Euro crisis. Implications of the wage-led demand regime', *International Review of Applied Economics* 26(2), 191–203. https://doi.org/10.1080/02692171.2011.631903

Storm, S. & Naastepad, C.W.M., 2013, 'Wage-led or profit-led supply: Wages, productivity and investment', in *Wage-led growth,* pp. 100–124, Palgrave Macmillan, London.

Vogel, L. & Hein, E., 2009, 'Distribution and growth in France and Germany: Single equation estimations and model simulations based on the Bhaduri/Marglin model', *Review of Political Economy* 21(2), 245–272. https://doi.org/10.1080/09538250902834053

World Bank, 2018, *Overcoming poverty and inequality in South Africa: An assessment of drivers, constraints and opportunities,* World Bank, Washington, DC.

Yildirim, E., 2017, *The impact of functional income distribution on capital accumulation in Turkey: A linear ARDL analysis*, pp. 1–20, Hitit University, Çorum.

Yılmaz, E., 2015, 'Wage or profit-led growth? The case of Turkey', *Journal of Economic Issues* 49(3), 814–834. https://doi.org/10.1080/00213624.2015.1072429

Appendix A

Supplementary information

1. Gross domestic product growth was sourced from the South African Reserve Bank, entry KBP6006Y.
2. The data on Gini coefficients and income inequalities were sourced from the Standardized World Income Inequality Database (SWIID).
3. As the value of net output equals the factor incomes that generate it and in the absence of income distribution statistics, compensation of employees is considered a suitable proxy. The data on compensation of employees as a percentage of gross domestic product (GDP) were sourced from the South African Reserve Bank, entry KBP6295J.
4. Whilst, in recent times, patents and intellectual property rights index have been put forward as an alternative proxy for technological progress, expenditure on research and development remains a commonly used proxy that is held in high regard. As such because technology does not have well-defined units, data on the gross capital formation in research and development will serve as such a proxy. The data on gross capital formation – research and development were sourced from the South African Reserve Bank, entry KBP6191Y.
5. The data on public total loan debt (net) were sourced from the South African Reserve Bank, entry KPB4117J.
6. The data on the current account balance as a percentage of GDP were sourced from the South African Reserve Bank, entry KBP5380J.
7. We want to know the marginal propensity to consume out of wages, and to do this, we take the coefficient of the demand effect, $z = 0.1220$, and subtract it from 1 (unit), giving us that the marginal propensity to consume out of wages is $1 - 0.1220 = 0.878$. After that, to get the marginal propensity to consume out of profits, we subtract the the coefficient of the profit rate, $r = 0.3524$, from the marginal propensity to consume out of wages. That gives that the marginal propensity to consume out of profits is 0.5256 (Yilmaz 2015).