Is planet Earth as a whole likely to be wage-led?

Arslan Razmi*

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Abstract

Evidence regarding the relationship between distribution, demand, and growth in the short run has been mixed. Open economy models that create the possibilty of "beggar-thy-neighbor" growth offer one theoretical explanation for why this may be expected. Several authors have argued recently, however, that even if demand and growth are profit-led in many individual countries, the world as a whole is likely to be wage-led since the planet as a whole runs balanced trade. This paper finds that this argument, although intuitively appealing, does not hold up to careful examination.

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Key words: Demand regime, income distribution, wage-led growth, stagnationism, exhilarationism, neo-Kaleckian models.

*Department of Economics, University of Massachusetts, Amherst, MA 01003; email: arazmi@econs.umass.edu

1 Introduction and Background

By recognizing the dual role of wages - as costs of production and sources of aggregate demand – neo-Kaleckian models have made an extremely important contribution to short-run macroeconomic analysis. In a closed economy set-up with mark-up pricing, involuntary unemployment, unutilized capacity, and nominal wage stickiness, a redistribution of national income from capitalists to workers (who save less, on average) may generate additional spending and demand. If firms respond by increasing capacity utilization, output rises. Insofar as investment responds positively to expected future demand, higher utilization boosts accumulation *given the profit share*. Thus, growth in a closed demand-driven capitalist economy could be wage-led barring a strong profit share effect on desired investment. Blecker (2002) and others have, however, shown that growth is much less likely to be wage-led in an open economy. This is because while redistribution towards workers boosts consumption demand, it simultaneously reduces external demand by making the domestic good less competitive in international markets.

Blecker (1989) investigated this issue in an open economy "imperfect substitutes" framework by introducing a flexible mark-up factor over average variable costs. Depending on the specification of the mark-up, any increase in the real wage is partially or fully passed through to the export price, making domestic goods less competitive internationally. This counters any positive effects on growth through increased utilization and investment. Thus, if the Marshall-Lerner condition is satisfied, open economy considerations constrain the room for wage-led growth. Even an economy that is wage-led in the absence of international trade can transform into a profit-led one if a decline in real wages boosts international demand adequately to offset the fall in domestic absorption.

In an "imperfect substitutes" framework, a country can boost domestic demand and growth by lowering real wages. However, this kind of growth has a "beggar-thy-neighbor" aspect to it as it originates from one country "stealing" demand from another. The rise in demand for the wage-lowering country, in other words, plays out in a zero-sum environment where one country benefits at the expense of the other. How is the analysis affected if we take the whole global economy as our unit of analysis?

Some recent literature has argued that since the world as a whole is a closed economy, it is likely to be wage-led. Put differently, since the constraint on export-led growth in an imperfect substitutes framework arises from the fact that one country runs trade surpluses at the expense of the other, and since the planet as a whole cannot run trade imbalances, the issues raised in an open economy context are not relevant, and the global economy is highly likely to experience wage-led demand and growth. Lavoie and Hein (2015)[p. 8] point out, for instance, that "at the level of planet earth, since net exports are zero by definition, the only reasonable strategy for the expansion of aggregate demand is to pursue a strategy of wage-led growth, that is, a strategy that is favourable to the labour force." Similarly, Onaran (2015)[p. 10] observes that "even if there are some countries, which are profit-led, the global economy as a whole is

wage-led because the world is a closed economy. This makes intuitively sense; because planet earth is a closed economy, at least as long as we do not trade with Mars!"

It is not clear, however, that this line of reasoning is coherent. The relevant issue is the presence of trade imbalances *within* the planet, that is, between countries. As long as countries differ along the relevant dimensions (saving rates, levels of capacity utilization, resource scarcity, consumer behavior, etc.), global demand as a whole can be either wage-led or profit-led. Moreover, the same observation applies with even more force to global growth. The fact that the planet as a whole does not run trade surpluses or deficits against itself is not central.

To put the point across starkly, suppose that the world consists of two countries that are identical in every way. Indeed let's go further and assume that saving rates are identical across classes (capitalists and workers) within countries, so that re-distribution has no effect on spending. Increasing the real wage now has no effect on internal demand but lowers external competitiveness and, therefore, leads to a trade deficit.[1] Demand is thus affected negatively for the re-distributing country and we could say, using the conventional definition, that demand in the country is profit-led. The other country now has an equivalent trade surplus although there has been no re-distribution in that country. The world economy is profit-led even though trade at the level of the planet is balanced, so there is no beggar-thy-neighbor effect at the global level. As long as there is a line dividing the globe into more than one economy, it is the national level demand that becomes the relevant unit of analysis.

Another stark example again involves a two-country world where both countries are identical in size and every other aspect except that one country imports all its consumption goods from the other country while the other country is self sufficient in consumption goods. Then a re-distribution towards profits in the first country increases investment spending (given greater saving out of profit income) without affecting consumer demand for the domestic good. Utilization rises as a result and demand in that country is profit-led. Moreover, the boost in utilization increases consumer demand for the second country's goods, increasing utilization there as well. The world as a whole then appears to be profit-led thanks to differences in consumer demand for the goods produced in the two countries.

This paper explores the conditions under which the global economy as a whole could experience wage- or profit-led demand and growth in the short run. I start with a simple framework where the world consists of two countries and both countries are exactly identical in terms of the level of capital stocks, saving, investment, and consumption behavior, and income distribution. Both countries are capital abundant in the sense that a lack of capital does not constrain production and capacity utilization varies in response to demand. I show that, even in this boiled down set-up, global demand could be either profit-led or wage-led, while the nature of the demand regime *within* each country depends

[1] Assuming that the famous Marshall-Lerneer condition is satisfied.

on global consumption behavior. For example, if global consumption is skewed heavily towards the good produced by one country, then the other country will tend to have profit-led demand. The intuition is simple; if the good produced by a country is only used as an investment good, then any global re-distribution towards profits necessarily increases demand for that good, regardless of the nature of the demand regime in the other country.

The simple model also shows that considering the global economy as a whole does not make wage-led growth more or less likely. The global economy is the sum of its parts. When divided into two equal parts, the planet as a whole is wage-led only if: (1) either *both* economies are wage-led, or (2) if one economy is profit-led, the other economy is very strongly wage-led. Thus, as long as one finds that, as suggested by empirical studies, at least some countries have profit-led growth, one cannot make a general statement about the planet as a whole being likely wage-led.

Next, I extend the model to include a more conventional structuralist North-South closure, with the South modelled as a capital-constrained economy with a fixed real wage. I show that the possibility of global wage-led growth is more limited in such a set-up. Intuitively, a global redistribution towards wages in this set-up lowers investment in the South without affecting capacity utilization, while possibly raising it in the North if the latter has wage-led demand.

Finally, I extend the North-South model to incorporate the possibility of learning externalities and catching up. Such a set-up yields multiple equilibria, and under some conditions, global re-distribution can have destabilizing effects on the global economy.

In sum, the global economy can be either wage-led or profit-led, or in the presence of externalities, both. The fact that the globe as a whole has balanced trade does not eliminate profit-led growth as a significant possibility.

To the best of my knowledge, one other paper has explored these issues in a two-country paper. von Arnim et al. (2014) show that, even if two large economies are profit-led, the world as a whole is likely to be wage-led. The intuition originates from the insight that the world as a whole is a closed economy. Any increase in international competitiveness gained by one economy will be nullified by the corresponding decrease in the other economy. For example, their work shows that redistribution towards labor in one country always increases growth globally if that country is wage-led even though it may lead to lower growth relative to the other country. However, the relevant thought exercise for our purposes would involve the global effects of *global* redistribution rather than of re-distribution in one country. This is because the argument that I explore in this paper is about whether the fact that the world as a whole is a closed economy makes wage-led growth more likely. Asking the relevant question requires analyzing the comparative statics and dynamics of redistribution that is global in nature.

2 A Simple Two-Country Model

Let's start by defining macroeconomic behavior. Consider two countries, say North and South that are similar in the sense that neither economy has a capital constraint. Each produces a good – called good N in the case of North and S in the case of South – and the two goods are imperfect substitutes in consumption.[2] At this point I attach no significance to the terms North and South as far as income or structural differences are concerned. Both economies have excess capacity, and rates of utilization (denoted by u_N and u_S) vary in order to equilibrate the respective goods markets. Consumers in each country spend a fraction on their own goods and the remainder on the foreign good. Only profit income is saved. Utilization is proxied by outputs as ratios of capital stocks (e.g. $u_N \equiv Y_N/K_N$). Thus, denoting the consumption of good i by country j's consumers by C_{ij}, I am able to define the following equations to describe macroeconomic consumption behavior after normalizing by the respective capital stocks and expressing all quantity variables in terms of the N-good:

$$C_{NN} = \Theta_N q^{\gamma}(1 - s_N\pi_N)u_N K_N \tag{1}$$

$$C_{SN} = \frac{(1 - \Theta_N q^{\gamma})(1 - s_N\pi_N)u_N K_N}{q} \tag{2}$$

$$C_{SS} = \Theta_S q^{-\gamma}(1 - s_S\pi_S)u_S K_S \tag{3}$$

$$C_{NS} = q(1 - \Theta_S q^{-\gamma})(1 - s_S\pi_S)u_S K_S \tag{4}$$

The share of consumption of each good ($\Theta_N q^{\gamma}$ and $1 - \Theta_N q^{\gamma}$ in the case of Northern consumers) is affected by it's relative price ($q \equiv P_S/P_N$) and national income. Ignoring government spending and taxes, we only need to define the investment functions in order to specify equilibrium conditions. Since I do not impose a trade balance condition, I can specify independent investment functions for each country. I employ general functions that specify investment as a function of profitability conditions and aggregate demand.

$$\frac{I_N}{K_N} = f(\pi_N, u_N) \tag{5}$$

$$\frac{I_S}{K_S} = h(\pi_S, u_S) \tag{6}$$

The two goods market conditions in excess demand form follow:

$$C_{NN} + C_{NS} + \frac{I_N}{K_N} - u_N = 0, \text{ or}$$
$$NN(u_N, u_S; \pi) = [\Theta_N q^{\gamma}(1 - s_N\pi_N) - 1]u_N + (1 - \Theta_S q^{-\gamma})(1 - s_S\pi_S)qu_S k + f(\pi_N, u_N) = 0 \tag{7}$$

[2] See Table 1 for a list of symbols and their definitions.

$$C_{SS} + C_{SN} + \frac{I_S}{K_S} - u_S k = 0, \text{ or}$$
$$SS(u_N, u_S; \pi) = (1 - \Theta_N q^{\gamma})(1 - s_N \pi_N) u_N + [\Theta_S q^{-\gamma}(1 - s_S \pi_S) - 1] q u_S k + h(\pi_S, u_S) = 0 \tag{8}$$

where all the quantities in both equations have been normalized by $P_N K_N$, and k ($\equiv K_S/K_N$) defines the relative capital stock in the South.

2.1 Global redistribution toward wages

Now suppose there is a redistribution of income globally from profits to wage income. First, a look at the partial effects in each market:

$$-NN_{\pi} = [\Theta_N q^{\gamma} s_N u_N + (1 - \Theta_S q^{-\gamma}) s_S u_S q k] - f_{\pi} \gtrless 0 \tag{9}$$

$$-SS_{\pi} = [\Theta_S q^{-\gamma} s_S u_S q k + (1 - \Theta_N q^{\gamma}) s_N u_N] - h_{\pi} q k \gtrless 0 \tag{10}$$

Redistribution away from profits raises consumption spending in both countries. For either country, if this increase along with the boost to exports is sufficient to dominate the decline in investment due to the lower profit share, then demand in that country is wage-led; otherwise it is profit-led. The nature of demand is influenced by the initial distribution of world capital stock, global consumer preferences, and of course, more standard factors such as saving and investment behavior. In order to anticipate later results, notice that the more world demand is skewed towards a country's products, the more likely it is to have wage-led demand.

To focus on the question at hand, let's now simplify by assuming that each country begins at the same level of capital stock ($k = 1$ initially) and that consumers in the two countries are exactly similar in that they have identical preferences over the basket of goods available. Thus, $\Theta_N = 1 - \Theta_S$. In other words, consumers in both countries devote the same share of expenditure to each good. Let's assume also that wages are the same across countries as is the constant mark-up over costs. This latter assumption translates into equal profit shares of income in each country ($\pi_N = \pi_S = \pi$). Notice also, that under these conditions, $q = 1$. Finally, let's assume away differences in saving and investment behavior in the two countries so that $s_N = s_S = s$, $f_{\pi} = h_{\pi}$, and $f_u = h_u$.

In sum,

$$\begin{aligned} \Theta_N &= 1 - \Theta_S,\ \pi_N = \pi_S = \pi \text{ (so that } q = 1),\ s_N = s_S = s,\ f_{\pi} = h_{\pi},\ f_u = h_u, \\ \text{and initially, } k &= 1 \end{aligned} \tag{11}$$

The world is essentially one large economy except for that there is a line running through it that divides it equally in such a way that one good is produced in each part.

2.1.1 Demand

Under these conditions, we get the following expressions for comparative static changes in the rates of utilization following global redistribution towards wages.

$$-\frac{du_N}{d\pi} = \frac{(1-f_u)\left[\Theta_N s(u_N+u_S) - f_\pi\right] - (1-s\pi)(1-2\Theta_N)f_\pi}{(s\pi - f_u)(1-f_u)} \gtrless 0 \qquad (12)$$

$$-\frac{du_S}{d\pi} = \frac{(1-f_u)\left[(1-\Theta_N) s(u_N+u_S) - f_\pi\right] - (1-s\pi)(1-2\Theta_N)f_\pi}{(s\pi - f_u)(1-f_u)} \gtrless 0 \qquad (13)$$

Note that both bracketed terms in the denominator are positive by the traditional Keynesian stability conditions.

Demand in either economy could be either wage-led or profit-led. The outcome, as we see shortly, depends crucially on global consumption behavior in terms of composition. In order to dig deeper, we can explore some interesting cases.

Skewed global preferences

Consider first the case where global consumption demand is extremely skewed towards the S-good, so that $\Theta_N = 0$ and $\Theta_S = 1$. The effect is to ensure that the North is profit-led. Why? Because, with the N-good being used only for investment, any redistribution towards wages leaves consumer demand for that good unchanged. The only remaining effect on demand is the negative one through lower investment demand. Mathematically,

$$-\frac{du_N}{d\pi} = -\frac{f_\pi}{(1-f_u)} < 0$$

The effect on South is, on the other hand, is ambiguous. The intuition is a bit more involved. Since global redistribution toward wages lowers utilization in the North, Southern exports suffer. The direct effect of the redistribution on demand for the S-good works through the two standard channels. The direct effect on investment is to lower it. The effect on consumption, and indirectly via consumption on demand is negative. Thus, the overall effect on demand for the S-good is ambiguous.

$$-\frac{du_S}{d\pi} = \frac{(1-f_u)s(u_N+u_S) - (2-f_u-s\pi)f_\pi}{(s\pi - f_u)(1-f_u)} \gtrless 0$$

It is clear. however, that the South is more likely to be wage-led than if it were a closed economy. This is because of the boost to exports that redistribution causes. To see this more clearly, we can decompose the numerator of the expression above into two terms such that wage-led demand requires that:

$$\{s[f_u(u_N+u_S) - f_\pi\pi] + (1-f_u)f_\pi\} - [s(u_N+u_S) - f_\pi] < 0$$

Now, the second term (in square brackets) is positive if the South is wage-led, which tends to make the overall expression negative. However, the first term (in curly brackets) is highly likely to be positive and makes satisfaction of the inequality less likely.

What about *global* demand?

$$-\left(\frac{du_N}{d\pi}+\frac{du_S}{d\pi}\right)=\frac{s(u_N+u_S)-2f_\pi}{(s\pi-f_u)}\gtrless 0$$

A *sufficient* condition for global demand to be wage-led is that *both* countries are wage-led.[3] Since that is not true in this case – recall that the North is unambiguously profit-led – the South should be sufficiently wage-led to offset the profit-led demand in the North. Mathematically this condition boils down to:

$$s(u_N+u_S)-f_\pi > f_\pi$$

The left hand side is the condition for the South to be profit– or wage-led. Thus, if the South is profit-led, the globe as a whole is profit-led. If the South is wage-led, things become ambiguous at the global level in spite of the absence of beggar-thy-neighbor effects.

Finally, since the two countries are symmetric, the same analysis would apply in mirror image form if global consumer preferences were skewed towards the S-good rather than the N-good.

Symmetric global preferences

Next, consider the case where global consumers devote an equal proportion of their spending to either good, i.e., $\Theta_N = \Theta_S = 0.5$. Now the relevant conditions take on a different form. Mathematically, from eqs. (12) and (13),

$$-\frac{du_N}{d\pi}=\frac{s(u_N+u_S)-2f_\pi}{2(s\pi-f_u)}=-\frac{du_S}{d\pi}\gtrless 0 \tag{14}$$

Not surprisingly the condition for utilization to rise in response to global redistribution toward wages is the same in each country. Moreover, it is the same as the condition for global demand to be wage-led in the presence of skewed preferences (see equation (14) above). For the globe as a whole, the change in utilization is given by:

$$-\left(\frac{du_N}{d\pi}+\frac{du_S}{d\pi}\right)=\frac{s(u_N+u_S)-2f_\pi}{(s\pi-f_u)}\gtrless 0$$

which is the same as the condition in the case of skewed preferences. The necessary condition for both countries to be wage-led is that the globe be wage-led and a sufficient condition for the globe to be wage-led is that both countries be wage-led. As in the case of skewed preferences, if one of the two-countries has profit-led demand, the world as a whole could have profit-led demand.

[3] Notice that we can add up changes in the two utilization rheates because the initial level of capital stocks in teh two countries are the same.

2.1.2 Growth

Let's now turn our focus to the nature of effects on accumulation rather than demand in the short-run and over time. Equations (5) and (6) have already defined investment behavior. The immediate change in the global rate of accumulation is given by $\hat{K}_S + \hat{K}_N$, while the evolution of relative capital stocks over time is given by:

$$\hat{k} = \hat{K}_S - \hat{K}_N$$

We are now in a position to re-visit our thought experiment involving global redistribution. Once again, we will explore scenarios with different global consumption behavior.

Skewed global preferences

Recall that in this case the N-good is only used for investment. Redistribution towards wages, therefore, lowers investment demand, making both demand and growth unambiguously profit-led. Indeed demand declines to the same extent as investment.

$$-\frac{d\hat{K}_N}{d\pi} = -\frac{f_\pi}{(1-f_u)} < 0$$

As in the case of utilization, the effect on Southern accumulation is less clear. Indeed, not unexpectedly, the condition for wage-led growth is more stringent than that for wage-led demand. This is because, even if demand is wage-led, the resulting boost to investment must dominate the direct effect of a lower profit share on investment.

$$-\frac{d\hat{K}_S}{d\pi} = -\frac{(1-f_u)s\left[f_\pi\pi - f_u(u_N+u_S)\right] + f_u f_\pi(1-s\pi)}{(s\pi-f_u)(1-f_u)} \gtrless 0$$

A positive effect on *global* accumulation requires, as a sufficient condition, that in investment in both countries be more sensitive to utilization than to the profit share ($2f_\pi\pi - f_u(u_N+u_S) < 0$). Since growth in the North is unambiguously profit-led, simply having wage-led growth in the other country will not suffice to make global accumulation wage-led. Instead, investment in the latter country will have to more than compensate for decumulation in the other country in response to redistribution.

$$-\left(\frac{d\hat{K}_N}{d\pi} + \frac{d\hat{K}_S}{d\pi}\right) = -\frac{s\left[2f_\pi\pi - f_u(u_N+u_S)\right]}{(s\pi-f_u)} \gtrless 0$$

How does the relative Southern capital stock evolve in response? Since investment is set back in the North, relative investment is likely to pick up in the South. However, if growth in the South is strongly profit-led, this result could be reversed.

$$-\frac{d\hat{k}}{d\pi} = \frac{(1-f_u)s(u_N+u_S) - 2(1-s\pi)f_\pi}{(s\pi-f_u)(1-f_u)} \gtrless 0$$

While our primary concern is with the short-run consequences of redistribution at a global level, one may, as a thought exercise, consider the impact on the global distribution of capital over time. again, the effect is ambiguous, although the relative stock of capital in the South is likely to be negative. Again, this is driven by the fact that redistribution has an ambiguous negative effect on investment in the North. Global consumer preferences matter.

$$-\left.\frac{dk}{d\pi}\right|_{\hat{k}=0} = \frac{s(u_N+u_S) - 2(1-s\pi)f_\pi}{(s\pi-f_u)(1-f_u)} \gtrless 0$$

Symmetric global preferences

Recall that this is the case where consumers world-wide allot an equal share of their consumption expenditures to each good. In this case, both goods are used symmetrically for consumption and investment so that neither of the two countries is unambiguously profit-led.

$$-\frac{d\hat{K}_S}{d\pi} = -s\frac{2f_\pi\pi - f_u(u_N+u_S)}{2(s\pi-f_u)} = -\frac{d\hat{K}_N}{d\pi} \gtrless 0$$

The effect on investment in each country is determined by the cumulative effect in the two countries. A sufficient condition for global growth to be wage-led is that in each country the utilization elasticity of investment in each country be less than the profit share elasticity. Exactly the same condition ensures that global growth is wage-led. A less stringent necessary condition is that at least one of the countries have wage-led growth. If one of the countries has a profit-led growth regime, the other must have a strongly wage-led regime. The world as a whole may have either of the two regimes as long as the two countries differ in their regimes.

$$-\left(\frac{d\hat{K}_N}{d\pi} + \frac{d\hat{K}_S}{d\pi}\right) = -s\frac{[2f_\pi\pi - f_u(u_N+u_S)]}{(s\pi-f_u)} \gtrless 0$$

Finally, the relative capital stock does not evolve over time. The change in the capital stock in one country is exactly offset by a similar change in the other country. This is a result of the symmetry in global consumption assumed in this scenario.

$$-\frac{d\hat{k}}{d\pi} = 0$$

$$-\left.\frac{dk}{d\pi}\right|_{\hat{k}=0} = 0$$

Table 1: Definitions of key variables

Variable	Definition
Y_i	Consumption and output of good i, respectively ($i = N, T$)
π_i	Profit share of output in each country ($i = N, T$)
C_{ij}	Consumption by country j of good i
K_i	Stock of capital in country $i (i = N, T)$
u_i	Capacity utilization rate in country 'i'
k	Relative capital stock ($\equiv K_S/K_N$)
I_i	Investment in country $i (i = N, T)$
TB	Trade balance
s_w, s_π	Worker and capitalist saving rates
P_i	Price of good i
q	Relative price ($\equiv P_S/P_N$)
Θ_i	Share (with $q = 1$) of global consumption expenditure devoted to the good i

3 Extensions

Work in progress

3.1 The traditional structuralist North-South closure

3.2 Economies of scale

4 Concluding Remarks

Do open economy arguments pointing out the constraints to wage-led demand and capital growth become irrelevant once we consider that the planet as a whole is a closed system? This paper argues that this is not the case. Even in a closed world economy where both countries have excess capacity and underutilized resources, and the gains from increased competitiveness for one country come at the expense of the other country, the world as a whole could easily be profit-led. This is because as long as there is a line dividing the world into two countries that produce different goods, it requires for only one country to be profit-led for the world as a whole too to be profit-led. The fact that global consumption of the two goods is not identical may indeed push demand regimes in some countries in the direction of being profit-led.

The lesson extends to a multi-country world, where again, its possible at least in theory for the world to be profit-led if even one or a few countries have that demand regime. Furthermore, the likelihood of the world being profit-led increases if one incorporates the typical structuralist assumption that the South is capital constrained, and does not have excess capacity, or that the

Southern countries are price takers in international tradable markets.[4] Finally, as I show in work under progress, the assumption hat the world is likely to have a wage-led demand regime as a whole is further undermined if there are learning externalities that are limited to one part of the world.

5 Mathematical Appendix

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[4] See, for example, Razmi (2015).