

HIERARCHICAL CONSUMPTION PREFERENCES, REDISTRIBUTION, AND STRUCTURAL TRANSFORMATION

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1 Introduction

Engel's Law¹ is considered one of the most robust empirical findings in economics and has been argued as implicit to classical development literature going back to Smith and Lewis (Eswaran and Kotwal 1993). This paper explicitly explores the relevance of hierarchical consumption preferences in developing economies for the robustness of standard conclusions from growth strategies that advocate for building around domestic wage demand. More specifically, the paper addresses whether calls for 'wage-led growth' are robust to developing country contexts where the pattern of consumption is characterized by significant polarization across income groups and the structure of production preclude demand shocks from generating multiplier/accelerator feedback effects.²

This issue may characterize many developing countries for a number of reasons related to large natural resource endowments, high levels of income and wealth inequality, and histories of settler colonialism.³ As Deaton (1999, 34) has pointed out, minerals ownership tends to be highly concentrated and gains in exports of minerals tend to accompany unusually skewed distributive outcomes, resulting in 'enclave' production without the necessary forward and backward linkages relevant to inclusive development. These dynamics are generally consistent with a positive reduced

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¹ Which suggests a hierarchical structure of consumption preferences; as incomes rise the proportion of income allocated to consumption of food declines.

² An early paper in the neo-Kaleckian literature (Dutt 1991) explored whether standard neo-Kaleckian results would be robust to the dual economy context. However, Dutt acknowledges the key results may be dependent on the absence of Engel effects, which were explicitly excluded from the analysis.

³ These factors are often related to one another.

form relationship between growth episodes and inequality⁴, if via mechanisms distinct from those explored in the model below. More importantly, from a policy perspective and as relates to the analysis that follows, measures to reduce income inequality might not stimulate growth through the usual multiplier/accelerator mechanisms emphasized in the literature.⁵

At face value, the political appeal for wage-led growth is strong – many countries have been plagued by growing inequality and stagnant growth rates in recent decades, and it would indeed be convenient if social targets for reducing inequalities happened also to be strong instruments for realizing higher rates of long run growth. However, whether changes in income distribution can be analyzed as proponents of wage-led growth have done has been contested on general grounds (Skott 2017). Amidst recent debates on this subject, there has been relatively little critical evaluation of the relevance of wage-led growth to the developing country context and issues of structural transformation.⁶ Insofar as the canonical neo-Kaleckian models, in their one-sector nature, disregard interrelations between economic sectors of differing relevance to development strategy, there are limitations on these models as a basis for assured policy recommendations in dual-economies.

The central argument of this paper is that contemporary neo-Kaleckian arguments have less explanatory power in contexts where domestic modern sector production is oriented away from domestic wage demand.⁷ This claim is related to the observation that low-income economies tend to have large traditional sectors and diversify productive activity until relatively high levels of per capita income (Imbs and Wacziarg 2003). Growth theorists, going back at least to Pasinetti (1981), have been cognizant of the interaction between economic growth and the pattern of consumption.

The main contribution of this paper is the repurposing of the model in Razmi *et al.* (2012) to bring de Janvry and Sadoulet's (1983) argument to contemporary growth theory debates. The paper shows that neo-Kaleckian theory may not be robust to countries with extreme polarization

⁴ Recent studies on the distribution of consumption expenditure in sub-Saharan Africa for the 2002-2012 period covering the 2000s commodity boom seem to lend credence to this hypothesis by showing that the distribution of consumption has become more unequal and polarized (Clementi *et al.* 2020, 13).

⁵ Income inequality is a social harm of great concern worthy of policy response for intrinsic reasons. Addressing the implications of income redistribution for growth need not imply a normative position on how much a society should tolerate income inequality.

⁶ Razmi (2016) and Ros (2016) are important exceptions.

⁷ This is an argument in keeping with accounts of the role of export promotion (and explicit rejection of a strategy focused on the domestic market) in successful late-industrialization strategies, like Westphal (1990).

in the distribution of income or where the consumption preferences of a broad subsection of wage earners fails to cross over with the focal point of industrial strategy. This conclusion is relevant to macro-policy debates in countries like Brazil, China, or South Africa – countries where the strong normative-intrinsic case for reducing high levels of income inequality has at times been mistaken for a positive-instrumental argument about growth and structural change.⁸ Remaining sections set out neo-Kaleckian arguments and Kalecki’s writing on development issues, before discussing properties of a two-sector growth and distribution model.

2 ‘Kaleckian’ models, Kalecki, and disarticulation

As per Lavoie (2014), four features are held as core to neo-Kaleckian models: an investment function depending at least in part on the rate of utilization; mark-up pricing; a higher saving rate out of profits than wages; the absence of capital and labor constraints (Lavoie 2014, 360).⁹ These features render neo-Kaleckian models both restrictive in their generality/applicability and narrow in their interpretation of Kalecki’s writing.¹⁰

Contrasting neo-Kaleckian insights with Kalecki’s views on development makes for interesting reading, although Kalecki’s writing on development concerns the question of whether aggregate demand is the constraint on growth in dual economies rather than the growth implications of redistributions. Kalecki carefully qualifies the generality of his analyses,

⁸ Padayachee and Zarenda (1996) outline the neo-Kaleckian arguments that have been central to post-apartheid South African policy debates, and Lavinias (2017) comments on the ‘social developmentalism’ strategy put forward by the Worker’s Party in Brazil. Chapter 4 of Klein and Pettis (2020) provides a critical account of the Chinese growth model since the 1990s, with a neo-Kaleckian flavor. China’s chief growth strategists have since advocated for a model emphasizing ‘dual circulation’, whereby both exports and rising domestic consumption are promoted. Pettis (2021) addresses some of the immediately appearing contradictions of dual circulation but does not revise advocacy for a consumption-centered growth strategy. Lin (2021) likewise identifies the relevance of increasing returns to scale in manufacturing in a critical account of the new Chinese development paradigm. In the sectors where China is targeting industrial catch up, like micro-chips, will wage demand from the bottom end of the distribution be key? I am skeptical, but it is worth acknowledging that the move toward emphasis on internal circulation may be at least partly motivated by the chauvinistic international rivalries that look to stall Chinese development – Chinese development planners will be well-aware of the latecomer advantages to sustaining high rates of capital accumulation with export-oriented industrialization, given the experience of preceding decades.

⁹ Appendix A sets out the neo- and post-Kaleckian frameworks in full.

¹⁰ A wider reading of Kalecki’s writings might acknowledge the relevance of labor constraints to mature economies, and capital constraints to dual economies. Lavoie (2020, 420) appears to defend the application of neo-Kaleckian models to developing country contexts based on the country of origin of authors working in the tradition: “I am no emerging economies expert, but what I find intriguing is that two of the first four authors in the Kaleckian tradition to build wage-led models came from India (Amitava Dutt) and Brazil (Edward Amadeo): both emerging economies.”

distinguishing clearly between the principal cause of unemployment across dual and mature economies by contrasting the problems of deficient effective demand from structural supply-side issues related to capital shortage (Kalecki 1968).¹¹

The essential macroeconomic issue in developing economies was, according to Kalecki, thus expressed as how to achieve expanded productive capacity through raising the rate of investment. This is recognized in the literature, although infrequently by neo-Kaleckians. Sachs (2004) emphasizes Kalecki's view that "the rate of growth of labour productivity... is the foundation for both economic and social progress and improvement in living standards, provided the gains in productivity are equitably distributed within the society" (Sachs 2004, 176). Indeed, Kalecki (1955, 9) argues that industrial productivity growth is key to the growth of real wages, insofar as it promotes a fall in the price of industrial goods greater than food prices rise. In taking this view, Kalecki assumes a relatively even split of worker consumption demand between basics and industrial goods, i.e., he ignores the Engel effects explored below.

At the general level of aggregate demand policy,¹² Kalecki (1955) provides a strong qualification on the applicability of general aggregate demand stimulus (be it in the form of boosting wages or expansionary fiscal policies) in dual economies. This qualification is derived out of concern for the supply of consumption goods to expand in a corresponding fashion to an increase in demand (i.e., concern for the prevalence of bottlenecks in wage-goods sectors.) Ignoring this feature of dual-economies and boosting aggregate demand is prone to driving 'forced savings' in the context of constrained quantity adjustment (Kalecki 1955, 4). The bottom line is simple and has an intuitive congruence with long-run Harrodian policy conclusions: with a target for structural transformation necessitating a high investment rate, aggregate demand stimulus in the form of aggressive fiscal policy or a heavy-handed wage policy runs against the problem of capital constraints. However, a contemporary analysis of the relevance of general aggregate demand stimulus to the class of dual-economy growth issues cannot rest on the laurels of Kalecki's argument about the 1950s agrarian economy – the assumption of inelastic wage-goods supply may

¹¹ Sawyer (1985, 213) corroborates this perspective: a "first and basic theme expressed by Kalecki (e.g. Kalecki, 1975, Chapter 1) is that the cause of unemployment in underdeveloped countries... is seen to result from the shortage of capital equipment rather than from a deficiency of effective demand". The problem of underdevelopment is, according to this view, not unutilized capacities but rather insufficient capacities.

¹² The neo-Kaleckian tradition treats shifts in income distribution as aggregate demand policy, however, it is questionable whether the functional distribution of income is a policy tool, and there are important senses in which distributional policies ought to be treated distinctly from the conventional fiscal and monetary instruments.

not be relevant to today's semi-industrialized economies, where feudal lords may not be the fetter historically emphasized by development planners and strategists influenced by Soviet industrialization debates.

There are still useful insights for the contemporary period to be drawn from the above account of Kalecki's approach to development. Two propositions follow. Firstly, Kalecki was not insensitive to the relevance of structural heterogeneity and how it shaped the generality (or lack thereof) of demand management recommendations. Secondly, Kalecki stressed the role of the supply-side – specifically capacity constraints, rather than unutilized capacity and deficient demand as central to underdevelopment problems. On these grounds, Kalecki's writing on development could be contrasted with neo-Kaleckian advocacy for wage-led growth, where the rate of utilization is assumed an accommodating variable in the long run, and where policy conclusions for dual economies are derived from theoretical and empirical analysis of one-sector frameworks. More to the point, one could argue, as Fitzgerald (1990, 185) does, that Kalecki explicitly dissents from the “underconsumptionist thesis that market size limits industrial growth in developing economies [and that] increased investment will generate matching demand for consumer goods from the wages fund.”

Related concerns to those addressed by Kalecki have received attention in development theory after his writings. Below I review literature which makes use of, or comments on, two-sector models, with an eye to assess the implications for the applicability of neo-Kaleckian insights in dual economies.

Two-sector models have played an important role in the development of growth theory in general,¹³ but the dual-sector model has a special importance for development theory. Dutt (1996) notes that the one-sector Keynesian “model abstracts from all supply constraints that were argued to be relevant for LDCs, because it assumes that excess capacity always exists, that there is only one input (and no skilled labour, working capital, and infrastructure), there is only one sector (thereby ruling out agricultural constraints), and that we have assumed a closed economy, which makes foreign exchange constraints irrelevant” (Dutt 1996, 130).

Taylor and Arida (1988, 167) similarly demonstrate the usefulness of a multi-sectoral approach for the topic at hand, identifying that “if industrialization beyond production of simple goods like food and textiles is to occur... then income concentration to sustain demand for more

¹³ See Trigg (2006).

sophisticated commodities is unavoidable under present social conditions.” This concept was important to Latin American Structuralism and was formally represented in de Janvry and Sadoulet (1983). The main innovation of this paper was to analyze structural change implications of redistributions amidst inter-class heterogeneity in consumption patterns. When the consumption pattern of the working class is in important senses distinct from the upper classes, and if production in the ‘key growth sector’¹⁴ is geared overwhelmingly to demand from the upper classes, growth of key sectors requires increasing inequality (de Janvry and Sadoulet 1983, 278). This situation is referred to as ‘social disarticulation.’ The disarticulated economy can be contrasted with Kalecki (1968), where wages make up the largest proportion of demand for all sectors within the economy. In the latter case “steady-state growth requires that any increase in the productivity of labor in the sphere of production must be matched by an increase in real wages in the sphere of circulation”, implying the dual nature of labor as both a cost and a source of profit realization (de Janvry and Sadoulet 1983, 279).¹⁵

Harris (1996) accords with the preceding analysis and explores the implications for adoption of Keynesian policies to influence long run growth in dual economies. Harris contrasts ‘articulated’ Keynesian models with dual-economy ‘Kaleckian and Lewis-type models’ showing that “if import substitution is ruled out and the modern sector’s principal markets are external, it is not responsive to domestic demand management, and an expansionary shock to the modern

¹⁴ Stylized representations of dual economies have considered the key growth sector in different ways. Some have distinguished between manufacturing/agriculture. Formal/informal and tradable/non-tradable have been other popular representations.

¹⁵ The dynamic analysis of de Janvry and Sadoulet shows the possibility of three types of growth: a) Where the investment structure implies the modern sector is the ‘key growth sector’ and the income structure suggests the economy is suited to a process of ‘unequalizing industrialization’ (typically observed in developing countries) (de Janvry and Sadoulet 1983, 293). b), Where social articulation has occurred and the modern sector is the key sector, suggesting the economy is suited toward a more egalitarian distribution of income (a situation observed in advanced countries, where wages are high enough to support consumption of modern sector goods). The authors add that less-developed countries might still fit in this category and that “the poorer the country, the more egalitarian the ‘articulating’ threshold in the distribution of income is” (de Janvry and Sadoulet 1983, 294). In the third and final case, c), equalizing growth can be achieved through making the traditional sector the key growth sector, but this requires investment to be shifted to this sector to meet equilibrium conditions (de Janvry and Sadoulet 1983, 295). As investment rises in this sector, incomes rise and, provided Engel’s Law, consumption shifts from the traditional sector to the modern sector. While de Janvry and Sadoulet’s analysis refers directly to Kalecki, the model departs from neo-Kaleckian analysis by disregarding the functional distribution of income (preferring instead measures of wage inequality), meanwhile investment is independent of demand conditions and/or profitability. Chapter 9 of Taylor (1983) provides a related analysis whereby a shock to the distribution of final income through fiscal policy is emphasized, rather than the functional distribution of income or wage inequality. More recently, Milanovic (2019) briefly discusses disarticulation.

sector does not generate multiplier type demand and output increases in a positive feedback with the backward sector because of their segmentation” (Harris 1996, 160).

How relevant is the description of dual economies as disarticulated today? This is a complex empirical question.¹⁶ For some an approximating assumption of worker consumption of basic goods may seem anachronistic in an age where smartphones and other advanced manufactures are more widely available to and readily purchased by workers than before. But this is to miss the point. Very few developing countries produce advanced manufactures for the domestic mass market – even if workers may increasingly consume these goods as income levels grow. More importantly, short of a wholesale rejection of Engel’s Law, it appears uncontroversial that the share of income the rich devoted to consumption of advanced manufactures is greater than those at the bottom of end of the distribution.¹⁷ Insofar as workers in low- and middle-income economies consume advanced manufactures, they usually make up a small percentage of their consumption basket and tend to be imported.¹⁸

Empirically evaluating the comprehensiveness of these claims is not the focus of this paper. However, empirical work on related subject matter may be informative. Imbs and Wacziarg (2003) find a U-shaped relationship between the pattern of sectoral diversification and per capita income.

¹⁶ The question is made complex by issues of data availability and identification of the ‘key growth sector’. Identifying the key growth sector (or sub-sector) and the degree to which its’ output articulates with wage demand depends on a given economy’s stage of development. Income expenditure surveys can be used to get a sense about how the pattern of consumption varies by income percentile but tend to be measured infrequently. National accounts data meanwhile reflect the production structure but are insensitive to production complexity, i.e., manufacturing activities as varied as food processing (canning or bottling) are categorized together with production of mining equipment. This makes analysis of categories in the national accounts more prone to indicating articulation between wage demand and manufacturing growth than may be the case and calls for examination of sub-sectoral/firm data.

¹⁷ Developing countries may be disarticulated because they tend to have high levels of inequality. However, path-dependence in the ‘subsistence’ level of consumption of the rich in settler colonies might provide even greater impetus for the emergence of disarticulated structures of production/patterns of consumption. Despite their arrival in countries with vastly lower per capita income levels, it is plausible that settler colonialists ‘imported’ their desired consumption standards to colonies and transferred this to their children. As Leon (1967, 120) puts it: “The level of consumption reached by the older generation is a given for the following generation, and the utility which that level furnishes to the following generation is nil.” To explain the relevance of this perspective in an applied sense, consider Posel (2019, 30), writing of the South African context in 1861: “an unnamed ‘lady’, recently arrived in Cape Town, was relieved to discover the degree of material comfort among the colony’s propertied elite, notwithstanding the fact that ‘the place was in its infancy as to riches, conveniences, taste and luxury’ A Lady 1998: 37). Referring to the homes of the ‘ladies of the garrison’, the author registered her initial surprise at: ‘how very well-ordered are the appointments of many of these houses. They are generally situated in the suburbs – called the ‘Gardens’ – and besides being provided with stables and coach-houses, have flower-pots and verandahs with bloom. Most of the drawing-rooms are very prettily furnished, with profusion of vases, easy chairs and walnut and rosewood articles ‘deluxe’. (A Lady 1998: 11)’

¹⁸ Lavinias (2017, 631) notes that insofar as social policies (i.e., cash transfers, raising minimum wages) designed by the Worker’s Party to drive industrial development succeeded in stimulating consumption of industrial goods, they did so for *imported* home appliances.

Low-income economies are relatively specialized and tend to diversify as they grow until they reach fairly high levels of per-capita income. The finding is highly robust and Engel effects are one of two arguments used to explain the observation: by and large the structure of production corresponds to the pattern of demand and the pattern of demand is a function of income levels (Imbs and Wacziarg 2003, 42). Arguably, there are good reasons to believe Engel effects remain of relevance to investigation of the structural transformation implications of redistributive policies, and aggregate demand policy more broadly.

A common thread in the frameworks commented on above regards their emphasis on the importance of heterogeneous production structures in discussing distribution and growth dynamics. The next section explores the relevance of Engel effects for the structural change implications of redistributions, based on theoretical and empirical justifications provided in the current section.

3 Model

This section outlines an alternative framework for considering the structural transformation implications of redistribution in an underdeveloped economy. Modifying Razmi *et al.* (2012),¹⁹ a model of a disarticulated economy is set out for the purpose of internal critique.²⁰ The model's time horizon concerns the short run, correspondingly disregarding balance of payment constraints and taking the preference structure of consumption as given. All consumption is of domestically produced goods, investment goods are imported and there is open unemployment.²¹

$$\omega_N = \frac{w_N}{P_N} = vA; 0 < v \leq 1 \quad (1)$$

¹⁹ The analysis here departs from Razmi *et al.* (2012), where the focus is on the role for real exchange rate policy in development, by introducing a different specification for investment, the equalization of wages across each sector and the introduction of a tradable sector pricing equation for one of two cases – to address the structural change implications of shifts in income distribution (via changes in the worker productivity share).

²⁰ The model is neo-Kaleckian in the sense of retaining all features argued to be key to this class of models by Lavoie (2014). Retaining these features but including sectoral heterogeneity and a disarticulated pattern of consumption, I explore the robustness of the key results from standard one-sector neo-Kaleckian models.

²¹ The full set of equations required to solve the model is provided in Appendix B. Appendixes C and D show equilibrium solutions in full.

Equation 1 gives the real wage rate, ω_N , in the non-tradable sector. A gives labor productivity in the non-tradable sector. The worker productivity share, v , influenced by worker bargaining power, is the primary exogenous distributional variable of interest in this model, treated as a policy variable.

$$\omega_T = \omega_N = vA \quad (2)$$

Equation 2 gives the assumption, for simplicity, that wages are equalized across the two sectors.²²

$$C_N = \beta(vAL_N + vAL_T) + (1 - s)(\alpha)[qubK - vAL_T + AL_N - vAL_N] \quad (3)$$

Equation 3 gives demand for non-tradable goods. It is assumed that workers spend all their income on consumption of non-tradable goods.²³ Meanwhile, capitalist and landlords save a fraction of income (s), and consume a fraction (α) of non-saved income on non-tradable goods, with the remainder ($1-\alpha$) devoted to consuming output of the tradable sector. L gives employment, with subscripts corresponding to N(ontradable) and T(radable) sectors, and q gives the relative price of tradable to nontradable goods in domestic currency. h is a positive constant.

$$\alpha = h \frac{P_T}{P_N} = hq \quad (4a)$$

Equation 4a gives the short-run determination of the proportion of capitalist and landlord expenditure on non-tradable goods, depending positively (h is a parameter) on the relative price of tradable to non-tradable goods in domestic currency (q). Equation 5 gives pricing in the tradable sector, for one of two cases²⁴ where prices are marked up (θ) on the nominal wage. a gives labor

²² Appendix E includes a union/formal/tradable sector wage premium, which leaves the results qualitatively unchanged and opens space for analyzing the implications of a wider range of (policy) shocks.

²³ In other words, it is assumed that the share of worker consumption dedicated to the N-sector good, β , equals 1. Appendix F sets out the equilibrium solution for each sector where $0 < \beta < 1$.

²⁴ ‘Case 1’ (a fix-price scenario associated with the law of one price), where the mark-up declines because of the increase of v , to maintain q and α constant, and ‘case 2’ (a flexible-price scenario corresponding to a regime characterized by trade protection).

productivity for the tradable sector. The implications of these two scenarios for the question at hand are addressed below.

$$P_T = (1 + \theta)vAP_N/a \quad (5)$$

Under a regime of mark-up pricing, equation 5 implies equation 4a can be rewritten as follows:

$$\alpha = hq = h(1 + \theta)vA/a \quad (4b)$$

Demand for tradable goods excludes worker consumption demand, reflecting disarticulation. The complete exclusion of worker consumption for tradable goods (the case of $\beta = 1$ in equation 6) is a strong assumption, but one that allows for a simple inclusion of a static representation of Engel's Law.^{25 26} It has been modelled in a similarly strong form in Eswaran and Kotwal (1993).

$$C_T = \{(1 - \beta)(vAL_T + vAL_N) + (1 - s)(1 - \alpha)[qubK - vAL_T + AL_N - vAL_N]\}/q \quad (6)$$

In the short run, export demand is not assumed to be perfectly elastic, instead the level is predetermined. Meanwhile, the accumulation rate ($\frac{I}{K}$) is both increasing in the T-sector profit-share (π_T) and utilization rate (u), in line with standard representations in the (post-) Kaleckian

²⁵ For some, the treatment of the pattern of consumption as exogenous to changes in income may seem less than ideal for a framework directed toward evaluating the implications of changing income distribution/income levels. However, it is important to stress that the framework developed here addresses primarily short-run effects of changes in income distribution at the margin, while the dynamic properties of Engel's law can be understood as a long-run phenomenon (Leon 1967, 45).

²⁶ Agricultural goods can of course be tradable, and while the modelling choice for the consumption pattern is clearly stylized, a large literature on dual-sector models has treated the tradable sector as a placeholder for manufacturing (see for example Rodrik (2016)). Worker consumption of domestic manufactured goods may be limited in economies with an important commodity sector, especially where manufacturing is backwardly linked to this sector. More importantly, with the structure of consumption preferences given over the short/medium run, any growth strategy targeting rapid industrial growth and 'big push' externalities from inter-firm demand linkages (as seen in South Korean industrial strategy organized around Heavy-Chemical Industry (HCI)) will not be able to rely on wage demand for the product of the key growth sector.

literature. z captures the ‘animal spirits’ of capitalists and all investment goods are imported (as the only import goods in this economy).

$$\frac{I}{K} = z + \gamma u + \rho \pi_T \quad (7)$$

With additional equations and equilibrium condition (set out in full in the appendix to essay 1), we can solve the model for equilibrium values of utilization, output and investment and evaluate comparative statics.

The effect of an increase in v in case 1 (where q and α are constant) is given by equation 8, assuming the presence of open unemployment ($L_T + L_N < \text{the labor force, } N$.)

$$\frac{\partial Y_N^*}{\partial v} = \frac{ubK}{(1-v)^2} \left[\frac{A}{a} + \frac{\alpha(1-s)q}{1-\alpha(1-s)} \right] > 0 \quad (8)$$

Intuitively, an increase in the wage-bill across both sectors stimulates demand for N-sector output and the presence of open unemployment makes quantity adjustment feasible.

Taking exports and the share of capitalist and landlord expenditure on non-tradable goods as fixed, a change in v leaves tradable sector output unchanged.

$$\frac{\partial Y_T^*}{\partial v} = 0 \quad (9)$$

Intuitively, where T-sector prices are fixed, an increase in v implies a reduction in the mark-up, and workers increase their income share, in turn stimulating demand of the N-sector good. Gross profits in the N-sector grow as the demand effect dominates the decline in the N-sector profit share, and this increase in profits offsets the effect of the falling T-sector capital share on demand for the T-sector consumption good.

Given the importance of capital accumulation to structural transformation problems (as in Lewis (1954)), a central result for the present framework regards the negative relationship between the worker productivity share and the rate of investment:

$$\frac{\partial(\frac{I}{K})^*}{\partial v} = \frac{-\rho AL_T}{qY_T} < 0 \quad (10)$$

This result derives from the invariance of capacity utilization to changes in the worker productivity share when T-sector prices are exogenously given – changes in v influence the investment rate via the direct effect on income distribution, outlined in equation 7.

Taking θ as exogenously given (case 2), by incorporating definitions of α and q that include their relationship to v , produces qualitative ambiguity to the analysis of how N-sector outcomes change with v . Intuitively, however, one would expect output to increase by a greater extent than in equation 8 since the proportion of capitalist and landlord expenditure on non-tradable goods (α) would increase, in addition to the wage bill (all of which goes to consumption of non-tradable goods).

The case 2 results are more straightforward with respect to effects of v on tradable sector output. Profit income does not fall when the worker productivity share rises and the mark-up is given exogenously, however, shifts in relative prices (q) prompt changes in capitalist and landlord consumption preferences in an unfavorable direction for the T-sector.

$$\frac{\partial Y_T^*}{\partial v} = \frac{-XhA(1+\theta)(1-s)}{as} < 0 \quad (11)$$

This negative outcome from a change in v for T-sector output is mirrored by a fall in the accumulation rate, seen in equation 12.

$$\frac{\partial(\frac{I}{K})^*}{\partial v} = -\frac{\gamma XhA(1+\theta)(1-s)}{abKs} < 0 \quad (12)$$

4 Discussion

In summary of the analysis above, there are two broad scenarios under which changes in v are assessed in this paper: case 1, where an increase in v underlies a reduction in the mark-up (q and α remain constant) and case 2, where the mark-up is constant (q and α increase with p_T). In the first case, output in the non-tradable sector increases while output in the tradable sector remains

unchanged. While the rate of utilization remains unchanged, the tradable sector is hindered by the tradable sector profit share falling in ν , driving down the rate of capital accumulation.

In case 2, in contrast to the N-sector, the consequences of an increase in ν for tradable sector output are again unambiguously negative. The assumption of a constant mark-up implies an increase in ν raises P_T , in turn increasing q and α . In this instance, utilization is negatively affected by an increase in α , while the profit share in the tradable sector remains unchanged. The combination of these factors brings down the rate of capital accumulation, albeit through a distinct mechanism than that which characterizes case 1.

It should be noted that in contrast to one-sector neo-Kaleckian models, the disarticulated model presented here precludes the prospect of direct class conflict in the sense usually outlined in models of the former variety. Where an increase in mark-up mechanically reduces the real wage in standard Kaleckian models, in a disarticulated model an increase in the tradable sector mark-up has no direct effect on the real consumption wage in either sector. Distributional conflict over tradable sector pricing would reappear in the model if workers consumed tradable goods.

Intuitively, a redistribution towards workers (underlined by an increase in the main distributional variable of interest in this model, ν) brings about an increase in consumption of non-tradable goods, as these are the goods workers purchase exclusively. It is expected that an increase in ν would particularly stimulate N-sector output when the mark-up is constant, because of how α is specified. For simplicity, I assume no capital is used in this sector and that the economy is characterized by open unemployment, as such output adjusts through greater utilization of the labor force. Although N-sector production takes place without capital, we broadly have the conditions for ‘wage-led’ output growth in this sector after a redistribution since nothing in this model suggests the possibility of increased consumption demand being mitigated by lowered rates of accumulation nor worsened export performance, due to the key modeling assumptions.

However, in contrast to the non-tradable sector, the tradable sector exhibits a tendency toward ‘profit-ledness,’ with the increase in ν negatively affecting the profit share (in case 1) and negatively affecting the rate of utilization (in case 2). Output remains unchanged in this sector when ν increases (unless the mark-up is constant, in which case output declines as α increases). The core finding from this model, which ties into the literature review, is that the rate of accumulation declines in both cases.

How does this differ from the results that follow from standard neo-Kaleckian models? Since we have a sectoral disaggregation where one sector can exhibit wage-led and the other profit-led tendencies the aggregate character of the economy is left ambiguous. However, policies for raising v have unambiguously adverse ramifications for structural change and capital accumulation. Taking authors in the neo-Kaleckian tradition to interpret the implementation of wage-led growth policies primarily in terms of measures that strengthen worker bargaining power, as in Lavoie and Stockhammer (2012, 18), these results run in contrast to much of the wage-led growth literature.

Interestingly, since the mark-up, θ , enters multiplicatively with v under case 2, the effects of a decline in the (modern sector) mark-up are quite different than those of an increase in workers' real consumption wage. This is because a reduction in the mark-up and a fall in real consumption wages (often treated as shocks to income distribution in opposite directions) share common effects on putting downward pressure on α , which the rate of capacity utilization is falling in. The precise source of the shock to income distribution is hence relevant to analysis of the outcomes following changes in income distribution.²⁷

While the primary aim of this paper is to illustrate the lack of robustness of even short-run Kaleckian conclusions to disarticulated contexts, interest in questions of development necessitate a view on the long-run. A long-run approach would emphasize that the pattern of consumption (the share of income devoted to each good by each social class) is determined not only by relative prices, but also by income levels and income distribution.²⁸ Moreover, in line with behavioral accounts in the Harroddian tradition, utilization rates are not plausibly an accommodating variable in the long-run, as such demand-induced accelerator effects from changes in the pattern of consumption after redistribution are precluded by definition. In the absence of these effects, and in the presence of a large external market when producing at the given international price in foreign currency, the consumption of workers *and* excessive capitalist consumption compete with investment for national resources.²⁹

²⁷ Skott (1989, 38-9 & 151-2) discusses related issues.

²⁸ See Falkinger and Zweimüller (1996), Laitner (2000).

²⁹ Skott (2021) provides a treatment of long run structural change implications of fiscal policy in dual economies, assuming strong relative wage norms as the intrinsic feature of duality, no open unemployment, and no distinction between consumption out of profit and wage income. The Robinsonian/Harroddian specification of investment and distributional dynamics suggest the growth rate is increasing in the profit share, and imply a long run relationship between fiscal policy instruments and growth.

5 Caveats

The analysis in this paper relies on several stylized assumptions to keep the analysis tractable and to serve the purpose of an internal critique. Questions about the pattern of consumption, specification of investment and structure of production are particularly open to challenge. It is doubtful whether the simplified model presented above corresponds to any specific economy and a number of caveats, as follows, are worth highlighting. Any propensity for relatively substantial capitalist consumption to be directed toward the modern sector must be contextualized alongside high degrees of unproductive capitalist expenditure toward consuming financial services or real estate. These are forms of elite consumption unamenable to dynamic feedback effects with the modern sector.

Worker demand in developing economies meanwhile may exhibit complementarities with sectors like clothing and textiles, white-goods, and household furnishings. The point, however, regards the extent to which these sub-sectors correspond to industrial strategy in both static and dynamic senses. If one is assessing the ramifications of income redistribution for upper-middle income economies, will it be sufficient to articulate domestic demand with manufacturing sub-sectors associated with the industrial strategy of the low-income economy? Even in low-income economies, if wage demand articulates with the sub-sectors key to industrial strategy at an initial stage, will the preference structure of wage earners be able to evolve rapidly enough to sustain demand as the industrial structure upgrades rapidly, with the latter as the target of growth policy? Moreover, if one is analyzing special cases like a semi-industrialized economy with an important minerals sector, stimulating domestic demand for the manufacturing sub-sectors with backward linkages to mining means something very different to what neo-Kaleckians might contend.³⁰

In the long run, the caveats regarding the pattern of consumption matter doubly. Capital accumulation and the rate of growth become determinants of consumption preferences. Income levels are not static, and preferences dynamically evolve over the development process, as reflected in evidence presented in Imbs and Wacziarg (2003). The dynamic properties of the

³⁰ The caveats concerning the pattern of consumption are addressed in Appendix F, including worker consumption of the modern sector good. The qualitative results depend on the values of parameters reflecting worker and capitalist, respective, propensities to consume modern sector goods and the saving rate out of profits.

pattern of consumption are mirrored by properties of the production structure – informal firms catering to low-income consumption become formal and the highly-dualistic structure of the model becomes an impediment to understanding the relationship between distributive patterns and growth.³¹ This paper abstracts from these important issues, leaving them as a topic for further research.

A final caveat concerns the role of worker bargaining power in industrial development. The model above provides a reified introduction of worker bargaining power, reflected in the variable v , which does not consider the full complement of plausible effects introduced by changes in worker bargaining power. An argument in accounts of late industrialization attempts in India has emphasized the role of a mobilized labor movement with the capability of populating the state with bureaucrats carrying a proclivity for disciplining capital, in line with the state's development strategy (Chibber 2003, 111). Whether or not this account aligns with successful models of development employed elsewhere,³² it is worth taking into consideration broader institutional benefits to society, state and industrial strategy that may stem from greater worker control and influence over the political process. I am, however, skeptical that these benefits run primarily through linkages between domestic worker demand and the output of the key growth sector.

Does recognition of this point imply the applicability of Thatcherite policies that *weaken* labor's bargaining position? Potentially harmful effects to raising v *need not* imply that growth strategy should put downward pressure on v , and I would argue that the latter is neither socially nor politically desirable in the presence of alternatives. Beyond the time horizon where capacity utilization is an accommodating variable, raising the growth rate of the modern sector is made possible by a range of policies that stimulate the investable surplus. Disarticulation can become convenient from a distributive perspective – policies that raise the modern sector mark-up may

³¹ Gollin (2014) discusses related issues concerning the Lewis model's characterization of dualism.

³² My perception is that it does not, or at least not unambiguously. If we use raising the labor share as a proximate objective of a strong labor movement, it is interesting to note that the prominent accounts of the Nordic model emphasize its distributive objectives as limiting wage inequality rather than raising the labor share (Moene and Wallerstein 2002). A key feature of the Nordic model, solidaristic wage bargaining, was a tool for ensuring wage compression and spurred development insofar as it brought the wage share down in the key-growth sector (in high-productivity firms). On this reading, the Nordic model ensured a sufficiently high share of the surplus went to firms in the key growth sector through a process of centralization that weakened the wage setting power of unions in the high productivity sector. Unions may have strengthened in aggregate but in the modern sector their influence, and worker's share of output, fell. Seguino's (1997) account of South Korean industrialization meanwhile shows the prevalence of real wage growth falling significantly below productivity growth in key industrial sub-sectors like electronics.

facilitate capital accumulation without lowering the real consumption wage, and hence industrial policies need not engender class conflict over worker purchasing power.³³

6 Conclusion

The era of settler colonialism left a profound and lasting imprint on the economic structure of many economies. Many of these economies had ‘dual’ structures in senses beyond the mere presence of abundant labor supplies. That is to say that dualism manifested itself by vast disparity across a variety of social groups in terms of income levels, consumer preferences/consumption patterns and location, shaping the trajectory of capitalist development in these economies. Concretely, economies like the settler economies of southern Africa had relatively developed capitalist sectors that often catered primarily to the high-end demand of a small white population composed of supervisory laborers, managerial-professionals, and capitalists. Black labor was commonly seen exclusively as an industrial input, and scarcely an important source of industrial demand, in contrast to the hallmarks of the Fordist model³⁴ in advanced capitalist economies. Posel (2019, 41) notes of racist views in the *South African Spectator* in 1902 that “we should aim at the production of good black men and not attempt to make impossible white men out of good black men and thereby waste excellent raw material.” As a result of this history, the middle class remained small and, economically speaking, black labor remained something approximating little more than a cost to capital in certain key sectors. To sustainably change the colonial consumption structure requires long periods of high-income growth. How does this history influence the prospects for wage-led industrialization? Unfavorably, in my opinion.

This is to say that a strong legacy of inequalities shaped not only how much different social classes consumed but what they respectively consumed. That the economic history of many settler colonies is on these terms is indubitable.³⁵ Two questions principally remain: 1) does this continue to be the case in an important, if diminished, sense for macroeconomic outcomes and 2) what ought

³³ An unsettling corollary of this claim is that disarticulation implies the direct benefits to modern sector productivity growth accrue exclusively to the owners of capital. Eswaran and Kotwal (1993) explore this proposition analytically.

³⁴ See Grandin (2009, 146) for an account covering differences in the Ford Motor Company’s wage structure in Detroit and the Amazon company town ‘Fordlandia.’

³⁵ Other categories of developing countries of course have different histories. However, it seems plausible that developing countries’ economies are commonly influenced by hierarchical preferences on the consumption structure and dualistic labor markets.

to be done about income inequality? In answering the first question, one can observe the imprint of extreme inequality on the consumption pattern of different income deciles and as reflected in income and expenditure surveys. High levels of income inequality in economies with a moderate per capita income ensure that individuals at various ends of the income distribution will consume differently.

This is a descriptive claim about a particular set of economies as they are of relevance to a myriad of low- and middle-income economies that wish to rapidly upgrade technical productive capability in sectors key to a national development strategy. For these set of economies, building industrial capacity around broad-based domestic demand would constrain industrialization, if the preference structure of workers is not implausibly elastic to aggregate income growth. Were there not a sufficiently large pool of external consumers willing and able to consume sophisticated products at competitive prices with little regard for where those goods are made, the argument for containing the expansion in complexity of the production side of the economy by pursuing a domestic wage-demand centric strategy may be more convincing.

As regards the second question raised above, there are important intrinsic reasons for tackling income inequality. However, the analysis presented in this paper suggests that particularly short run arguments for redistributing income should not be confused with a development strategy. In the long run, tackling income inequality can be reconciled with a development strategy – but crucially not through wage-led accelerator effects. Over this time horizon, capacity constraints are binding and the need for a high investment share in output requires contracting the consumption share – squeezing luxury consumption is a major instrument for facilitating this and a means of reconciling targets for income distribution with targets for long run growth. In this context, fiscal policy becomes key, and the functional distribution of income is better characterized as a target than an instrument. Squeezing the consumption share of the rich in output will not be sufficient to drive forth long run growth by itself and there is an important role for state-led industrial policies to bring forth high rates of investment. The availability of these policies ensures that development policy need not imply slashing real consumption wages.

To put the central analysis derived above concisely, the lack of worker consumption for manufactures negatively impacts on the space for wage-led industrialization. One way of presenting the negative claim about the applicability of wage-led strategies in developing countries in terms of a positive claim is to argue for the importance of industrial policies. To achieve

development (structural transformation), merely boosting aggregate demand, in this case via shifts in income distribution, is insufficient. This insufficiency is underlined by one sector models in general and calls for wage-led growth in particular.

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Appendix A

This appendix outlines the neo- and post-Kaleckian models in closed, canonical form. In these single sector models, a rise in the mark-up captures a decline in the real wage. Core to this model is the assumption that a homogenous output is produced for both consumption and investment purposes and that changes in the mark-up are purely exogenous.

The profit share, π , is determined by the mark-up, θ .

$$\pi = \theta/(1 + \theta) \quad (\text{A.1})$$

The profit rate, r , is given by π , capacity utilization, u , and the capacity-capital ratio, j .

$$r = \pi u/j \quad (\text{A.2})$$

The saving rate, g_s , is given by propensity to save out of profits, such that:

$$g_s = sr = s\pi u/j \quad (\text{A.3})$$

And the rate of accumulation is determined by animal spirits, z , and demand conditions, where γ is a parameter.

$$\frac{I}{K} = z + \gamma u \quad (\text{A.4})$$

The model is solved for a goods market equilibrium in the standard form and assuming the Keynesian stability condition:

$$s\pi > j\gamma u \quad (\text{A.5})$$

The equilibrium value of the rate of utilization is subsequently given by:

$$u^* = \frac{z}{\frac{s\pi}{j} - \gamma} \quad (\text{A.6})$$

And corresponding the equilibrium rates of accumulation and saving become:

$$\left(\frac{I}{K}\right)^* = z + \frac{\gamma z}{\frac{s\pi}{j} - \gamma} \quad (\text{A.7})$$

$$g_s^* = \frac{(s\pi z)/(\frac{s\pi}{j}-\gamma)}{j} \quad (\text{A.8})$$

In summary then, the framework can be used to analyze the ‘paradox of thrift’ – a lower propensity to save becomes expansionary and induces a growth of consumption demand, utilization, resultingly investment (Hein 2014, 254):

$$\frac{\partial u^*}{\partial s} = \frac{-z\pi/j}{(s\pi-\gamma)^2} < 0 \quad (\text{A.9})$$

$$\frac{\partial(\frac{I}{K})^*}{\partial s} = \frac{-\gamma z\pi/j}{(\frac{s\pi}{j}-\gamma)^2} < 0 \quad (\text{A.10})$$

The model also allows for an illustration of the ‘paradox of costs’:

$$\frac{\partial u^*}{\partial \pi} = \frac{-zs\frac{1}{j}}{(\frac{s\pi}{j}-\gamma)^2} < 0 \quad (\text{A.11})$$

$$\frac{\partial(\frac{I}{K})^*}{\partial \pi} = \frac{-\gamma z(s\frac{1}{j})}{(s\pi-\gamma)^2} < 0 \quad (\text{A.12})$$

This model thus establishes the prospects for ‘wage-led growth’ (neglecting the possibility of a ‘profit-led growth’ regime) since capital accumulation is influenced only by the rate of utilization. Hence, the neo-Kaleckian model has no space for the potential negative effects of a reduced profit share of income on investment. This prospect was introduced in Bhaduri and Marglin (1990) – the so-called ‘post-Kaleckian’ model. Their extension essentially updates the investment function to include the effect of changes in the profit share on investment.

$$\frac{I}{K} = z + \gamma u + \rho\pi \quad (\text{A.13})$$

There is now the possibility of an invalidation of the underconsumptionist implications derived by neo-Kaleckians. Solving the model for the equilibrium rate of utilization (using the saving function of the neo-Kaleckian model) we get the following:

$$u^* = \frac{z+\rho\pi}{\frac{s\pi}{j}-\gamma} \quad (\text{A.14})$$

$$(\frac{I}{K})^* = z + \gamma\left(\frac{z+\rho\pi}{\frac{s\pi}{j}-\gamma}\right) + \rho\pi \quad (\text{A.15})$$

The partial effect of the savings rate on capacity utilization remains qualitatively as before:

$$\frac{\partial u^*}{\partial s} = \frac{-(z+\rho\pi)\pi/j}{(\frac{s\pi}{j}-\gamma)^2} < 0 \quad (\text{A.16})$$

$$\frac{\partial (\frac{I}{K})^*}{\partial s} = \frac{-\gamma(z+\rho\pi)\frac{\pi}{j}}{(\frac{s\pi}{j}-\gamma)^2} < 0 \quad (\text{A.17})$$

However, the paradox of cost no longer necessarily holds:

$$\frac{\partial u^*}{\partial \pi} = \frac{\rho - s\frac{u}{j}}{\frac{s\pi}{j} - \gamma} \quad (\text{A.18})$$

$$\frac{\partial (\frac{I}{K})^*}{\partial \pi} = \frac{\gamma(-\gamma\rho - z s\frac{1}{j})}{(\frac{s\pi}{j} - \gamma)^2} + \rho \quad (\text{A.19})$$

The analysis hence allows for the possibility of two regimes: a ‘stagnationist regime’ (wage-led regime), where investment is weakly responsive to changes in the profit share, and an ‘exhilarationist regime’ (profit-led regime), where the capitalist investment responds more strongly to changes in the profit share (Bhaduri and Marglin 1990, 381-382).

Appendix B

Since the non-tradable sector is not particularly capital intensive, for simplicity I assume labor is the exclusive factor of production in this sector. There are constant returns to labor.

$$Y_N = AL_N \quad (\text{B.1})$$

By contrast, the tradable sector meanwhile uses a Leontief technology.

$$Y_T = aL_T = ubK \quad (\text{B.2})$$

Equilibrium in the non-tradable sector requires that real output and consumption are equivalent.

$$Y_N = C_N \quad (\text{B.3})$$

Meanwhile, q is defined as the relative price of tradable goods to non-tradable goods, in terms of domestic currency.

$$q = \frac{P_T}{P_N} \quad (\text{B.4})$$

Export levels are given exogenously in the short run, ensuring capacity utilization remains an accommodating variable and realization problems may affect tradable sector firms at this time horizon.

The aggregate output level, in terms of non-tradable prices, is given by:

$$Y = Y_N + qY_T \quad (\text{B.5})$$

Finally, domestic demand in aggregate (also in terms of non-tradable prices) is given by:

$$D = C_N + qC_T + q \frac{P_K}{P_T} I \quad (\text{B.6})$$

Using the equilibrium condition for the non-tradable sector:

$$Y_N = C_N \quad (\text{B.7})$$

And solving for Y_N gives an equilibrium value of non-tradable output (workings can be found in Appendix C) and employment:

Appendix C

This appendix sets out the proof for derivation of the N-sector equilibrium, assuming $\beta = 1$.

$$\text{Step 1: } AL_N = vAL_N + vAL_T + (1-s)(\alpha)[qubK - vAL_T + AL_N - vAL_N]$$

$$\text{Step 2: } AL_N = vAL_N[1 - \alpha(1-s)] + vAL_T[1 - \alpha(1-s)] + \alpha(1-s)[qubK] + \alpha(1-s)AL_N$$

$$\text{Step 3: } \frac{AL_N}{[1-\alpha(1-s)]} = vAL_N + vAL_T + qubK \frac{\alpha(1-s)}{[1-\alpha(1-s)]} + AL_N \frac{\alpha(1-s)}{[1-\alpha(1-s)]}$$

$$[L_T = \frac{ubK}{a}, \text{ from B. 2}]$$

$$\text{Step 4: } \frac{AL_N}{[1-\alpha(1-s)]} = vAL_N + ubK \left[\frac{vA}{a} + \frac{\alpha(1-s)q}{[1-\alpha(1-s)]} \right] + AL_N \frac{\alpha(1-s)}{[1-\alpha(1-s)]}$$

$$\text{Step 5: } \frac{AL_N}{[1-\alpha(1-s)]} [1 - \alpha(1-s)] = vAL_N + ubK \left[\frac{vA}{a} + \frac{\alpha(1-s)q}{[1-\alpha(1-s)]} \right]$$

$$\text{Step 6: } AL_N(1-v) = ubK \left[\frac{vA}{a} + \frac{\alpha(1-s)q}{[1-\alpha(1-s)]} \right]$$

$$\text{Step 7: } Y_N^* = \frac{ubK}{1-v} \left[\frac{vA}{a} + \frac{\alpha(1-s)q}{[1-\alpha(1-s)]} \right]$$

Appendix D

The equilibrium solution for the tradable sector can be found as follows, using the tradable consumption function incorporating a strong form of Engel's Law ($\beta = 1$).

$$\text{Step 1: } ubK = X + C_T$$

$$\text{Step 2: } ubK = X + (1-s)(1-\alpha)[qubK - vAL_T + AL_N - vAL_N]/q$$

$$\text{Step 3: } u = \frac{X}{bK} + (1-s)(1-\alpha)u - \left(\frac{vA}{q}\right)\left(\frac{L_T}{bK}\right)((1-s)(1-\alpha)) + \frac{AL_N}{qbK}(1-v)((1-s)(1-\alpha)) \quad z$$

$$\text{Step 4: } u[1 - (1-s)(1-\alpha)] = \frac{X}{bK} + \frac{AL_N}{qbK}(1-v)((1-s)(1-\alpha)) - \left(\frac{vA}{q}\right)\left(\frac{L_T}{bK}\right)((1-s)(1-\alpha))$$

$$\left[\frac{L_T}{bK} = \frac{u}{a}, \text{ from B. 2}\right]$$

$$\text{Step 5: } u[1 - (1-s)(1-\alpha)] = \frac{X}{bK} + \frac{AL_N}{qbK}(1-v)((1-s)(1-\alpha)) - \left(\frac{vA}{q}\right)\left(\frac{u}{a}\right)((1-s)(1-\alpha))$$

$$\left[L_N = \frac{ubK}{A(1-v)}\left[\frac{vA}{a} + \frac{\alpha(1-s)q}{1-\alpha(1-s)}\right], \text{ from B.1 and step 7 of Appendix C.}\right]$$

$$\text{Step 6: } u[1 - (1-s)(1-\alpha)] = \frac{X}{bK} + u\left[\frac{vA}{qa} + \frac{\alpha(1-s)}{1-\alpha(1-s)}\right](1-\alpha)(1-s) - \frac{vAu}{qa}(1-\alpha)(1-s)$$

$$\text{Step 7: } u[1 - (1-s)(1-\alpha)] = \frac{X}{bK} + u\left[\frac{\alpha(1-s)}{1-\alpha(1-s)}\right](1-\alpha)(1-s)$$

$$\text{Step 8: } u\left[1 - (1-s)(1-\alpha)\left(1 + \frac{\alpha(1-s)}{1-\alpha(1-s)}\right)\right] = \frac{X}{bK}$$

$$\text{Step 9: } u\left[1 - \left(\frac{(1-s)(1-\alpha)}{1-\alpha(1-s)}\right)\right] = \frac{X}{bK}$$

$$\text{Step 10: } u\left[\frac{s}{1-\alpha(1-s)}\right] = \frac{X}{bK}$$

$$\text{Step 11: } u^* = \frac{X[1-\alpha(1-s)]}{bKs}$$

Appendix E

For the purposes of deriving further policy conclusions in the absence of cross sector wage equalization, a simple extension to the model, incorporating a fixed tradable sector union wage premium (d), may be of interest:

$$C_N = vAL_N + dvAL_T + (1-s)(\alpha)[qubK - dvAL_T + AL_N - vAL_N] \quad (\text{E.1})$$

The wage in the tradable sector is no longer equal to the wage in the non-tradable sector, which has implications for the demand for non-tradable goods equation.

$$C_T = (1-s)(1-\alpha)[qubK - dvAL_T + AL_N - vAL_N]/q \quad (\text{E.2})$$

Likewise, the union wage premium enters the equation for demand for tradable goods.

$$\pi_T = 1 - \frac{dvAL_T}{qY_T} \quad (\text{E.3})$$

The profit share in the tradable sector also undergoes a minor alteration, which has implications for the accumulation rate equation defined below.

$$\frac{I}{K} = f(z, u, \pi_T) = f\left(z, u, \left(1 - \frac{dvAL_T}{qY_T}\right)\right); f_u > 0, f_{\pi_T} > 0 \quad (\text{E.4})$$

The equation depicting mark-up pricing also undergoes a minor alteration.

$$P_T = (1 + \theta)dvAP_N/a \quad (\text{E.5})$$

Appendix F

Introducing worker consumption of the tradable good, such that workers consume β non-tradable goods out of the wage bill and $1 - \beta$ tradable goods, influences the equilibrium solution for each sector such that they are characterized by the following equations:

$$Y_N^* = \frac{ubK\left(\frac{vA}{a} + \frac{q\alpha(1-s)}{\beta - \alpha(1-s)}\right)}{\left(\frac{1-\alpha(1-s)}{\beta - \alpha(1-s)} - v\right)} = \frac{ubK\left(\frac{vA}{a}(\beta - \alpha(1-s)) + q\alpha(1-s)\right)}{1 - \alpha(1-s) - v(\beta - \alpha(1-s))} \quad (\text{F.1})$$

$$u^* = \frac{X}{bKS\left[\frac{(1-v)\left(\frac{vA}{a} + \frac{q\alpha(1-s)}{\beta - \alpha(1-s)}\right)}{q\left(\frac{1-\alpha(1-s)}{\beta - \alpha(1-s)} - v\right)} + \left(1 - \frac{vAL_T}{qY_T}\right)\right]} = \frac{X}{bKS\left[\frac{(1-v)}{q}\left(\frac{vA}{a}(\beta - \alpha(1-s)) + q\alpha(1-s)\right) + \left(1 - \frac{vA}{aq}\right)\right]} \quad (\text{F.2})$$