Placing Human Capacity at the Heart of Post-Keynesian Analysis: Reconsidering the Supply-Side Constraint and Lessons for Public Policy

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Abstract

This paper aims to contribute to post-Keynesian growth theory by placing the accumulation of human capacities – rather than economic growth – at the center of analysis. We develop a demand-led theoretical model comprising two interrelated spheres: market-paid production and the unpaid care economy. Care provision depends on both government investment in care-related activities and the allocation of labor time outside market production, and is essential for offsetting the depletion of human capacities. Our results identify a feminist reinterpretation of Harrod's first problem, in which time can also be seen as a supply constraint. This is accompanied by a condition of time poverty, in which the time available after market work is insufficient to sustain the recovery of human capacities. This condition generates instability in labor supply dynamics under scenarios of accelerated economic growth, even though the demand-led growth rate may remain unaffected. We show that public policies toward care provisioning can mitigate time poverty and help prevent such instability. Moreover, we examine the cyclical dimension of care provision, the gendered nature of time poverty, and a concept of full employment that explicitly incorporates the expansion of human capacities. The paper concludes by outlining several avenues for future research to further extend the proposed framework.

Keywords: Care economy, human capacities, post-Keynesian economics, time poverty, unpaid work.

JEL classification codes: B54, E12, E24, E62, J16.

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1 Introduction

Since the Classical political economists, economic theory has referred to "the economy" as everything that can be bought and sold in the market sphere: the production of commodities by means of commodities (Folbre, 2023). In this way, most theories of economic growth, including post-Keynesianism, have traditionally centered their analyses on the economic growth rate as the ultimate variable of interest. Within that framework, human beings are treated primarily as a means of production – labor input in the production function – rather than the focus of analysis. Consequently, the literature tends to follow Lucas's (1988) view of economic development as enhancing the growth rate of income, rather than Sen's (1999) conception of development as the process of expanding human capabilities.

This perspective implicitly assumes that economic growth is an end in itself (rather than a means to improve people's lives), whereas the expansion of human capacities is framed as a means to induce economic growth, rather than an end in itself. Even in models where growth impacts inequality or where human capital has a role, the analysis is rooted in technical change to increase, stabilize, or resolve the first Harrod problem of long-term equilibrium growth rates.

By contrast, feminist economics has emphasized the importance of human capacities, particularly the recognition of care work (Braunstein et al., 2011). By placing the reproduction sphere at the core of its analysis, feminist economics has highlighted several issues often overlooked by macroeconomists that can limit economic growth in both the short and long run. Among other elements to be considered – such as the impact of human capacities on productivity and demand – the "production of people by means of people" (Folbre, 2023) poses a limit from the supply side. When focusing on human capacities, Harrod's first problem gains a feminist parallel: in the same way that the employment rate is bounded between zero and one (leading to a long-run problem of the compatibility between the natural and equilibrium rates), the duration of a day is also limited to 24 hours. The production of human capacities – and, ultimately, population growth itself – is not exogenous to "the economy". From this perspective, a trade-off may exist between economic growth and human capacity expansion, particularly with respect to unpaid care work.

Onaran and Oyvat (2023) outline three reasons post-Keynesian economics needs its feminist counterpart: unpaid/paid care's role in labor production, sexual divisions of labor, and gender/race discrimination's erosion of bargaining power. We propose a fourth: elevating human capacity expansion as the ultimate aim, which highlights a Harrod-like time-use constraint that is unsolvable by endless growth. Macroeconomics must thus prioritize time-affecting policies, aligning with Blecker and Braunstein's (2022, p.1) call to "center the economic and social contributions of caregivers."

Building on this perspective, this paper aims to contribute to the literature in two distinct ways. First, we contribute to post-Keynesian theory by shifting the focus from economic growth to human capacity growth and formalizing the supply-side constraint related to time use and poverty. As previously discussed, when considering such a constraint perspective, policy analysis needs to be reframed. Thus, our second contribution consists of analyzing a set of public policies in light of the proposed analytical framework.

2 Beyond Growth: Human Capacities and Feminist Critiques

Traditional economic theories, including post-Keynesian approaches, prioritize growth rates and agent classifications tied to production roles, often sidelining human well-being. Class and conflict feature prominently in analyses of political economy, yet agents are classified by productive roles: capitalists, rentiers, and workers (Folbre, 2023). Income distribution and social conflict, therefore, remain tied to economic growth. Post-Keynesians, for instance, emphasize the role of distribution in shaping demand, investment, and capital accumulation. Models incorporating growth's effects on inequality or human capital likewise root their analysis in technical change to boost, stabilize, or resolve the first Harrod problem of long-term equilibrium growth rates. Serra (2021) and Setterfield (2023), for example, examine how human capital investment—defined as contributions to labor productivity—addresses the First Harrod Problem of uneven growth in production inputs (physical capital and labor). Population growth may enter the analysis centrally, but their core argument remains framed in the economic sphere: insufficient investment undermines long-term expansion.

Feminist economics, by contrast, adopts a broader view of human capacities, transcending the narrow framing of human capital as a mere productive input (Braunstein et al., 2011). From this perspective, the expansion of human capacities is influenced, but not limited by economic growth, income distribution, and labor market conditions.

For instance, time availability for unpaid care is crucial to enhancing human capacities. In addition, as most of these care responsibilities are socially assigned to women, gender becomes an indispensable variable. As discussed in Elson (2025), an equilibrium growth rate found by a macroeconomic model, even if a result of planned development, may not - and will likely not - lead to a "balanced distribution between men and women of paid work in production and paid work in social reproduction". In addition, as a significant part of care work is performed outside the market sphere, it becomes invisible. Long hours of paid and unpaid care work can lead to time poverty and harm productivity, as people (and mainly women) can get stressed or ill. Hence, there may be a coordination problem between the equilibrium growth rate of the macroeconomic model and the assumption that unlimited women's unpaid labor absorbs shocks, risking the depletion of human capacities (Elson, 2025). Incorporating such elements into the macroeconomic framework can yield distinct results. In Setterfield's (2026) macroeconomic model, for example, time poverty is a key constraint on unpaid domestic caregiving, disproportionately affecting women and undermining labor productivity in paid production, thereby affecting the economy's long-run equilibrium growth rate.

More than representing an alternative view to economic growth, the feminist economics framework places human capacities at the center of economic analysis, highlighting that different social structures – such as those based on inequality and exploitation – can generate similar growth outcomes while producing very different impacts on human well-being (Braunstein et al., 2021). Feminist economists critique how this invisible labor subsidizes markets without recognition or valuation, leading to crises such as those exposed by the COVID-19 pandemic, in which care deficits strained economies reliant on it (Harcourt, 2026).

At the same time, enhancing human capacities also has a procyclical dimension that cannot be ignored. For

instance, Onaran et al. (2022) and Onaran and Oyvat (2023) demonstrate within a macroeconomic framework that household consumption and public spending in the care economy – such as in health, education, and childcare – increase labor productivity[1]. Other types of public investment that contribute to human development include social and physical infrastructure, such as energy, clean water, and transportation (Seguino, 2012).

Hence, the state can play a pivotal role in providing a range of care services. In addition to contributing to the production and reproduction of human capacities, public investment in social services, such as health and education, has the potential to create more jobs than the same investment in other sectors, such as construction (Ilkkarakan et al., 2015; Marques et al., 2022). Since women are overrepresented in such sectors, it increases their employment and potentially reduces the unpaid care time at home due to public provisioning, while also enabling their labor force participation (Onaran et al., 2022). In addition, as in Setterfield's (2026) model, public provision of care can alleviate the time-poverty problem and restore stabilizing conditions for productivity and growth. Valuing care through policies like care income or public jobs in welfare and ecology fosters economic well-being, equity, and sustainability by addressing reproduction costs and building resilient systems (Harcourt, 2026).

The financing of such services through taxation, however, also needs to be part of the analysis. The devaluation of care work is also reflected in the market, where such services are paid for and constitute "the economy". The lower wages paid for health, education, and social services put women in a lower position in the income ladder. Hence, a progressive taxation is not only fair in terms of its contribution to reducing inequality, but also to reflect the redistribution of resources from those not involved in care[2] to those who do (Folbre, 2023; Folbre and Wolf, 2013).

3 Model

As previously explained, this paper aims to shift the focus from economic growth to the accumulation of human capacities. Adopting a post-Keynesian methodological framework, we propose an analytical model to formalize human capacity growth and the role of public policy, while accounting for the supply-side labor constraint. In this framework, we present a simple demand-led model with a government sector that maintains a balanced budget, collecting taxes and allocating the entire tax revenue to direct consumption in the production sector and to care-related goods. Moreover, we endogenize the allocation of labor time between market production and care activities. As a result, a trade-off may arise between economic growth and the accumulation of human capacities. Nonetheless, public spending on care might alleviate this trade-off, as discussed below.

We consider a simple closed economy that produces a single good used for both consumption and investment. This economy is divided into two spheres: market-paid production (M) and the unpaid care economy (C). To emphasize the discussion of time constraints and time poverty, we abstract from labor force growth and treat it as fixed. In this way, we can relate the labor shares in each sphere of the economy to the share of labor

[1] In a narrower sense, Lima et al. (2021) discuss similar effects of human capital accumulation.

[2] As discussed by Folbre (2023) and Folbre and Wolf (2013), the state is increasingly dependent on future generations of taxpayers to maintain the retirement policies and social services.

time allocated to it. Hence, total labor here can be considered the total labor time available for production over a time unit (a workday, for example)[3]. Thus, the total labor time L is fully allocated between these two spheres. For simplicity, we initially abstract from gender differences in employment across activities, treating L as a homogeneous variable:

$$L = L_M + L_C \tag{1}$$

where L_M and L_C denote the share of time employed in production and care activity, respectively. Within a demand-led framework, L_M is determined by aggregate-demand conditions in the goods market. Since total labor is constant and the duration of a workday (L) is limited and fixed, L_C is determined residually by the conditions of the market economy.

Representing employment in care activity as inversely related to labor market conditions is standard in this literature. Braunstein et al. (2011), for instance, explicitly model the formation of human capacities as dependent on the unpaid work time that men and women dedicate to household production, which is inversely related to wages determined by labor market conditions and bargaining power – both intrahousehold and in wage-setting dynamics. Similarly, Setterfield (2025) treats the production of human capacities as inversely related to employment conditions.[4]

3.1 The Market Economy

Production in the market economy is driven by effective demand conditions, and aggregate demand comprises consumption, investment, and government expenditures:

$$Y = Y[C(Y_d), I(\gamma_0 K, Y), G_M(T(Y)), G_C(T(Y))] \tag{2}$$

where $C(Y_d)$ denotes consumption out of disposable income $Y_d = Y - T$, with T representing tax expenditures, $I(\gamma_0, Y)$ is investment – which depends on income Y and on an autonomous component γ_0. The government collects taxes through a constant proportional tax rate t applied to all forms of income, generating tax revenue equal to $T = tY$. As previously stated, the government maintains a balanced budget in every period, ensuring that all tax revenue is spent directly in the market economy. Moreover, public expenditure is allocated between direct consumption in the market economy (G_M) and investment that supports care activities (G_C). The shares of government revenue devoted to each component are assumed constant, such that $G_M = (1-\beta)tY$ and $G_C = \beta tY$:

$$G = G_C + G_M = T = tY \quad \rightarrow \quad \beta G + (1-\beta)G = \beta tY + (1-\beta)tY \tag{3}$$

Therefore, we emphasize that G_C denotes market-sector expenditure on goods and services that support

[3]Differently from Setterfield (2026), we consider leisure as part of time spent on care, as leisure can also be considered self-care. This leads to a different concept of time poverty in our model, as will be discussed further.

[4]Alternatively, Setterfield (2024) models human capacity investment as a function of expected opportunities in the labor market.

care activities. It can be interpreted, for example, as investment in care infrastructure or as the provision of goods and services that enhance human capacities – such as education, health, and culture. From this perspective, the model does not include a separate care sector that produces goods aimed at developing human capacities; instead, all goods are produced within the market economy, while the care sector only represents unpaid activities devoted to care provision.

Regarding supply conditions, production in the market economy follows a Leontief fixed coefficient production function:

$$Y = min[Kv, a_M L_M] \tag{4}$$

where K denotes the physical capital stock employed in the market economy, the output-to-capital ratio v is constant and assumed to equal 1, and a_M is labor productivity in the market economy, which is influenced by care activity in the long run, as discussed below.

3.2 The Care Economy

The formation of human capacities in the care economy depends on two factors: labor time devoted to care activities (L_C) and government spending on care (G_C). Notably, care activity exhibits both countercyclical and procyclical components. On the one hand, L_C is inversely related to labor market conditions, which are driven by effective demand. In this sense, stronger economic activity reduces the labor time devoted to care activities. On the other hand, as the government operates under a balanced budget, G_C represents a procyclical component, as it depends on tax revenues.

Equations (5) and (6) explain how L_C and G_C contribute to human capacity formation. First, considering the labor component, care provisioning is given by a fixed coefficient production function:

$$H_C = a_C L_C \tag{5}$$

where a_C is the labor productivity in the care activity. The dynamics of a_C is a function of government expenses aimed at contributing to care activities, so that the change of a_C over time ($\dot{a_C}$) depends on the level of G_C per unit of labor time in that activity in every period:

$$\dot{a_C} = \frac{G_C}{L_C} \tag{6}$$

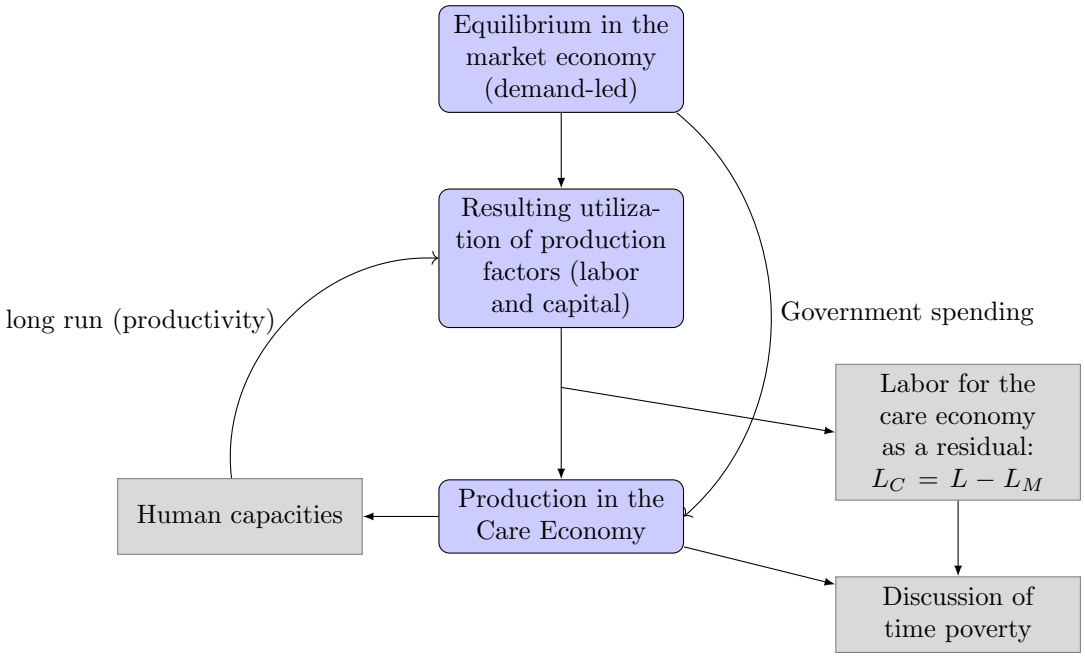
Although the relevance of care activities for the market economy is discussed in Section 4.2, the basic intuition is as follows: following Setterfield (2025), we assume that the labor power deteriorates at each period at a rate δ, so care is required to maintain – and potentially increase – the formation of human capacities. In that framework, the dynamics of labor productivity in the market economy (a_M) depend on the per capita level of care provisioning, H_C/L – notice that H_C is normalized by the entire labor time unit, since individuals outside the market economy also require care provisioning. From this perspective, time poverty arises when the

labor time devoted to care activities does not generate sufficient human capacities to offset depreciation.

3.3 Ordering of Events

To illustrate and discuss the interconnections and conflicts between the production of goods and the formation of human capacities, we assume a specific order (or hierarchy) to establish the model's equilibrium. We start then by having the market economy at the top of the hierarchy, so that the model will be solved following Figure 1.

Figure 1: Hierarchy of Markets



The equilibrium in the market economy determines L_M, while the remaining share of the labor time is allocated to care activities. The combination of L_C and government spending on care (G_C) gives the conditions of care provisioning and, consequently, the formation of human capacities. Care activity is therefore analyzed with respect to its influence on labor productivity in the market sphere, as it sustains human capacities from deterioration.

Figure 1 also summarizes part of the long-term discussion of the model. When care activity is insufficient relative to the rate of human capacity deterioration, the dynamics of labor productivity become compromised. For given equilibrium conditions in the goods market, lower labor productivity increases the labor requirements of production, which further reduces the labor time available for care activities. This feedback mechanism has implications for the discussion of time poverty and for the sustainability of a balanced growth path of the labor component of production.

4 Model Solution

4.1 Short Run

In the short run, we assume that the physical capital stock and productivity in both the market economy and care activity are constant. Following the hierarchy of markets discussed above, equilibrium in the market economy is given by demand conditions:[5]

$$Y^* = Y[C(Y_d^*), I(\gamma_0 K, Y^*), G(T(Y^*))] \tag{7}$$

Capacity utilization of the physical capital stock (u) adjusts in the short run to ensure equilibrium conditions in the market economy:

$$u^* = \frac{Y^*}{K} \tag{8}$$

Using Equations (1) and (4), employment in the market economy – and, consequently, in care activity – is driven by equilibrium conditions of economic activity:

$$L_M^* = \frac{Y^*}{a_M} \tag{9}$$

$$L_C^* = L - L_M^* \quad \rightarrow \quad L_C^* = L - \frac{Y^*}{a_M} \tag{10}$$

Note that both unpaid labor time and government expenditure in the care activity depend on output from the market economy, but in opposite directions. Higher output increases labor demand in market production, reducing the labor time available for care activities. At the same time, higher aggregate income raises tax revenues and, consequently, government spending on care. However, these channels operate over different horizons. The effects of G_C become relevant only in the long run, as they influence the accumulation of human capacities and, consequently, the growth of labor productivity. By contrast, the impact of economic activity on the labor time available for care is immediate: stronger demand conditions in the market economy directly reduce the labor time allocated to care activities in the short run:

$$\frac{\partial H_C^*}{\partial Y^*} = \frac{\partial (a_C L_C^*)}{\partial Y^*} = -\frac{a_C}{a_M} \tag{11}$$

The size of the effect of an increase in income on human capacities therefore depends on the relative levels of labor productivity in the care activity (a_C) and in the market economy (a_M). A higher level of productivity in the market economy reduces the amount of labor required for production, thereby increasing the labor available for care activities and mitigating the negative impact of higher output on H_C^*. Conversely, the higher the productivity in the care activity – which is ultimately influenced by policy in the long run – the lower the

[5]Notice that the composition of government expenditure does not influence aggregate demand, as both types of government consumption – including the one devoted to enhancing care activity – are spent in the production sector (Serra, 2021).

adverse effect that increased economic activity may exert on care provisioning.

With respect to the short-term economic growth rate, it is determined by the rate of capital accumulation, since capital productivity is constant:

$$g^* = \frac{I}{K} = I[\gamma_0, u^*] \tag{12}$$

As g^* is ultimately driven by changes in capacity utilization, the same reasoning applied to economic activity also holds here, with the share of tax revenue allocated to G_C, captured by β, and the level of care activity not affecting the short-term economic growth rate.

4.2 Long Run

In the long run, we allow the physical capital stock and labor productivity in both the market economy and care activity to vary. Given a constant output-to-capital ratio and a fixed total labor force, a balanced growth trajectory of the capital and labor components of the production function, captured by Equation (4), requires that capital (K) and labor productivity in the market economy (a_M) grow at the same rate, so that their ratio remains constant in equilibrium. Moreover, from Equations (5) and (11), it follows that the formation of human capacities will evolve along the same path when a_C grows at that same rate. For this reason, we represent the long-term dynamics of this economy as a two-dimensional system of equations, with the state variables defined as $A_M = a_M/K$ and $A_C = a_C/K$.

Part of the intuition behind the dynamics of a_M and a_C was discussed in Section 3.2. Labor productivity in the market economy depends on three factors: (i) the rate of deterioration of human capacities (δ), (ii) the per capita level of care provisioning, and (iii) a Verdoorn-type labor-saving technical change (τ). Productivity in care activities, in turn, depends on government spending on care-related goods:

$$\hat{a_M} = \tau + \frac{H_C}{a_M L} - \delta \tag{13}$$

$$\hat{a_C} = \frac{G_C}{a_C L_C} \tag{14}$$

Considering that the accumulation rate of physical capital follows Equation (12) in the long run, while the short-term equilibrium of capacity utilization, given by Equation (8), is maintained throughout the long-term dynamics, the two-dimensional system of equations, represented in terms of the growth rates of the state variables A_M and A_C, is given by Equations (15) and (16):

$$\hat{A_M} = \hat{a_M} - g_K = \tau - \delta - g_K + \frac{A_C}{A_M} L_C \tag{15}$$

$$\hat{A_C} = \hat{a_C} - g_K = \frac{A_M \beta t u}{A_C(A_M - u)} - g_K \tag{16}$$

where the constant labor force (and fixed labor time available in a day) is normalized to one ($L = 1$). Next, to analyze the properties of that system, we represent both equations in terms of their first differences, with $\dot{A}_M = \hat{A}_M A_M$ and $\dot{A}_C = \hat{A}_C A_C$. Using Equations (1), (3), and (5), the system of differential equations can be represented by Equations (17) and (18):

$$\dot{A}_M = A_M(\tau - \delta - g_K) + A_C(1 - \frac{u}{A_M}) \tag{17}$$

$$\dot{A}_C = \frac{A_M \beta t u}{(A_M - u)} - g_K A_C \tag{18}$$

The equilibrium of the system is calculated by setting Equations (17) and (18) to zero, which results in:

$$A_M^* = \frac{\beta t u}{g_K(g_K - \tau + \delta)} = \frac{\beta t u}{g_K B} \tag{19}$$

$$A_C^* = \frac{\beta^2 t^2 u}{g_K[\beta t - g_K(g_K - \tau + \delta)]} = \frac{\beta^2 t^2 u}{g_K D} \tag{20}$$

where $B = g_K - \tau + \delta > 0$ and $D = \beta t - g_K(g_K - \tau + \delta) = \beta t - g_K B > 0$. Before we perform comparative analysis on the equilibrium of the state variables, we put forward a discussion of the stability conditions of the system of differential equations around the equilibrium. The Jacobian matrix of the system, using the equilibrium values of A_M^* and A_C^* given by Equations (19) and (20), is:

$$J = \begin{bmatrix} \frac{\partial \dot{A}_M}{\partial A_M} & \frac{\partial \dot{A}_M}{\partial A_C} \\ \frac{\partial \dot{A}_C}{\partial A_M} & \frac{\partial \dot{A}_C}{\partial A_C} \end{bmatrix} = \begin{bmatrix} -B + \frac{g_K B^2}{D} & \frac{D}{\beta t} \\ -\frac{\beta t (g_K B)^2}{D^2} & -g_K \end{bmatrix} \tag{21}$$

To analyze the stability of the system, we first examine the signs of the elements of the Jacobian matrix. The sign of $J_{1,1} = \partial \dot{A}_M / \partial A_M$ is ambiguous. On the one hand, for given aggregate demand conditions, higher labor productivity in the market economy reduces employment in production and, consequently, increases the labor time allocated to care activities. This channel tends to stimulate the growth of A_M. On the other hand, an increase in A_M lowers its own growth rate relative to the accumulation rate of physical capital. Next, productivity in the care sector increases H_C, thereby contributing to higher labor productivity in the market economy. This effect is captured by $J_{1,2} = \partial \dot{A}_M / \partial A_C > 0$. Moreover, A_M has a negative effect on A_C, as represented by $J_{2,1} = \partial \dot{A}_C / \partial A_M < 0$. As previously discussed, a higher A_M increases the labor time allocated to care activities, which reduces the ratio G_C/L_C and, consequently, the growth of productivity in care activities. Finally, $J_{2,2} = \partial \dot{A}_C / \partial A_C$ is negative. Since the dynamics of a_C depend on the level of G_C per unit of labor in care, an increase in a_C reduces its own growth rate relative to the accumulation rate of capital.

Using the elements of the Jacobian matrix, the determinant of the system can be written as $Det(J) = Bg_K > 0$. Therefore, the stability of the system depends on the sign of the trace of the Jacobian matrix. In particular, local stability requires the trace to be negative, as given by $Tr(J) = J_{1,1} + J_{2,2}$.

Notice that $J_{1,1}$ can be written as:

$$J_{1,1} = \frac{\partial \dot{A}_M}{\partial A_M} = -B\Big(1 - \frac{g_K B}{D}\Big) \tag{22}$$

Thus, the condition for $J_{1,1} < 0$ – which is a sufficient (though not necessary) condition for stability – is $g_K B < D$, which can be written as $\beta t > 2g_K(g_K - \tau + \delta)$. Therefore, contrary to the short-term results, in the long run the share of income spent in goods and services related to care activity – captured by βt – becomes crucial for the stability of the system. The higher economic growth and the depreciation of human capacities – in comparison to the Verdoorn-type labor-saving technical change – the greater public investment required to sustain stability.

If this condition is not satisfied and βt is relatively low, such that $Tr(J) > 0$, care provisioning in effective units – i.e., $a_C L_C$ – will be insufficient to offset the depreciation of human capacities, leading to time poverty. As a result, under given aggregate demand conditions, more labor will be required in the market sphere, leaving less labor time available for care activities and further weakening human capacities. This mechanism underscores the role of public investment in care for ensuring a balanced growth path of the state variables.

Moreover, there is another situation not explored in the analysis above, the possibility that taxation, at rate t, affects capacity utilization and therefore economic growth (g_K). As the government maintains a balanced budget, when savings are taxed, government spending represents a reinjection of aggregate demand previously leaked through savings, thereby contributing to economic activity and growth. In this case, unlike changes in β, which only alter the composition of aggregate demand, variations in t also affect the condition that ensures $J_{1,1} < 0$.

Note that, because t also affects g_K, changes in the tax rate influence the condition $\beta t - 2g_K(g_K - \tau + \delta) > 0$ in opposite directions. On the one hand, a higher t directly increases care-related government expenditure; on the other hand, it may stimulate economic growth, which in turn raises the demand for care activities. The net effect on this condition depends on the comparison between β and $2(\partial g_K)/(\partial t)(2g_K - \tau + \delta)$. The main policy implication is that a higher economic growth rate – whether induced by a higher tax rate or by an increase in γ_0 – requires the government to allocate a larger share of expenditures to G_C in order to offset the stronger depreciation of human capacities and thereby sustain care provision. Moreover, if g_K rises beyond the threshold at which the condition for $J_{1,1} < 0$ is violated, increasing β becomes necessary not only to sustain care provision but also to ensure the long-run stability of the system.

Although this is not the main focus of our study, as present discussion concentrates exclusively on the demand-driven growth rate, we highlight that care activity also has implications for the natural growth rate of the economy. Other studies, such as Setterfield (2025), have emphasized how care activity may influence the Harrodian natural rate of growth. From Equation (4), given the parameter v and a constant L_M in equilibrium, a balanced growth path of this economy is ensured only when K and a_M grow at the same rate – otherwise resulting in Harrod's First Problem regarding imbalances between the growth rates of the capital and labor components of production. This condition is satisfied when the ratio $A_M = a_M/K$ remains stable in the

long run. Additionally, from Equation (13), we again emphasize the relevance of H_C, as it contributes to the dynamics of labor productivity.

With respect to the equilibrium levels of time employed in the market economy and care activity, using Equations (9)-(10) and (19)-(20), we obtain:

$$L_M^* = \frac{g_K B}{\beta t} \tag{23}$$

$$L_C^* = \frac{D}{\beta t} \tag{24}$$

Using Equation (23) – and, analogously, Equation (24) – note that a higher economic growth rate (g_K) and human capacity depreciation rate (δ) increase L_M^*, whereas the Verdoorn-type labor-saving technical change (τ) and a larger share of care-related government expenditures β reduce the time employed in the market activity. The opposite results apply to L_C^*. Therefore, for given aggregate demand conditions, factors that contribute to labor productivity – including those related to care activities – imply a lower requirement in market production.

One aspect of our analysis deserves clarification. We may interpret L_C as the market economy's unemployment. However, we are not arguing that unemployment rates should be kept high. Rather, since employment levels are influenced by public policy, we argue for a decision on the level of full employment that does not compromise the recovery of human capacities from depreciation. Such intervention may occur through changes in parameters that affect economic activity – such as t – or through parameters that influence only the composition of aggregate demand (β). Moreover, the stability of the system, for a given combination of parameters, ensures that L_C neither falls excessively nor increases to levels that would generate another social concern, which is a persistently high unemployment.

In this sense, we underscore the relevance of the composition of aggregate demand when prioritizing human capacities in public policy, even when such composition does not affect economic growth itself. Thus, we arrive at a conclusion similar to Pasinetti (2012), who argues that "aggregate effective demand must reach a certain level to ensure full employment, but its composition is entirely open to choice, by individuals, by groups of individuals, and by the community as a whole. This means that there is no single way to pursue full employment." (p. 42) [Free translation by the authors from the Italian original.]

Nonetheless, as the focus of this study is the formation of human capacities, we draw attention to the possibility of time poverty when L_C becomes relatively low. Time poverty is defined here as the situation in which the actual production of human capacity becomes negative. Intuitively, this means that, everything else constant, there is insufficient labor time available for care – self-care and care for others, including rest and leisure time – to compensate for the deterioration of the labor force. Therefore, incorporating the dynamics of A_C into the analysis helps shift the focus of economic analysis toward conditions that enhance individuals' well-being, not only with respect to care provision but also by addressing the problem of time poverty. In the following section, we further examine this issue by incorporating gender differentiation in care provision.

5 Engendering the Model

As we shift the focus of the analysis to the care and unpaid economy, gender naturally emerges as an important variable to include in the discussion. Care responsibilities are historically assigned to women, and the invisibility of such work leads to a set of inequalities inside the home, in the labor market, and in society as a whole.

In this section, we introduce the gender variable into the previously developed model. The model developed in this paper builds on the feminist contribution of highlighting the role of care in the production of human capacities, and our main point in this extension is to examine gender relations within that structure of the market and the unpaid economy.

Consider then a gendered division in the labor market where out of the total labor time available, a fixed share (s_f) of it is coming from women and another (complementary) share is from men ($s_m = 1 - s_f$):

$$L = L_f + L_m = s_f L + s_m L \tag{25}$$

where L_f is the total available time coming from women and L_m the total available time coming from men. We can assume that this is proportional to the shares of men and women in the working age, for example.

A fraction θ of total labor time in the market economy is provided by women ($\theta L_M = L_{f_M}$) and the complementary share ($(1-\theta)L_M = L_{m_M}$) is composed of men:

$$L_M = \theta L_M + (1-\theta)L_M = L_{f_M} + L_{m_M} \tag{26}$$

In the same way, a fraction ϕ of total labor time in the care economy is provided by women ($\phi L_C = L_{f_C}$) and $(1-\phi)$ is men:

$$L_C = \phi L_C + (1-\phi)L_C = L_{f_C} + L_{m_C} \tag{27}$$

Since we assume the labor force is constant, so that L can be understood as the labor time allocated in a workday, the amounts L_f and L_m must also be constant, and so will the shares s_f and s_m.

The fraction of women in both the market economy θ and the care economy ϕ, however, will depend on the composition of demand, measured by the parameter β. The composition of aggregate demand will matter when considering the production of human capacities and time restrictions. As shown by Ilkkarakan et al. (2015) and Marques et al. (2022), public investment in care sectors, such as education and health, can significantly increase women's employment relative to men.

$$\theta = \theta(\beta) \quad , \quad \theta' > 0 \tag{28}$$

Since L_f is constant, this means that ϕ will inversely depend on β.

$$\phi = \phi(\beta) \quad , \quad \phi' < 0 \tag{29}$$

In addition, we assume that the care time is divided into self-care (η) and care for others. Men's self-care is fixed and equal to η_m. For simplicity, we assume that men's self-care time is enough to offset the depreciation of human capacities, so that men are never in a time-poverty situation. If there is time left, they will also care for others:

$$L_{m_C} = (1-\phi)L_C = \eta_m + [(1-\phi)L_C - \eta_m] \tag{30}$$

This assumption may reflect that men are, on average, less responsible for caring for others, typically "helping" with such activities only if they have time left. Women, on the other hand, are held responsible for most of the care activities, which usually makes them more susceptible to time poverty situations. In our model, this means that women's self-care will not be exogenous but will depend on men's "time left". This can also be seen as women's self-care time playing an adjusting role.

$$L_{f_C} = \eta_f L_{f_C} + (1-\eta_f)L_{f_C} \quad , \quad with \;\; \eta_f = \eta_f((1-\phi)L_C - \eta_m) \;\; and \;\; \eta_f' > 0 \tag{31}$$

Engendering the division of labor time does not change the overall results regarding equilibrium labor productivity and capital ratios, as we abstract from differences in consumption or sectoral behavior by gender[6]. However, we can still analyze what the short-run comparative statics and the long-run deviations from equilibrium mean in terms of the gender division of paid and unpaid labor.

In the short run, the equilibrium for labor time in the market economy will be given by the equilibrium level of output, determined by demand, and the Leontief production function coefficient a_M (equation (23)). In this way, any factor that increases output in the short run, such as an increase in tax rates or in investors' animal spirits, will proportionally increase the participation of both men's and women's time in market economy activities. If we assume that men are overrepresented in market-economy paid activities, with $\theta < 0.5$, an increase in output that does not change the composition of demand will keep such gender inequality constant.

The increase in time allocated to the market economy also reduces time available for the unpaid care economy. Even though the reduction in time allocated to the care economy will affect growth only in the long run, this increase in demand makes it more likely that the economy will suffer from time poverty, as less time is available for the development of human capacities. Time poverty will also have a gendered aspect. As there will be less care time available for both men and women, this means that women will bear the burden of care for others, leaving less care time for their self-care:

$$\frac{\partial \eta_f}{\partial L_M} = \frac{\partial \eta_f}{\partial L_C}\frac{\partial L_C}{\partial L_M} < 0 \tag{32}$$

where $\frac{\partial \eta_f}{\partial L_C} > 0$, but $\frac{\partial L_C}{\partial L_M} = -1$. If self-care falls below depreciation, $\eta_f < \delta$, then women face time poverty.

The same reasoning applies in the long run: whenever the rate of growth of economic activity increases without a change in the composition of demand, more time will be devoted to the market economy and less

[6]There are several ways to incorporate a gender dimension into a macroeconomic model. See Seguino (2020) for a summary of macroeconomic models incorporating gender aspects.

time will be available for care activities. This means that, even though women will be entering the labor market, this also reduces their time for care activities.

A change in parameter β, however, has qualitative implications for the allocation of time for men and women between the market economy and the unpaid care economy. In the short run, the share of the budget allocated to care-related activities does not affect output, and hence does not change the total labor time in the market economy L_M. However, by changing the composition of demand and increasing the weight of paid care-related activities, it will shift the gendered composition of time in the market and the unpaid care economy: women will increase their participation in the market. In the long run, if the government increases β, i.e., the share of the budget allocated to care-related activities, this decreases the share of time in the market economy by increasing productivity. However, unlike the effect of an increase in economic growth, in this case, women entering the labor market do not create a problem of time poverty: public care is complementary to unpaid care, hence alleviating the pressure on unpaid care time:

$$\frac{\partial \eta_f}{\partial \beta} = \frac{\partial \eta_f}{\partial \phi}\frac{\partial \phi}{\partial \beta} + \frac{\partial \eta_n}{\partial L_C}\frac{\partial L_C}{\partial \beta} > 0 \tag{33}$$

In other words, even though the entrance of women in the labor market might seem to pressure care time (and especially self-care time), with $\frac{\partial \eta_f}{\partial \phi} < 0$, this is combined with the increase in men's time for care $\frac{\partial \phi}{\partial \beta} < 0$, resulting in a positive effect. In addition, due to productivity gains from such policies, public investments in care also increase the total unpaid care time available in the economy in the long run, with $\frac{\partial L_C}{\partial \beta} > 0$.

6 Discussion

In this paper, we examine how feminist economics can contribute to post-Keynesian growth theory by placing the accumulation of human capacities at the center of analysis. We primarily draw on Setterfield (2024, 2025, 2026), aiming to incorporate into this literature both the discussion of care work – following, for instance, the feminist macroeconomic approach of Braunstein et al. (2011) – and the strand of research that links human capital accumulation to the resolution of Harrod's first problem, notably Serra (2021), as previously suggested by Setterfield (2023). Our specific contribution lies in the development of a simple demand-led growth model with public care-related expenditures, which enables the analysis of public policies addressing time poverty.

The model is deliberately specified to minimize the impact of the care sector on the demand-led growth rate, while devoting limited attention to the potential growth rate. This modeling strategy reflects our objective of highlighting the dynamics of human capacity accumulation and time poverty, even in contexts where these factors do not necessarily constrain actual economic growth. From this perspective, we identify a feminist version of Harrod's first problem, characterized by a tension between the rising demand for care provision – intensified by economic growth – and the finite duration of the working day.

Under certain conditions that compromise care provision, economic growth may give rise to instability. Importantly, such instability does not concern the growth rate itself; rather, even when growth remains stable,

the system may become unstable in terms of time allocation between paid work in the market sphere and (unpaid) care activities. Faster economic growth increases the need for care to offset the depletion of human capacities, while simultaneously drawing labor away from care activities toward the market economy. This dynamic ultimately reduces society's capacity to provide the necessary level of care.

The main policy implication of the model concerns the role of public policy in preventing such instability and mitigating time poverty. Within a balanced-budget framework, we focus on two dimensions of fiscal policy: the overall tax burden – and thus the level of public expenditure – and the composition of public spending. An increase in total public expenditure may stimulate economic activity in a demand-led framework, thereby intensifying pressures on care provision. By contrast, changes in the composition of public spending do not directly affect aggregate demand. Although both policy instruments can support care provision, their macroeconomic effects differ: expanding total expenditure may also promote economic growth and is therefore more appropriate in low-growth contexts, whereas reallocating expenditure is preferable when economic activity is already strong, as it avoids further increasing the demand for care.

From this standpoint, periods of economic expansion may lead to a "care crisis", which "refers to a transformation whereby society is becoming one that is less able and less willing to provide caring labour" (Ilkkaracan, 2013, p. 32). The cyclical nature of economic growth further underscores the need to account for care dynamics, since tighter labor markets reduce the time available for care provision. Finally, we propose metrics for defining a socially desirable level of full employment – achievable through public policy – that explicitly incorporates time poverty and the time required for the maintenance and expansion of human capacities.

7 Concluding Remarks

This paper develops a post-Keynesian growth model that integrates feminist insights on unpaid care work and time constraints, and focuses on the production of human capacities rather than on the rate of growth. By endogenizing labor allocation between market production and care activities within a fixed daily time budget, we reveal a feminist parallel to Harrod's first problem: economic expansion intensifies care demands to offset human capacity depreciation while simultaneously eroding available care time, risking systemic instability and time poverty, particularly for women. The framework advances post-Keynesian theory by formalizing supply-side limits from care reproduction, showing that stability hinges on fiscal - and thus demand - composition.

In this framework, fiscal policy is pivotal. Higher tax rates can reinject demand but amplify care pressures, whereas reallocating expenditures toward care mitigates time poverty without curbing growth, thereby enabling gendered employment gains in care sectors. We advocate redefining "full employment" to incorporate care recovery thresholds and to prioritize expenditure composition. Aggregate demand can sustain economic activity, but its structure shapes human well-being.

Future research could extend the model along several dimensions. First, it could incorporate endogenous gender shares in employment, allowing for an analysis of how the gender wage gap shapes economic dynamics (Seguino and Setterfield, 2010). This line of inquiry could be further enriched by introducing a paid-care sector

into the framework. Second, although the model assumes a constant effect of public expenditure on economic activity, empirical evidence suggests that the composition of public spending influences the magnitude of fiscal multipliers (Dante et al., 2025). In this regard, incorporating public debt dynamics and budget constraints on the expansion of care-related expenditures is a promising avenue for further research, particularly regarding their implications for economic growth and care provision. Third, although the model adopts a unified tax rate, extending the analysis to incorporate alternative tax structures, such as progressive income taxation and wealth taxes, could yield implications for improving income distribution and promoting gender equality in the labor market (Onaran et al., 2023). Finally, future work could explicitly address demographic dynamics – especially the aging of the population pyramid, which is increasingly relevant – by examining how shifts in population structure increase care demand, thereby further reinforcing the importance of analyzing this topic.

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