International competitiveness and gender inequality: Rethinking the balance of payments constrained growth model

Abstract

The paper aims to introduce a gender-sensitive Balance of Payment Constrained Growth (BOPCG) model by analyzing the relationship between international competitiveness and gender division of labor, primarily focusing on developing countries. The BOPCG model posits that long-term output growth is driven mainly by export expansion, maintaining trade account equilibrium (Vera, 2006). While there is some early literature on the gendered consequences of trade liberalization, the consequences for women have been explored little. To analyze the women's perspective on international competitiveness strategies, the novelty of this paper is the introduction of the gender division of labor in the BOPCG model: social norms allocate the primary responsibility for social reproduction to women, so that their time allocation is divided across the market paid work and unpaid home care. The paper analytically demonstrates that disequilibrium adjustment mechanisms ultimately depend on women's time allocation between market work and unpaid self-care. In the short term, international price competitiveness is driven by low women's wages, thereby generating time stress for women due to gendered caregiving norms. In the long run, adequate social care infrastructure allows women to increase paid labor without compromising care time and reducing time stress. Disequilibrium adjustment in the model shows how international trade could reinforce structural inequalities by reinforcing the gender inequality that women unequally bear in capitalist economies.

Keywords: International competitiveness, unpaid care, gender division of labor, public social infrastructure expenditure

JEL Codes: B54, E12, F43, O11

1 Introduction

Emphasising Kalecki's work, Post-Keynesian models of distribution and growth have traditionally centred on the societal class divide. This analysis has primarily addressed the allocation of income (and, to some extent, wealth) between capital and labor, examining the connection between the distribution of profits and wages and the processes of capital accumulation and economic growth (Hein, 2021), which depends on the real exchange rate due to international competitive pressures (Oreiro, 2023). In particular, the relationship between real exchange rate (RER) and economic growth has been intensely debated in the literature. The volatility of RER is associated with lower growth, particularly in the context of developing countries, and arguments are put forward to transition to a competitive exchange rate regime. Indeed, emerging countries with low-complexity production systems and reliance on commodity exports often experience greater volatility (de Paula et al., 2024). The empirical literature favours the argument for a competitive exchange rate regime, which seems helpful in job creation and thus provides the impetus for structural transformation and economic diversification (Porcile and Yajima, 2019; Rodrik, 2008). Various macroeconomic models have been

only developed to incorporate gender's impact on overall economic well-being. These models either focus on how gender equality in education and workforce participation enhances productivity and growth, or they adopt a structuralist perspective that includes these supply-side effects while also considering the influence of aggregate demand and economic structure on gender-related macroeconomic outcomes (Braunstein et al., 2020). However, Heterodox macroeconomics has consistently resisted incorporating gender as an analytical framework, mistakenly presuming that economic aggregates and policies are gender-neutral and gender is an external factor unrelated to the core economic system (Braunstein, 2022). Recently, gender studies have emerged as a new field in Heterodox macroeconomics, which has often overlooked a systematic evaluation of their contributions. Notably, Zuazu (2024) highlights how gender-aware macroeconomic literature and Feminist macroeconomics are not frequently mentioned, despite the latter recognizing demand-side factors and adopting a more heterodox viewpoint.

Since the mid-1990s, alongside gender-focused economic studies, Feminist economics has significantly influenced the field by strongly challenging the gender-neutral perspective of mainstream macroeconomics (Cagatay et al., 1995). Indeed, the latter often ignores gender in inequality analysis and perpetuates a male-centric view, falsely presenting gender neutrality (Okin, 1989), or it views gender inequality as incidental to equilibrium and socio-economic balance theories. On the contrary, feminist perspectives argue that the economy inherently exhibits gender biases, with gender inequality being both a cause and consequence of economic dynamics. This approach integrates gender as a fundamental analytical category that affects labor distribution, economic outcomes, and institutional biases, thus enriching macroeconomic analyses and policies. Indeed, feminist economists contend that "engendering macroeconomics" — that is, rendering visible how gender relations pervade the functioning of the economy — constitutes the initial step towards formulating alternative policies that mitigate gender, class, and ethnic inequalities, as well as policies that foster human well-being (Grown et al., 2000).

Recognizing various forms of discrimination and inequality, Feminist economics pays particular attention to household and care work (Corsi and Guarini, 2017). Indeed, gender disparities in access to paid employment and job quality may arise from constrained choices at the household level due to (a) women's disproportionate responsibility for unpaid care work, (b) stereotypes that direct women and men into different occupations and sectors of the economy, or (c) wage gaps favouring men, with unpaid care work obligations prompting families to choose the lowest-paid adult to perform this work (Seguino, 2020). In particular, feminist macroeconomics aims to offer macroeconomic models that integrate the care economy, which, according to Elson (1995), encompasses both women's role in unpaid work in social reproduction and paid work in production, which is essential for macroeconomic performance. Indeed, social reproduction refers to the daily and intergenerational activities, attitudes, behaviours, emotions, responsibilities, and relationships crucial for life maintenance (Laslett and Brenner, 1989). This includes providing necessities such as food and shelter, child care, and elder care, which are predominantly reliant on women's unpaid labor and undervalued by capitalist ideologies (Kawarazuka et al., 2023). However, overlooking the critical role of care and social reproduction, many macroeconomic models, such as those driving structural adjustment programs, erroneously assume an abundant supply of unpaid labor from women and girls, which may have compromised not only women's well-being but also the economic objectives of these programs (Braunstein, 2021; Braunstein et al., 2011). Instead, the distribution of paid and unpaid

labor within households affects social reproduction, which has both short-term and long-term implications for workforce resupply and human development, respectively (Seguino, 2020).

The fundamental issue at the heart of gender inequality and social reproduction is the gendered division of labor as prescribed by the patriarchal social order and economic relations, which encompasses the distribution of time and responsibilities across market, non-market, and leisure activities. Feminist scholars have consistently argued that the prevailing gender division of labor is inequitable, disproportionately disadvantaging women (Robeyns, 2003), who must shoulder a more significant burden of unpaid domestic labor and childcare than men, even as they participate in paid work (Yavorsky et al., 2015). Especially in a patriarchal society, women are overrepresented in low-wage employment and bear the primary responsibility for unpaid reproductive labor (Aloè et al., 2024), so they have to continue to allocate a disproportionate amount of time to unpaid work and caregiving compared to men, primarily due to prevailing norms and stereotypes (Connelly and Kongar, 2017). Indeed, Onaran and Oyvat (2023a) examine the significance of gender relations and intra-household bargaining in determining the allocation of paid and unpaid labor of men and women. This leads to gender-segregated labor markets where women can access only lower-paying jobs and unequal household production, reinforcing disparities in income and perpetuating inequalities based on gender.

However, women are not only exposed to the stress generated by the time allocation between market labor and unpaid care work, but they are also engaging in a "second shift" of housework and self-care after their market work hours (Kamp Dush et al., 2018). In her seminal article, Elson (1991) highlighted the existing male bias in public expenditure, which attributes a higher burden of care responsibilities to women. Indeed, she argued that reductions in government social programs disproportionately increased women's unpaid care burdens, exacerbating gender inequality and diminishing their market contributions. She highlighted how overlooked impacts on the care economy could offset any economic gains from reduced public spending on care services. Therefore, this imbalance is not only a reflection of entrenched gender norms but also of institutional policies that fail to support equitable sharing of domestic responsibilities. Indeed, concerning macroeconomic policies, Zuazu (2024) suggests how they can often neglect unpaid labor and the unequal repercussions of public spending cuts on different genders, emphasizing the need for a deeper analysis of their gender implication. As sustained by Seguino and Grown (2006), an essential condition for achieving a gender-equitable economy is the fair allocation of state resources, which can help bridge gender disparities in economic and social well-being. This includes ensuring access to health care, education, basic infrastructure, and other public goods to address market and social inequalities. In particular, since increased participation in paid employment is frequently achieved at the cost of self-care time, public spending in programs for children and the elderly, as well as in social infrastructure, is anticipated to alleviate women's unpaid labor burden and facilitate a better balance between competing responsibilities by freeing up time for women to engage in remunerative labor activities (Folbre, 2006; Onaran and Oyvat, 2023b).

The gender division of labor may impact the country's cost competitiveness in international trade by reducing female wages (Busse and Spielmann, 2006) because women are predominantly employed

in industries such as electronics, textiles, and garments, where maintaining low labor costs[1] is essential for achieving international competitiveness (Braunstein, 2000). Expanding exports or attracting foreign direct investment can drive firms to compete based on labor costs, resulting in a deterioration of international labor standards (Berik and Van der Meulen Rodgers, 2008). Seguino (1997, 2000) explores the relationship between gender wage disparity and export (and growth) performance in several semi-industrialised, export-oriented nations, revealing that gender imbalances may contribute to these countries' export achievements. Therefore, there is a "feminization of exchange earnings" effect, where reduced wages in the export sector boost competitiveness, leading to increased foreign exchange earnings. This, in turn, provides greater access to global markets for capital and technology, further promoting economic growth (Braunstein, 2008). Additionally, Berik et al. (2004) found that trade competition in competitive industries is positively correlated with wage discrimination against women in these nations. Moreover, gender wage differentials are inversely associated with the terms of trade for manufactured goods in semi-industrialised countries, indicating that increased discrimination results in lower export prices and a deterioration of the terms of trade. Therefore, gender-based labor segmentation has facilitated the availability of low-wage female workers in export sectors, while men retain higher-status positions in other sectors. This dynamic is evident in export-processing zones, where women are concentrated in low-wage jobs with fewer rights (Busse and Spielmann, 2006). Therefore, increased employment may not improve well-being if women bear the entire burden of unpaid labor and if employment conditions and remuneration remain poor.

While a strand of literature examines how trade liberalization affects the structure of labor demand, resulting in distinct outcomes for men and women within the gender-segregated labor market, and especially the gendered impact of trade liberalization on the export, there is a paucity of macroeconomics models concerning competitive trade openness and gendered division of labor. Indeed, few Feminist Post-Keynesian models explore "*the effects of gender inequality on growth for developing countries*" (Hein, 2020, p. 641), considering dual production, labor segregation, balance-of-payments constraints, and economic policies' roles in these economies. Women offer a cost advantage to firms contending with intense cost competition from other export-oriented economies. The appeal of female labor is linked to the relative ease of terminating their employment, influenced in part by gender norms that position women's paid work as secondary to their care responsibilities (Seguino and Grown, 2006). Given the critical role that the terms of trade between female and male labor force participation play in shaping international competitiveness, there remains a significant gap in our understanding of how the gendered division of labor affects export price competitiveness.

From a theoretical point of view, the Post-Keynesian literature on labor addresses several significant feminist concerns, including issues such as discrimination, dual and segmented labor markets, the endogeneity of preferences, and the rejection of worker and consumer sovereignty. For instance, Lavoie (2003) recently identified four shared principles between Post-Keynesian economics and Feminist economics that could serve as a foundation for deeper interaction between the two

[1] Employers often regard women as more "productive" in export-sector jobs due to stereotypes such as their supposed "*nimble fingers*", compliance, lower likelihood of engaging in labor unrest, suitability for repetitive tasks, and perceived reliability and trainability compared to men (Elson and Pearson, 1981).

frameworks. Moreover, Post-Keynesian and Feminist economics share key perspectives: agents are socially embedded and interact with power-laden structures; both prioritize distributional issues, with the former focusing on class and the increasing gap between rich and poor countries, while the latter on gender and poverty; they emphasize institutions as contested, non-neutral entities shaping economic outcomes (Staveren, 2010). Recently, a more limited cohort of scholars has directed their attention towards the integration of gender considerations into Post-Keynesian macroeconomic models, thereby establishing a linkage between two heterodox schools of thought: Post-Keynesian economics and Feminist economics (see, for instance, Blecker and Braunstein (2022), Vasudevan and Raghavendra (2022)).

To link the two schools of thought, this paper contributes to the Post-Keynesian literature by rethinking the standard Balance of Payments Constrained Growth (BOPCG) model by introducing the gendered division of labor to examine how gender inequality both in the short run can favor a low road international competitiveness (Milberg and Houston, 2005) and how it is possible to reduce women's stress in the long run. In particular, following Braunstein (2000), Blecker and Seguino (2002) and Seguino (2010), this paper illustrates the case of a stylized semi-industrialized economy with two sectors that are gender-typed: a female labor-intensive export sector and domestic goods one that only employs men. Therefore, as mentioned earlier, the segregation of women in the export sector would enable sustaining international competitiveness through low wages. Moreover, since women's time allocation between home production, childrearing, and market work is influenced by their access to social infrastructure (Agénor and Canuto, 2012), which allows them to allocate more time to remunerative economic activities, we examine how relaxing these structural constraints via social care infrastructure might alleviate gender inequality and help in maintaining competitive exchange rate in trade in the long run.

The paper is organised into four other sections: the second section presents the baseline BOPCG model; section three introduces the gender division of labor, while section four evaluates the women's time constraint that supports a competitive real exchange rate in the short term and the long-run impact on it of public social infrastructure expenditure. The last section contains concluding remarks.

2 The BOPCG base model with a gender perspective

The Balance-of-Payments-Constrained Growth (BOPCG) model, a cornerstone of Post-Keynesian economics, is a fundamental tool for analysing long-term growth in open economies, as Thirlwall (2011) highlighted. Keynesian growth models for open economies emphasise the balance-of-payments constraint as a critical determinant of the growth of effective demand. Over the long term, the growth rates of exports and imports must align. Other sources of effective demand must adjust endogenously to maintain external equilibrium. Consequently, the effective growth rate must converge with the natural growth rate and the equilibrium growth rate of effective demand represented by the balance-of-payments constraint (Porcile and Spinola, 2018).

The effective growth rate is contingent upon effective demand, thereby rendering the growth rate demand driven. Consequently, it is imperative to scrutinise the dynamics inherent within the various sources of effective demand to elucidate the adjustment process (Porcile and Spinola, 2018). According to Guarini and Porcile (2016), the aggregate demand is composed of two different

components that are autonomous expenditure (A) and real net export (X-QM), as in the following equations:

$$Y = A + X - QM \quad (1)$$

$$X = Q^{\theta} Y_R^{\varepsilon} \quad (2)$$

$$M = Q^{-\kappa} Y^{\pi} \quad (3)$$

$$Q = \frac{P^* q}{P} \quad (4)$$

where *Q, P*, P, q* are the real exchange rate (RER), international price, national price, and nominal exchange rate. X is export, θ is export price elasticity ($\theta > 0$), Y_R is the rest of the world's income, and ε export income elasticity ($\varepsilon > 0$). Exports depend negatively on the price of exports relative to the price of foreign products in the home currency. M is import, κ import price elasticity ($\kappa > 0$), Y the domestic income, and π import income elasticity. Imports depend negatively on the price of imports in the home currency.

The export-led growth framework posits that economic growth is determined by the growth rate of autonomous expenditure combined with the growth rate of exports. Therefore, log differentiating equations (1), (2), and (3) for the time and indicating the growth rate with a hat, we obtain:

$$\hat{Y} = \alpha \hat{A} + \gamma_1 \hat{X} - \gamma_2 (\hat{Q} + \hat{M}) \quad (5)$$

$$\hat{X} = \varepsilon \widehat{Y_R} + \theta \hat{Q} \quad (6)$$

$$\hat{M} = \pi \hat{Y} - \kappa \hat{Q} \quad (7)$$

Where $\alpha \equiv A/Y$ is the share of autonomous expenditure in total income, $\gamma_1 \equiv X/Y$ is the share of export in total income and $\gamma_2 \equiv QM/Y$ is that of import in the total income.

Substituting (6) and (7) in (5), the effective growth rate equals:

$$\hat{Y} = \alpha \hat{A} + \gamma_1 (\varepsilon \widehat{Y_R} + \theta \hat{Q}) - \gamma_2 (\hat{Q} + \pi \hat{Y} - \kappa \hat{Q}) \quad (8.1)$$

$$\hat{Y} = \frac{\alpha \hat{A} + \gamma_1 \varepsilon \widehat{Y_R} + \hat{Q}(\theta \gamma_1 - \gamma_2 + \gamma_2 \kappa)}{1 + \gamma_2 \pi} \quad (8.2)$$

Thirlwall (1979) asserts that the primary limitation on demand is the external constraint, whereby the effective growth rate must align with the equilibrium in the current account. According to Blecker and Setterfield (2019, p. 428), assuming that "*there are no net capital flows in the long run, BP equilibrium requires balanced trade in goods and services, that is the value of exports must equal the value of imports, measured in a common currency*". This means that:

$$PX = P^* q \, M \quad (9.1)$$

$$X = \frac{P^* q}{P} M = QM \quad (9.2)$$

Equilibrium in the current account requires that exports and imports grow at the same rate, which implies that:

$$\hat{X} = \hat{M} + \hat{Q} \quad (10)$$

Substituting (6) and (7) in (10):

$$\varepsilon\widehat{Y_R} + \theta\hat{Q} = \pi\widehat{Y^E} - \kappa\hat{Q} + \hat{Q} \quad (11.1)$$

$$\pi\widehat{Y^E} = \varepsilon\widehat{Y_R} + \theta\hat{Q} + \kappa\hat{Q} - \hat{Q} \quad (11.2)$$

$$\widehat{Y^E} = \frac{\varepsilon\widehat{Y_R} + \hat{Q}(\theta + \kappa - 1)}{\pi} \quad (11.3)$$

The standard BOPCG model posits the existence of two goods that serve as imperfect substitutes for each other: a domestically produced good, which can be marketed domestically or exported, and an imported good produced abroad. Araujo and Lima (2007) argue that "*the BP-constrained growth approach, despite being demand-oriented, does acknowledge the importance of the supply characteristics* […], *the structure of production matters for aggregate economic growth*". To control for the supply factors and, in particular, for the labor force participation of men and women, we define the total number of hours spent on labor[2] as follows:

$$L = L_M^m + L_M^f \quad (12)$$

Where L_M^m and L_M^f are the male and female labor amounts, respectively.

According to Hein (2021), firms mark up unit labor costs, so we can define *P* as follows:

$$P = (1 + z)\frac{W}{\lambda} = (1 + z)[\psi\frac{W_m}{\lambda_m} + (1 - \psi)\frac{W_f}{\lambda_f}] \quad (13)$$

Where z is the mark-up, λ_m is the labor productivity of men, W_m is the men's wage, λ_f is the labor productivity of women and W_f is the women's wage, ψ represents the gender structure of labor: ψ is the share of men and $(1 - \psi)$ is the share of women. The country's economic structure influences women's job segregation and its sectorial nature, which can be expressed through the parameter ψ: according to Seguino (2010), women are concentrated in labor-intensive export industries, while men dominate domestic goods and capital-intensive exports in semi-industrialised economies, extreme hiring by the author imposing that export industries employ only women and that in our case would correspond to the condition $\psi = 0$. On the contrary, in agricultural economies, women focus on subsistence production, whereas men are involved in cash crops and commodity exports (Antriyandarti et al., 2024; FAO, 2011), which a high value for this parameter can represent ($\psi > 0$).

[2] Goldberg and Pavcnik (2003) observe that nations like Colombia and Brazil have significantly expanded the non-tradable sector due to trade liberalization. According to Palazzo (2024), a more competitive real exchange rate would enhance profitability by sustaining investments in the tradable sector and reducing labor costs in the non-tradable one. This aspect is significant because many women are frequently employed in traditional non-tradable sectors (Shepherd and Stone, 2017). Since the terms of trade between the exporting and the non-exporting sectors play a crucial role in exchange rate competitiveness, two sectors, a tradable and a non-tradable one, could be introduced in the model for understanding the gendered consequences of export price competitiveness on the non-tradable sector.

Substituting (13) in (4), the real exchange rate can be expressed in terms of male and female market labor as follows:

$$Q = \frac{P^*q}{(1+z)[\psi\frac{W_m}{\lambda_m}+(1-\psi)\frac{W_f}{\lambda_f}]} = \frac{P^*q}{(1+z)(\frac{\psi W_m\lambda_f+(1-\psi)W_f\lambda_m}{\lambda_m\lambda_f})} = P^*q\ \frac{1}{(1+z)}\left(\frac{\lambda_m\lambda_f}{\psi W_m\lambda_f+(1-\psi)W_f\lambda_m}\right) \quad (14)$$

Putting, for simplicity, $P^*q = \rho_1$ and $\frac{1}{(1+z)} = \zeta$, the real exchange rate becomes:

$$Q = \rho_1\zeta\left(\frac{\lambda_m\lambda_f}{W_m\lambda_f+W_f\lambda_m}\right) = \rho_1\zeta\lambda_m\lambda_f(\psi W_m\lambda_f + (1-\psi)W_f\lambda_m)^{-1} \quad (15)$$

Several empirical works (see, for instance, Los and Verspagen (2006) and Missio et al. (2015)) show that the real exchange rate dynamics play an important role in the production structure not only in the short term but also in the medium and long term. Log differentiating equation (15) respect time and indicating the growth rate with a hat, the growth rate of the real exchange rate ($\hat{Q}$) equals:

$$\hat{Q} = \widehat{\rho_1} + \hat{\zeta} + \widehat{\lambda_m}[1-c(1-\psi)] + \widehat{\lambda_f}(1-b\psi) - \psi\widehat{W_m}b - \widehat{W_f}c(1-\psi) \quad (16)$$

Where $\widehat{\lambda_m}$ is the growth rate of men's labor productivity, $\widehat{\lambda_f}$ is the growth rate of women's labor productivity, $\widehat{W_m}$ is the growth rate of men's wages, $\widehat{W_f}$ is the growth rate of women's wages, and the terms b and c are positive parameters representing the weights. The changes in production and employment structure throughout the relocation of labor and resources within and between all sectors are essential drivers of economic growth. However, if we assume that no structural change occurs in the economy, persisting the gender division of labor, the parameters ρ_1, ζ, λ and W_m remain constant, which means that:

$$\widehat{\rho_1} = \hat{\zeta} = \widehat{\lambda_m}[1-c(1-\psi)] = \widehat{\lambda_f}(1-b\psi) = \psi\widehat{W_m} = 0 \quad (17)$$

Manufacturing in SIEs is often oligopolistic with rigid price-cost margins, influenced by male union power and wage rigidity from minimum wage laws and long-term union contracts, so W_m can be assumed constant (Blecker and Seguino, 2002). Specifically, the assumption $\widehat{\rho_1} = 0$ does not influence the final results. Therefore, the real exchange rate's depreciation depends on the women's wages in the short run. Substituting (17) in (16), the growth rate of the real exchange rate becomes:

$$\hat{Q} = -c\widehat{W_f}(1-\psi) \quad (18)$$

3 The gender division of labor and the real exchange rate

The recent development literature has brought out the adverse role played by the patriarchal social norms and other structural constraints faced by women as a barrier to their labor force participation. As suggested by Schulz (2020), the interplay between caregiving and employment has been substantially examined, but the academic debate remains inconclusive. While caregiving and employment could exhibit a positive correlation, limited evidence supports the notion that caregiving prompts workforce entry or increases working hours. This is because both caregiving and employment are time-intensive activities that inherently compete for the same finite resource - time. The competing demands framework provides support for a negative relationship between caregiving

and work, arguing that time allocation operates as a zero-sum dynamic, where dedicating time to one activity necessarily diminishes the time available for the other.

In particular, Feminist economists argue that gender significantly shapes power dynamics and resource allocation within households, often privileging men and disadvantaging women, potentially leading to poverty despite aggregate household wealth. Gender roles are reinforced through the gender division of labor, with unpaid work symbolizing femininity and masculinity tied to avoiding such tasks (Chauhan, 2021). Indeed, the unequal burden of unpaid care work on women has been mainly focused on in the literature on women's workforce participation, which is influenced by time constraints arising from variations in paid working hours and the allocation of unpaid caregiving and domestic labor within households (Samtleben and Müller, 2022). As mentioned in the introduction, women consistently engage in more unpaid care work than men; this phenomenon is not isolated, but it is a trend observed across various cultures and economic contexts (Chauhan, 2021). Tasks classified as unpaid labor are both physically demanding and time-intensive. Consequently, women's engagement in unpaid work consumes a significant portion of their time, resulting in time poverty and limiting their ability to participate in productive activities such as education and paid employment (Coffey et al., 2020). Women's lack of personal income undermines financial independence, bargaining power, and decision-making, reinforcing gendered resource inequalities within households. Limited labor force participation discourages education and skill development, perpetuating unpaid labor (Ferrant et al., 2014). This disproportionate burden limits women's formal economic opportunities, career progression, and leisure time. Moreover, triple work burdens—unpaid, reproductive, and paid labor - undermine empowerment, social participation, and overall well-being, often leading to significant psychiatric and physical morbidity associated with chronic caregiving stress, which negatively affects women's health (Schulz, 2020).

Care and unpaid work represent not only limits to women's participation in the labor market; they are essential to the functioning of the market economy itself (King et al., 2021). Women's unpaid care work is often invisible, informal, and unrecognized within the economy, placing them in a vulnerable position. The lack of acknowledgement of gender segregation and labor inequalities in macroeconomic policies contributes to the poor quality of paid work available to women, so women's bargaining power diminishes, reinforcing traditional gender roles and perpetuating their engagement in unstable and insecure jobs (Vyas, 2022). In particular, most studies have examined the impact of export-led policies and the exploitation of women in the export industries or the tradable sector in general. Addati et al. (2018) state that the burden of unpaid care work, primarily performed by women, limits their participation in paid employment, affecting their career progression, income levels, and overall economic empowerment. This, in turn, impacts the competitiveness of economies by underutilizing a significant portion of the labor force. On the contrary, Feminist Heterodox economists argue that women workers offer a competitive advantage to producers employing labor-intensive methods, due to gender-based disparities in bargaining power within households and labor markets (Tran, 2019). Standing (1989) was among the first to highlight the connection between trade liberalization and the feminization of global labor, attributing increased demand for low-cost female workers and declining job quality for men to intensified firm competition in a globalized economy seeking export competitiveness. Indeed, in developing countries, the "feminization of foreign exchange earnings" strategy stimulates women's participation in labor-intensive export industries to boost competitiveness and profitability by enabling firms to suppress wages, paralleling the impact

of currency devaluation on trade performance. However, these policies do not typically consider the additional unpaid care burdens that women carry (Braunstein et al., 2011). Therefore, our contribution aims to examine how gender inequality can represent the main channel for a competitive exchange rate strategy by introducing the gendered division of labor in the standard BOPCG model presented in the previous section.

Since the gendered social norms give them primary responsibility for unpaid care work (Ferrant et al., 2014), women allocate total labor (L^f) between paid market work (L_M^f) – that is function of their participation rate and the unemployment rate – and unpaid care work (L_C^f), that is the time that the women must devote to the care of others and themselves in the household. The unequal distribution of unpaid work, where women bear a larger share compared to men, imposes a significant limitation on women's ability to participate in and benefit from market activities and state provisions. For women, this burden makes the allocation of the total labor (L^f) between paid market work and unpaid activities a complex decision-making process, which reflects intrahousehold bargaining and patriarchal social norms impinging directly on their empowerment. Observing the Nigerian context, Adebola and Ononokpono (2022) highlight that the burden of unpaid labor restricts women's ability to pursue economic opportunities and their labor force participation. In particular, since the time for unpaid care of others is not easily negotiable for women, time for market labor can only be increased at the expense of self-care time, with negative effects on their productivity and well-being (Vasudevan and Raghavendra, 2022). Our aim here is to show how the burden of unpaid work for women becomes the ultimate mediating variable through which the real exchange rate adjusts to the competitive pressures of trade. Therefore, the total women's labor is given by the following equation:

$$L^f = L_M^f + L_C^f \qquad (19)$$

In equation (19), we can define L_M^f/L^f as a participation rate for the all-time available, where L_M^f depends on the "feminization of foreign exchange earnings" strategy, which is based on the increase of women's participation in labor-intensive export industries to sustain competitiveness. Instead, we further consider the unpaid care work (L_C^f) as a non-linear combination of two groups of activities, which are the unpaid domestic care time (L_{CO}^f) and unpaid care goes to women's self-care (L_{SC}^f), as follows: $L_C^f = L_C^f(L_{CO}^f; L_{SC}^f)$ (20)

In equation (20), the term L_{CO}^f denotes unpaid care time that is spent on other caregiving activities for others in the household, like childcare, cooking, cleaning, elderly care, etc. Such care activities may not be negotiable for women in the sense that such activities impose a hard time constraint on women's daily lives. For instance, women with children under six months old may be unable to delegate childcare time to others. Similarly, women look after older adults, who need more intensive care daily. Moreover, some of these activities may overlap, and reducing time in one activity might impact the other activity or set of activities. While the other term L_{SC}^f indicates the remaining proportion of total unpaid care that goes to women's self-care. This set of activities could include women's sleeping time, skill development training time, or entertainment like watching TV, movies, etc., and all activities that help in the process of self-reproduction, i.e. the caregiver's capabilities to earn a livelihood, pursue education, acquire skills and on-the-job training, obtain sufficient nourishment, and maintain good health (Sinha and Sedai, 2022).

According to Folbre (2006), enhanced engagement in paid employment frequently comes at the cost of time previously allocated to personal care, sleep, and leisure activities. Therefore, self-care time can be considered the residual time (or leisure) for women, which remains after paid market work and unpaid care work that they perform for others in their household. For instance, women adjust (both increase or decrease) their sleeping time as and when required, whether due to increased market work or unpaid care work for others. When they decrease their sleeping time, for instance, from 6 hours to 3 hours, women face time stress, which can impact their work the following day and hamper the process of self-reproduction, that is, "*their ability to develop their own capabilities […] and their relative standard of living*" (Folbre, 2006, p. 185). Across nations, variations exist in the degree to which women bear a disproportionate responsibility for care work (Braunstein et al., 2020). These two unpaid care activities overlap, and women multitask on many of these activities. To capture the overlapping nature of these two activities and to capture the substitution between these unpaid care activities, following Raghavendra (2023), we postulate the unpaid care time as follows:

$$L_C^f = L_{CO}^f e^{\mu_1 L_{SC}^f} \quad (21)$$

Equation (21) represents the complex challenge women face in terms of time allocation between the two categories of unpaid work. Indeed, women, both in urban and rural areas, face complex substitutions between L_{SC}^f and L_{CO}^f. Childcare is one of those activities that is often undertaken along with other activities. This overlap between the two categories of unpaid work can be quite complex, depending on the level of care infrastructure in the economy[3]. Using the Indian Time-Use Survey 2019-20, Gautham (2022) estimates the complex trade-off between women's work and childcare, documenting that in rural areas where women's work is concentrated in paid and unpaid subsistence production and informal sector employment. This is because in rural areas with very little to non-existent childcare infrastructure and with entrenched gender norms around childcare, working from home or in the vicinity of their homes gives them greater flexibility in combining income-earning work and childcare. In urban areas where the care infrastructure is negligent, the overlap between paid and unpaid activities imposes a double burden on women, and this often results in women taking up temporary or casual low-quality jobs, which has wider implications for women's autonomy and empowerment.

In this model, we take into account the burden of overlapping activities faced by women in terms of the two categories of unpaid work – unpaid care work for others and self-care. In (21), the parameter

[3] The Covid-19 pandemic laid bare the complexities of the relationship where home became the site of market work. There are various accounts on the disproportionate burden on women across different employment categories and across different countries with different levels of care infrastructure (For instance, see Heintz et al. (2021), Pandita et al. (2023), Purvis et al. (2022), Thibaut and van Wijngaarden-Cremers (2020)).

μ_1 captures the possibility of substitution[4] in time allocation between L_{SC}^f and L_{CO}^f. The higher (lower) values μ_1 reflects a more (less) stringent constraint women face in terms of the combination or substitution between the two categories of work. In other words, a larger μ_1, reflective of a lower level of care infrastructure in the economy, impose more stringent substitution possibilities for women, leaving them with a few choices and forcing them to reduce their self-care time to release that time to perform the unpaid care work for others in the family. A smaller value of μ_1, reflecting a higher level of care infrastructure, would impose a less stringent substitution possibility between the two categories of unpaid care work.

Starting from equation (19), we highlight the women's paid labor (L_M^f) and replace L_C^f according to equation (21), and get:

$$L_M^f = L^f - L_{CO}^f e^{\mu_1 L_{SC}^f} \qquad (22)$$

Within the gender division of labor perspective, the gender pay gap is connected to the gender care gap. The total men's labor (L_m) is given by the following equation:

$L^m = L_M^m + L_C^m$ (23)

As for women, L_C^m is a non-linear combination of L_{CO}^m and L_{SC}^m, as follows:

$L_C^m = [L_{CO}^m + L_{SC}^m]$ (24)

$L_C^m = L_{CO}^m e^{\overline{\mu_1} L_{SC}^m}$ (25)

Where $\overline{\mu_1}$ reflects the degree of substitutability between the two care activities for men.

$L_M^m = L^m - L_{CO}^m e^{\overline{\mu_1} L_{SC}^m}$ (26)

According to the literature, we can assume that $\overline{\mu_1} < \mu_1$. Men typically engage in more work hours than mothers and earn higher incomes while assuming less responsibility for family and childrearing

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[4] To evaluate how $\mu_1$influences the substitution between L_{CO}^f and L_{SC}^f, we can calculate the Marginal Rate of Substitution (MRS) from equation (21), as follows:

$$MRS = \frac{\Delta L_{CO}^f}{\Delta L_{sc}^f} = -\frac{\frac{\partial L_c^f}{\partial L_{sc}^f}}{\frac{\partial L_c^f}{\partial L_{CO}^f}} = -\frac{\mu_1 L_{CO}^f e^{\mu_1 L_{SC}^f}}{e^{\mu_1 L_{SC}^f}} = -\mu_1 L_{CO}^f$$

We are considering the possibility of women to give up L_{CO}^f to obtain an additional unit of L_{SC}^f. As indicated by the formula, the MRS depends on μ_1 that captures the structural constraint faced by women in the allocation of time between the two unpaid care works. Higher μ_1 reduces MRS between L_{SC}^f and L_{CO}^f in an incremental way, decreasing women's possibility to give up time from L_{CO}^f to L_{SC}^f. Indeed, reflecting a lower level of social infrastructure, the women will have few possibilities to give L_{CO}^f to obtain an additional unit of L_{SC}^f because they cannot redistribute the burden of unpaid care work for others in the family and free time for self-care without an adequate social care infrastructure, leaving them with limited opportunities of substitution between the two forms of unpaid labor.

duties (Kitterød, 2013). According to Bittman et al. (2003), this unequal distribution could also depend on gender identities: men often engage in traditionally masculine tasks and eschew activities associated with femininity, like housework, which may reinforce women's gender identity. This aspect is particularly relevant for developing countries, where this disparity is exacerbated due to limited access to public services and essential infrastructure, but developed countries seem also to be still characterized by the presence of a father-friendly welfare state and gender care gap (Kitterød, 2016). Specifically, following Blecker and Seguino (2002), we will focus the attention on women by carrying out a case study where women are the only ones responsible for unpaid care work and are concentrated in the labor-intensive exporting industries by assuming $\psi = 0$ in equation (18).

As mentioned in the introduction, the "feminization of foreign exchange earnings" strategy reinforces the crowding of women into labor-intensive export industries and enables employers to suppress wages (Seguino, 2020), with low wages effectively allowing for currency devaluation to sustain export competitiveness. Indeed, a negative impact of this export strategy on women's wages can be observed in both developing and developed economies (Seguino and Grown, 2006). Therefore, we further assume that women's wages depend negatively on the proportion of time women devote to market work, as given by:

$$W_f = \left(\frac{L_M^f}{L^f}\right)^{-\mu_2} \qquad (27)$$

Parameter $\mu_2 > 0$ depends on the weakness of women's bargaining power: the lower is the women's bargaining power, the higher is μ_2 and in turn, the stronger the negative relationship between female market labor and female wage. The low wages of women in export sectors across various countries cannot be fully attributed to their lower productivity or human capital. In particular, the human capital theory[5] posits that earnings result from the allocation of time to remunerative work, education, and skill development, so that the accumulation of human capital, and consequently effective participation in the labor market, is hindered by the involvement of women in unpaid care work (Becker, 1981). Instead, low wages for women can stem primarily from gender discrimination rooted in traditional norms, occupational segregation in export jobs, and the suppression of labor organizations by state-corporate alliances (Blecker and Seguino, 2002). Indeed, labor unions leverage tight labor markets to secure higher wages, but women, particularly in globally competitive industries, face weaker institutional support, limiting their bargaining power (Braunstein, 2000). Moreover, export manufacturing firms in semi-industrialized economies are characterized by limited sunk capital costs and minimal investment in worker training, which enhances their mobility and increases the likelihood of relocation in response to rising local production costs. This high degree of mobility weakens workers' bargaining power, thereby suppressing their wages (Choi, 2006). Furthermore, discriminatory practices or gender stereotyping by employers can restrict women's access to a broader

[5] If childcare and other domestic tasks require significantly greater amounts of energy compared to leisure and other non-market time activities typically undertaken by men, women responsible for household duties would have less energy available for participation in the labor market than men. This disparity could result in lower hourly earnings for married women, influence their job opportunities and occupational choices, and even reduce their investment in market-oriented human capital, despite working the same number of hours in the labor market as married men. Therefore, the domestic responsibilities of married women may be a primary factor contributing to gender disparities in earnings and occupational segregation (Becker, 1985).

range of employment opportunities. Additionally, limited access to secondary and higher education for women may constrain their career options, thereby diminishing their bargaining power (Blecker and Seguino, 2002).

Substituting (22) in (27), the women's wages become:

$$W_f = \left(\frac{L^f - L_{CO}^f e^{\mu_1 L_{SC}^f}}{L^f}\right)^{-\mu_2} \quad (28)$$

From equation (28), the growth rate of women's wage[6] yields:

$$\widehat{W_f} = -\mu_2 \widehat{L^f}\ \sigma_1 + \mu_2 \widehat{L_{CO}^f}\ \sigma_1 + \mu_2 \mu_1 \widehat{L_{SC}^f}\ \sigma_2 \qquad (29)$$

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[6] Starting from equation (21), the growth rate of women's wage is obtained as follows:

$$\widehat{W_f} = -\mu_2(\widehat{L_M^f} - \widehat{L^f})$$

The growth rate of the market work is:

$$\widehat{L_M^f} = \widehat{L^f}\frac{L^f}{L_M^f} - \widehat{L_{CO}^f}\frac{L_{CO}^f e^{\mu_1 L_{SC}^f}}{L_M^f} - \mu_1 \widehat{L_{SC}^f}\frac{L_{CO}^f e^{2\mu_1 L_{SC}^f}}{L_M^f}$$

Substituting the previous equation in the growth rate of women's wage, this becomes:

$$\widehat{W_f} = -\mu_2\left(\widehat{L^f}\frac{L^f}{L_M^f} - \widehat{L_{CO}^f}\frac{L_{CO}^f e^{\mu_1 L_{SC}^f}}{L_M^f} - \mu_1 \widehat{L_{SC}^f}\frac{L_{CO}^f e^{2\mu_1 L_{SC}^f}}{L_M^f} - \widehat{L^f}\right)$$

$$\widehat{W_f} = -\mu_2[\widehat{L^f}\left(\frac{L^f}{L_M^f} - 1\right) - \widehat{L_{CO}^f}\frac{L_{CO}^f e^{\mu_1 L_{SC}^f}}{L_M^f} - \mu_1 \widehat{L_{SC}^f}\frac{L_{CO}^f e^{2\mu_1 L_{SC}^f}}{L_M^f}]$$

$$\widehat{W_f} = -\mu_2[\widehat{L^f}\left(\frac{L^f - L_M^f}{L_M^f}\right) - \widehat{L_{CO}^f}\frac{L_{CO}^f e^{\mu_1 L_{SC}^f}}{L_M^f} - \mu_1 \widehat{L_{SC}^f}\frac{L_{CO}^f e^{2\mu_1 L_{SC}^f}}{L_M^f}]$$

From equation (22), we obtain:

$$\widehat{W_f} = -\mu_2[\widehat{L^f}\left(\frac{L^f - L^f + L_{CO}^f e^{\mu_1 L_{SC}^f}}{L^f - L_{CO}^f e^{\mu_1 L_{SC}^f}}\right) - \widehat{L_{CO}^f}\frac{L_{CO}^f e^{\mu_1 L_{SC}^f}}{L^f - L_{CO}^f e^{\mu_1 L_{SC}^f}} - \mu_1 \widehat{L_{SC}^f}\frac{L_{CO}^f e^{2\mu_1 L_{SC}^f}}{L^f - L_{CO}^f e^{\mu_1 L_{SC}^f}}]$$

$$\widehat{W_f} = -\mu_2[\widehat{L^f}\left(\frac{L_{CO}^f e^{\mu_1 L_{SC}^f}}{L^f - L_{CO}^f e^{\mu_1 L_{SC}^f}}\right) - \widehat{L_{CO}^f}\frac{L_{CO}^f e^{\mu_1 L_{SC}^f}}{L_M^f} - \mu_1 \widehat{L_{SC}^f}\frac{L_{CO}^f e^{2\mu_1 L_{SC}^f}}{L_M^f}]$$

Assuming $\left(\frac{L_{CO}^f e^{\mu_1 L_{SC}^f}}{L^f - L_{CO}^f e^{\mu_1 L_{SC}^f}}\right) = \sigma_1$ and $\frac{L_{CO}^f e^{2\mu_1 L_{SC}^f}}{L^f - L_{CO}^f e^{\mu_1 L_{SC}^f}} = \sigma_2$, the growth rate of women's wage equals:

$$\widehat{W_f} = -\mu_2\left(\widehat{L^f}\ \sigma_1 - \widehat{L_{CO}^f}\ \sigma_1 - \mu_1 \widehat{L_{SC}^f}\ \sigma_2\right) = -\mu_2 \widehat{L^f}\ \sigma_1 + \mu_2 \widehat{L_{CO}^f}\ \sigma_1 + \mu_1 \mu_2 \widehat{L_{SC}^f}\ \sigma_2$$

Where $\widehat{L_{CO}^{f}}$ is the growth rate of unpaid care spent on other caregiving activities to others in the household, $\widehat{L_{SC}^{f}}$ is the growth rate of women's self-care and $\widehat{L^{f}}$ is the growth rate of the total women's labor, while σ_1 and σ_2 are positive parameters representing the weights of the growth rate of unpaid care spent on other caregiving activities to others in the household ($\widehat{L_{CO}^{f}}$) and the growth rate of the total women's labor ($\widehat{L^{f}}$), as well as women's self-care ($\widehat{L_{SC}^{f}}$) (see footnote 6 for the mathematical details).

Given equation (11) in the export sector, the competitive real exchange rate is driven by women workers working more hours by reducing their unpaid care time, as given by the following equation:

$$\hat{Q} = -c\widehat{W_f} = c(\mu_2\widehat{L^{f}}\,\sigma_1 - \mu_2\widehat{L_{CO}^{f}}\,\sigma_1 - \mu_2\mu_1\widehat{L_{SC}^{f}}\,\sigma_2) \quad (30)$$

In developing countries like India, care responsibilities are often non-transferable due to their essential nature. Outsourcing domestic duties such as cooking or cleaning is unaffordable for most women, especially those in sectors with inadequate social protection, leading to time poverty and limiting women's participation in paid work and leisure (Vyas, 2022). In particular, caring for ill or disabled relatives presents significant challenges, as many caregivers lack adequate resources, forcing them to balance employment, education, personal responsibilities, and caregiving duties simultaneously because family members are often forced to assume caregiving roles by default. This forced role entails caregivers increasing levels of physical and mental fatigue, which grows in the function of the type of illness or disability the care recipient has (Beydoun et al., 2019). Moreover, the impact of domestic chores depends on their frequency and regularity, with essential daily tasks like cooking and cleaning often assigned to women, imposing restrictive time constraints because these activities cannot be postponed due to care obligations.

Furthermore, unpaid caregiving duties, particularly childrearing, significantly limit women's labor market participation. Beyond this phase, caregiving demand can often increase by shifting to ageing parents, in-laws, or spouses requiring support due to frailty or declining health (Ehrlich et al., 2020). Therefore, increased employment hours are typically offset by reduced sleep or leisure (Samtleben and Müller, 2022). While recognizing the importance of this aspect, this article does not consider the heterogeneity of the care for others for simplicity, but it acknowledges that care for others is not negotiable for caregivers and, in particular, women, by assuming that L_{CO}^{f} is constant and $\widehat{L_{CO}^{f}} = 0$, while $\widehat{L_{SC}^{f}}$ can move in the opposite direction to the structural constraint on women's time allocation (μ_1). Therefore, the growth rate of RER depends on the growth rate of total female labor and self-care, as follows:

$$\hat{Q} = \mu_2 c\widehat{L^{f}}\,\sigma_1 - \mu_2\mu_1 c\widehat{L_{SC}^{f}}\,\sigma_2 \quad (31)$$

Equation (31) reveals how the competitive real exchange rate target, even though it seems to be mediated through the low wages of women in the export sector as indicated in equation (18), could be achieved through the women's time allocation between paid market work and unpaid self-care time, at any given level of the social infrastructure. Women are often perceived as 'secondary' wage earners, deemed more suitable for labor-intensive, low-skill, or high-turnover positions, proposing

structured advantages for men (Seguino and Braunstein, 2019). Since the 1970s, women globally have often been relegated to lower-paying positions within industries where competitive pressures and firm mobility diminish their bargaining power related to men (Braunstein and Seguino, 2018). Consequently, despite the significant incorporation of women into the labor force due to globalization, they frequently encounter inferior working conditions compared to men. This dynamic has intensified job competition, with gender norms, stereotypes, and biases contributing to men's preferential access to higher-quality jobs (Arora et al., 2023). In contexts where the prevailing norm dictates that women should provide caregiving labor, women are less likely to be employed in skill- and capital-intensive industries that require on-the-job training. Firms may fear losing the sunk costs associated with training investments. Firms may prefer training male workers, viewing them as more deserving of secure employment and less likely to leave for domestic duties. This dynamic perpetuates gender disparities in job security and training investments (Seguino and Grown, 2006).

Moreover, industrial employment in developing countries is less likely to be informal compared to agriculture or services, which the International Labour Organization (ILO) classifies as 'vulnerable employment, which includes self-employment and unpaid family work, exposing workers to greater economic risks, lower income, and higher income volatility due to the lack of formal work arrangements and social insurance (Kuhn et al., 2018). According to dual labor market theory, core sector jobs, typically in the formal economy, offer higher wages, job security, and better working conditions, while peripheral sector jobs are insecure, informal, low-paying, and offer limited upward mobility. Institutional practices and social norms create a “glass wall”, making it difficult for workers, particularly women, to transition from peripheral to core sectors. In particular, Seguino and Braunstein (2019) suggest employers may also reinforce stereotypes promoted by patriarchal norms by concentrating women in labor-intensive export manufacturing jobs, thereby depressing women's wages and reducing export prices, enhancing competitiveness and profitability in semi-industrialised countries.

4 The analytical model

This section provides the analytical narrative of the model, offering two distinct temporal perspectives: in the short term, the gender division of labor, and in particular, women's time stress is the adjusting mechanism for sustaining international competitiveness. Finally, the long-run analysis focuses on the dynamic relationship between the structural constraints for women’s time reallocation and the level of public social infrastructure expenditure.

4.1 Short-run analysis

The previous section suggests how competitive real exchange rates are sustained by total women’s labor and by the women’s stress imposed by the time allocation between paid market work and unpaid self-care. Substituting (31) in (8.2) renders the effective rate of economic growth equals to:

$$\hat{Y} = \frac{\alpha\hat{A}+\gamma_1\varepsilon\widehat{Y_R}+(c\mu_2\widehat{Lf}\,\sigma_1-\mu_2\mu_1 c\widehat{L^f_{SC}}\,\sigma_2)(\theta\gamma_1-\gamma_2+\gamma_2\kappa)}{1+\gamma_2\pi} \quad (32)$$

with $(\theta\gamma_1 - \gamma_2 + \gamma_2\kappa) > 0$.

Substituting (31) in (11.3), the growth rate with the equilibrium in the current account equals:

$$\widehat{Y^E} = \frac{\varepsilon\widehat{Y_R}+(c\mu_2\widehat{L^f}\,\sigma_1-\mu_2\mu_1 c\widehat{L^f_{SC}}\,\sigma_2)\,(\theta+\kappa-1)}{\pi} \qquad (33)$$

with $(\theta + \kappa - 1) > 0$ -namely, the Marshall-Lerner condition holds.

The effective growth depends positively on the rate of growth of autonomous expenditure, and both economic growth rates depend positively upon the ratio between the income elasticity of exports and the income elasticity of imports (ε/π), the rate of growth of the world economy ($\widehat{Y_R}$), the growth rate of the total women's labor ($\widehat{L^f}$), and the structural constraint on women's time allocation (μ_1), while they depend negatively upon the growth rate of women's self-care ($\widehat{L^f_{SC}}$).

Since it is impossible to increase labor productivity in the short term, women's wages in the export sector fall to keep the real exchange rate competitive, enhancing export competitiveness and the country's growth rate (Blecker and Seguino, 2002); this policy is commonly recognized for its positive effect on export demand (Seguino, 2020). As described in the previous section, Standing (1989) suggests the firm's pursuit of least-cost female labor as a strategy to attain international competitiveness in an increasingly globalized economy. Recently, Tejani and Milberg (2016) highlighted how globalization had accelerated the feminization of labor as export growth subjected firms to intensified international competition, thereby increasing the demand for female labor due to their comparatively lower wages. Consequently, women have become a source of competitive advantage for firms operating in the export market due to limited bargaining power in the labor market. Given the time spent on unpaid care work for others (L^f_{CO}) is not negotiable, increasing time for paid market labor (L^f_M), women must reduce self-care time (L^f_{SC}). However, in some developing countries, altering gender norms related to care work may prove challenging in the short term. Moreover, the lack of publicly provided social care services poses a more significant challenge for women, especially for those living in low-income households, due to the unaffordability of market substitutes (İlkkaracan, 2016). Given that there could be little flexibility in freeing up time from their care work for others (L^f_{CO}) from (21), and in those cases, the whole burden of releasing more time to paid work might fall on reducing their self-care time (L^f_{SC}). The inverse relationship between the production of human capacities and female labor force participation is driven by low wages and substandard working conditions for women in general, exacerbated by inadequate public support for social reproduction (Braunstein et al., 2020).

Although one of the limits of the model may be the fact that this result depends significantly on the several assumptions described in the previous sections, equations (32) and (33) suggest that the competitive real exchange rate, driven by increased time stress for women, creates both actual and effective growth in output at any given level of the nominal exchange rate, foreign price, productivity differentials between the sectors and wages in the export sector. In particular, the main result is that higher economic growth driven by a competitive exchange rate regime is underpinned by unequal gender relations. Especially, the women's unpaid care time, and in particular their self-care time, becomes the fundamental adjusting variable to keep the real exchange rate competitive without adequate public social infrastructure, which highlights the gender impact of trade in the broader economy in the context of the BOPCG models, revealing how international competitiveness strategies exploit gendered labor dynamics. We now move on to analyze the model in the long run.

4.2 Long-run analysis

Braunstein et al. (2020) suggest that public policy can affect the allocation of care work between women and men and diminish the required care work. Social infrastructure spending can alleviate women's unpaid care burden by providing publicly funded social services, freeing time for paid employment and self-care. Therefore, in the long run, the structural constraints for women's time reallocation (μ_1) evolve through changes in the growth rate of public social infrastructure expenditure ($\dot{A}$); it has implications of this dynamic for the stability of the equilibrium of the BOPCG model, which needs to be understood.

Research has established a significant correlation between expenditures on social infrastructure, the burden of unpaid care shouldered by women, and the potential for economic growth (Seguino, 2015). Folbre (2008) suggested that the social construction of caring labor imposes a penalty on women, and this economic disadvantage associated with caring work can be mitigated through public policy interventions encompassing increased public support for parents and policies promoting pay equity. In particular, Onaran and Oyvat (2023) define public spending in the care economy as encompassing output in education, childcare, health, and social care sectors, including buildings for schools and hospitals, machinery and equipment in the care sector. In our model, the substitution between paid labor and unpaid care work depends on the structural constraints imposed by the given level of public social infrastructure expenditure. According to Onaran et al. (2022), the expansion of the social sector diminishes the reliance on unpaid labor for care, education, and health services, thereby enhancing women's opportunities to engage in the paid economy. Therefore, investment in social infrastructure would allow women to increase their time for paid work, facilitating the balance of several responsibilities without compromising domestic care and self-care time (Folbre, 2006). This will also enable women to seek quality jobs that entail a commitment to be away from home and thus positively influence productivity in the paid market work. In short, higher investment in social infrastructure relaxes the domestic care work constraint and allows them to take up permanent or semi-permanent and high-quality jobs that are relatively better than casual and low-quality jobs. Therefore, it could positively impact the tradable sector's overall labor productivity and economy.

Fiscal policy formulation is particularly relevant, and especially in emerging countries, is complex due to the dual necessity of fostering economic growth while managing substantial foreign debt obligations. In line with the balance of payments constraint tradition, the external sector imposes significant limitations on domestic demand expansion and, consequently, on economic growth. The countries needing foreign currency for debt payments, especially in the case of small open economies, must adjust their economies to maintain the balance of payments stability. This compromises fiscal policy, as governments must regulate spending and demand to ensure debt sustainability (Botta et al., 2023). At the same time, according to Blecker (2013), fiscal policy depends on the external constraint also with respect to the income multiplier principle: indeed, public expenditure financed by domestic debt should decrease with a balance of payment deficit to reduce income and, in turn, imports. Taking the cue from Guarini and Porcile (2016), we endogenize the autonomous social infrastructure expenditure using the standard dynamic for which autonomous social infrastructure expenditure decelerates ($\hat{A} < 0$) when the government perceives high vulnerability on the external front or the effective growth rate is higher than the equilibrium growth and a current account deficit arises, the government is likely to reduce effective demand by decreasing public expenditure (Porcile and

Spinola, 2018). On the contrary, it accelerates ($\hat{A} > 0$) when the effective or actual growth rate is lower than the equilibrium growth rate due to a surplus in the current account supporting expansionary fiscal policy, as follows:

$$\dot{A} = (\widehat{Y^E} - \hat{Y}) \quad (34)$$

Equation (34) means that social infrastructure is financed by an expansionary fiscal policy when it is sustainable, given the positive external conditions, $\widehat{Y^E} > \hat{Y}$.

In the long run, the evolution of structural constraints for women's time allocation is influenced by two things: 1) the existing level constraints that are exerted through cultural and social norms that define gender roles in society, and 2) the increase in the social care infrastructure, which is driven by the higher investment in social infrastructure ($\hat{A}$) that are funded by the acceleration in the equilibrium economic growth vis-à-vis the effective rate of growth. The dynamics of the evolution of structural constraints are given by:

$$\widehat{\mu_1} = \tau_0(\mu_1) - \tau_1\hat{A} \quad (35)$$

where $\widehat{\mu_1}$ is the growth rate of μ_1, $\tau_0(\mu_1)$ represents the influence of existing levels of structural constraints that are mediated through social norms – this could be seen as some kind of hysteresis effect or social path dependence, where women endure the burden of household care work and overtime gender and patriarchal social norms get entrenched and reinforced in a community with a historically low level of social infrastructure. For analytical simplicity, we will use a linear approximation of the function as $\tau_0\mu_1$, with $\tau_0 > 0$; moreover, we consider τ_0 as a parameter, but it is clear that is the product of social and cultural values and habits that could be changed thanks to progressive social and political agency, establishing new benchmarks for advancing women's rights globally (Charrad, 2010; OECD, 2019). The second term represents the positive impact of the social infrastructure on reducing the structural constraints for women, i.e., an increase in $\hat{A}$ implies higher social infrastructure, which will lower the constraints for women to substitute unpaid care work with market work. The parameter $\tau_1(> 0)$ captures the responsiveness of changes in the structural constraints to the growth of social infrastructure investment. This parameter can also reflect the prioritization of social infrastructure based on gender assignment, which relates directly to the structural constraints.

The dynamical interaction between the growth in the social infrastructure investment and the evolution of structural constraints for women's time allocation can be expressed as:

$$\begin{cases} \dot{A} = \left(\widehat{Y^E} - \hat{Y}\right) \\ \widehat{\mu_1} = \tau_0(\mu_1) - \tau_1\hat{A} \end{cases} \quad (36.1)$$

$$\begin{cases} \dot{A} = \left(\frac{\varepsilon\widehat{Y_R} + (c\mu_2\widehat{L^f}\,\sigma_1 - \mu_2\mu_1 c\widehat{L^f_{SC}}\,\sigma_2)\,(\theta+\kappa-1)}{\pi} - \frac{\alpha\hat{A} + \gamma_1\varepsilon\widehat{Y_R} + (c\mu_2\widehat{L^f}\,\sigma_1 - \mu_2\mu_1 c\widehat{L^f_{SC}}\,\sigma_2)(\theta\gamma_1 - \gamma_2 + \gamma_2\kappa)}{1+\gamma_2\pi} \right) \\ \widehat{\mu_1} = \tau_0(\mu_1) - \tau_1\hat{A} \end{cases} \quad (36.2)$$

Analytically, the dynamical system (36.2) is stable when both the trace ($T|J|$) is negative and determinant ($Det\ |J|$), is positive, which is given by the conditions (37) and (38) (see Appendix A for the stability analysis):

$$\tau_0 < \frac{\alpha}{1+\gamma_2\pi} \qquad (37)$$

$$\tau_1 > \tau_0 \frac{\alpha\pi}{\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2[\pi(\theta\gamma_1-\gamma_2+\gamma_2\kappa)-(\theta+\kappa-1)(1+\gamma_2\pi)]} \qquad (38)$$

The trace's condition (37) can be interpreted as for the system to be stable, the ratio of the share of autonomous social infrastructure investment to GDP ratio (α) to the import to GDP ratio (γ_2) scaled by the import income elasticity (π) must be greater than the adverse influence of the existing level of structural constraints that exert on women's time allocation between unpaid and paid work. In other words, the effect of the level of social infrastructure investment by the government, after taking into account the import demand, must be such that it should more than offset the adverse influence of the lack of social infrastructure that poses constraints on women's time allocation between unpaid and paid work. On the contrary, if the social infrastructure investment (α) becomes very small, for instance, when the government's child-care spending becomes very low, women face the immense pressure of taking care of children as well as engaging in market work to support the household. Either way, a reduction in the social infrastructure investment reinforces the existing, or any given level of, structural constraints mediated by the unequal gendered norms faced by women in society. In such a case where the social infrastructure spending α becomes very low, making the RHS of (37) falls. Since all parameters are positive and at any given value of τ_0, a lower α, ceteris paribus, reduces the RHS in such a way that the condition (37) is violated, i.e. $\tau_0 > \frac{\alpha}{1+\gamma_2\pi}$, which makes the system unstable.

The inequality condition (38) highlights that the stability of the system depends on the strength of the responsiveness of changes in the structural constraints to the growth of social infrastructure (τ_1) to be greater than the influence of the existing level of structural constraints (τ_0) that influence the social and gender norms in the community. However, a more stringent condition for $D > 0$ is obtained when the Right-Hand Side (RHS) of (38) is greater than one, as given by:

$$\frac{\tau_0\alpha\pi}{\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2[\pi(\theta\gamma_1-\gamma_2+\gamma_2\kappa)-(\theta+\kappa-1)(1+\gamma_2\pi)]} > 1 \qquad (38.1)$$

Further simplification yields the sufficient condition to be:

$$\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2 < \frac{\tau_0\alpha\pi}{\theta[\pi(\gamma_1-\gamma_2)-1]+1-\kappa} \qquad (38.2)$$

This condition is interesting as it involves the long-term growth of the self-care of women working in the export sector. Therefore, the stability of the dynamic system (36.2) depends on women's self-care growth to be less than the ratio between import income elasticity and a product of export price elasticity and import income elasticity weighted by the net export share in GDP. Further, for condition (38.2) to yield, the denominator of the RHS should be positive, and it will be positive under the following requirement:

$$\frac{\pi(\gamma_1 - \gamma_2) - 1}{\kappa - 1} > \frac{1}{\theta} \qquad (38.3)$$

Thus, the sufficient condition for the determinant (D) to be positive fundamentally depends on (38.1), which in turn is underpinned by the condition (38.3) - the ratio of net export to GDP to import to GDP be greater than the reciprocal of export price elasticity and more crucially on $\pi(\gamma_1 - \gamma_2) - 1 > 0$, which is similar to the Marshall-Lerner condition except that it is export and import shares of GDP weighted by the import income elasticity.

In short, what the stability analysis highlights is that the long-run stability of the system (36.2) depends on the structural constraints that govern gender norms (τ_0), the responsiveness of structural constraints to the growth or development of social care infrastructure (τ_1), and the growth of self-care of women (g), which needs to be less than the ratio of production parameters that are driven by international competitiveness, which in turn is guaranteed by a Marshall-Lerner-like condition in the export and import shares of GDP ($\pi(\gamma_1 - \gamma_2) - 1 > 0$).

This aspect is interesting because the more general model articulated here highlights that the growth of women's self-care seems to serve as the fundamental adjusting variable and delivers the stability of the long-run dynamics of the model. Its critical role is quite clear from the sufficient condition (38.2), where the export-led competitive real exchange rate pursuing an export-led economy is contingent on the growth of self-care of women remaining within limits defined by the production parameters. Any violation of this condition will lead to cyclical fluctuations in the system. Further, the trace condition (37) shows that the stability of the system fundamentally depends on the influence of the existing level of structural constraints that maintain the gender norms below a certain level that is warranted by the production parameters driven by the competitive economy. In other words, the stability of the long-run equilibrium in the competitive real exchange rate model fundamentally depends on reinforcing gender inequality. Any violation of these conditions would render the system unstable, i.e., any relaxation of the structural constraints on gender norms would render the system unstable. In short, stability is achieved only at the cost of unequal gender relations.

For the stability of the system, both conditions must be satisfied together. However, there exists the possibility of a range of dynamics exhibited by the dynamical system depending on the violations of either one or both of these conditions that make the equilibrium unstable[7]. Both the trace and determinant can change their signs from positive to negative depending on the conditions of (37) and (38). Table 1 classifies the range of possible dynamics of the system.

[7] The eigenvalues, derived from the characteristic equation $\lambda^2 - T\lambda + \mathrm{D} = 0$ and given by $\lambda_{1,2} = \frac{T \pm \sqrt{T^2 - 4\mathrm{D}}}{2}$, are real and distinct when the discriminant ($\Delta = T^2 - 4\mathrm{D}$) is positive implying $\mathrm{D} < \frac{1}{4}T^2$ or complex when the discriminant is negative implying $\mathrm{D} > \frac{1}{4}T^2$.

Table 1. The different solutions of the dynamic system

		$\boldsymbol{T<0}$	$\boldsymbol{T>0}$
$\boldsymbol{\Delta>0}$ $\mathrm{D}<\frac{1}{4}T^2$	$\boldsymbol{D>0}$	Stable node	Unstable node
$\boldsymbol{\Delta>0}$ $\mathrm{D}<\frac{1}{4}T^2$	$\boldsymbol{D<0}$	Stable saddle-node	Unstable saddle-node
$\boldsymbol{\Delta<0}$ $\mathrm{D}>\frac{1}{4}T^2$	$\boldsymbol{D>0}$	Stable spiral	Unstable spiral

As we can see from the classification, the dynamical system (36.2), which describes the interaction between the rate of growth in the social care infrastructure expenditure (or investment) and the evolution of structural constraints for women to negotiate the substitution between unpaid and paid work, exhibits an interesting range of dynamics including spiral and saddle-node possibilities. When the condition (37) is violated, and the sign of the Trace changes from negative to positive, or in other words, when the structural constraints are relaxed such that the substitution possibilities between unpaid care work and market work become greater than that is warranted by the production parameters, the stability of the system changes from a stable node (or spiral) to an unstable node (or spiral). Furthermore, depending on the sign of the determinant and the violation of its positive stability condition (38), the change in the trace sign can generate stable and unstable saddle-node dynamics (see Figure 1).

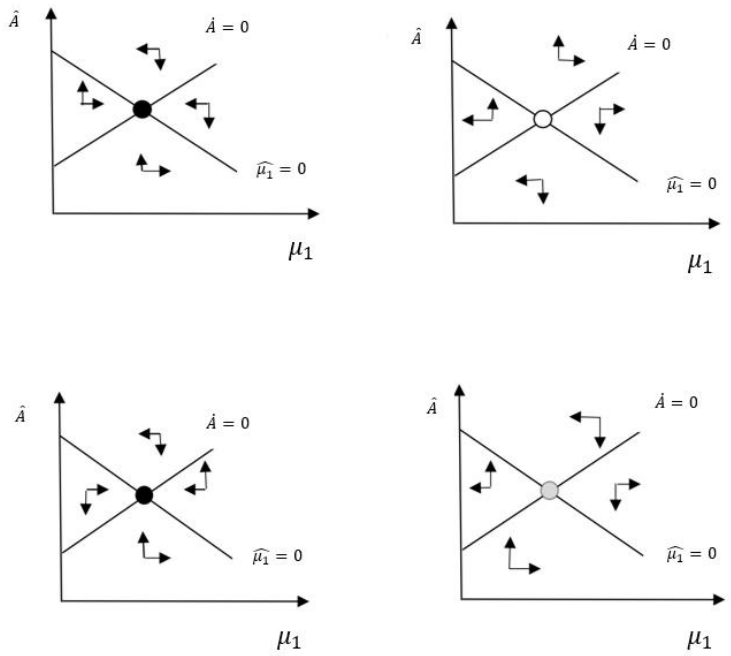

Figure 1. Visualising the dynamics of the system.

Note: Some potential dynamics of the system (36.2) are visualised in Figure 1. The top panel's left-hand and right sides show the stable and unstable nodes, respectively. The bottom panel left-hand shows the possibility of cyclical dynamics in the system, and the right-hand shows the possibility of saddle point dynamics where the system is stable along the $\dot{A} = 0$ isocline and unstable along the $\widehat{\mu_1} = 0$ isocline.

The long-run analysis reveals that the stability of a competitive real exchange rate model depends on the relationship between the influence of structural constraints on women's time allocation and the share of social care infrastructure expenditure in a direct way. Indeed, the gender-sensitive articulation of the stability of the competitive exchange rate model is fundamentally driven by gender inequality. This result reveals to us the fundamental role played by the structural constraints on women's time allocation even within the confines of the conventional BOPCG framework and points to a wider question of rethinking such models from a gender perspective because the cost of maintaining a competitive exchange rate seems to be borne unequally by women.

5 Concluding remarks

The relationship between the real exchange rate and economic growth has been extensively debated in the literature, supporting the idea that a competitive exchange rate regime aids job creation and fosters structural change. However, previous literature has overlooked the gendered consequences of a competitive real exchange rate regime, especially in export sectors with a high proportion of the female workforce. This paper has introduced a novel gender-sensitive Balance of Payments Constrained Growth (BOPCG) model by integrating the gender division of labor to analyse the relationship between international competitiveness and gender inequality by revealing how gender inequality in the short and long run can reinforce price competitiveness.

In particular, the paper considers a developing country where women are concentrated in labor-intensive export industries, while men are only employed in domestic goods (the analysis of an

agricultural economy where women are concentrated in cash crops and commodity exports could be part of a further research field). In the short term, international price competitiveness is favoured by an increase in the employment of women that reduces the time allocated to unpaid care work and self-care activities. However, social norms and the lack of public social infrastructure, which cannot be altered in the short term, constrain flexibility in freeing time from caring for others to the detriment of self-care, imposing a significant time stress burden on women. Therefore, women's unpaid care time, and ultimately self-care time, is the adjusting mechanism for sustaining a competitive real exchange rate and economic progress. Despite the feminization of exchange rates in export-led economies that can enhance price competitiveness, gender inequality imposes significant efficiency costs because this strategy tends to favour the concentration in less technology-intensive manufacturing sectors and low-skilled women's labor. Contrary to the idea that society had to compromise economic growth to reduce gender inequalities, equality policies in these contexts not only enhance social well-being but also contribute to the establishment of an economic system more conducive to learning, innovation, and increased productivity (Bárcena et al., 2018), by promoting, for instance, the virtuous "structural change for equality" advocated by ECLAC (2012). Furthermore, the model assumes that women are the only caregivers, and to that extent, there is a persistence of the gender care gap in the economy. However, men's involvement in unpaid care could be taken into account in a general model, but with a lower degree of substitutability in terms of self-care vis-à-vis women (Social Investment Agency, 2018). Removing the assumption of the concentration of women in the export sector alone, possible research will also include the time allocation and wages of men in the analysis, examining the different degrees of substitutability between care and market labor.

Instead, the long-run analysis demonstrates that the stability of the competitive real exchange rate equilibrium fundamentally depends on the relationship between structural constraints that govern gender norms, the responsiveness of those constraints to public social infrastructure investment, and the growth rate of women's self-care activities. Considering the case of social infrastructure financed by an expansionary fiscal policy that is sustainable given the positive external conditions, public investments in social infrastructures allow women to mitigate the unpaid care labor for the other burdens, freeing time for paid market labor and self-care activities. However, the model shows that the long-run stability of the export-led competitive real exchange rate pursuing an export-led economy is contingent on the growth of self-care of women to remain bounded within the limit warranted by the production parameters driven by international competitiveness concerns. Moreover, the growth of self-care of women depends on the structural constraint posed by Patriarchy, which is a systemic and institutionalized form of male dominance that permeates various aspects of society, economics, power relations and cultural norms, which can only be destabilized through education, policy reform, and cultural interventions to challenge patriarchal norms (Pringle, 2020). For designing effective policy instruments, further research could examine the possible reverse causality between economic and patriarchal conditions and women's time allocation decisions. Moreover, policymakers should prioritize investments in social infrastructure that alleviate the unequal burden of care responsibilities on women caused by the structural constraint, ensuring gender equality opportunities Not only in the areas directly related to unpaid care but also in other areas essential for well-being such as education, training and health and enhancing their job opportunities. In the absence of alternatives, women will remain concentrated in such sectors (Otobe, 2015), and their low wages will continue to drive international competitiveness.

In essence, this general gender-sensitive BOPCG model analytically illustrates how the adjustment mechanisms to maintain a competitive real exchange rate regime rely on perpetuating an unequal gender division of labor, where women disproportionately bear the burden through their time allocation between paid work in the export sector and unpaid domestic labor. While mainstream economic theories often treat gender as a neutral variable, this paper identifies gender inequalities that underpin international competitiveness and economic dynamics. The model articulated in the paper shows how a gender-sensitive macroeconomic analysis can highlight the inequalities (both in wages and unpaid care burden) that underpin and are sustained by the highly competitive international trade, which supposedly renders economic growth and human well-being. The implication of the model is to highlight the fundamental adjustment mechanism that underlies the competitive exchange rate regime. In a sense, the model provides a way to empirically test such mechanisms in the context of countries that strive to achieve growth through competitive external trade. While we don't endogenize female labor force participation, the model developed in this paper provides some insight into the analysis of female labor force participation and economic growth. In a more general female labor supply endogenized growth model, higher levels of growth might increase female labor force participation, but if the social infrastructure that allows women to substitute unpaid care work remains weak, it will only exacerbate the time stress or time poverty for women. On the surface, if it appears that there are higher rates of women's participation in the labor force, such apparent empowerment will come at the cost of invisible time poverty for women. While such a growth model is beyond the scope of this paper, the women's time allocation part of the model provides a way to develop a growth model. Thus, achieving sustainable, inclusive economic growth needs further research for identifying and addressing these invisible (latent) structural constraints that reinforce and are being reinforced by the process of growth, as well as studying the implications for increasing women's workforce participation as economies grow while at the same time reducing the relative wage gap differential vis-à-vis men. A reorientation is needed to integrate gender-sensitive macroeconomic analysis across areas like trade, fiscal policies, social protection programs and investment in public infrastructure. Policymakers must recognize that economic policies focused narrowly on cost competitiveness can sustain growth by only compromising progress towards gender equality by reinforcing unequal social norms and power relations.

Appendix A. The stability analysis of the dynamic system

Given the dynamic system (A.1), the stability can be studied by analysing the Jacobin matrix of partial derivatives.

$$\begin{cases} \dot{A} = \left(\frac{\varepsilon\widehat{Y_R} + (\mu_2 c\widehat{L^f}\ \sigma_1 - \mu_2\mu_1 c\widehat{L^f_{SC}}\ \sigma_2)\ (\theta+\kappa-1)}{\pi} - \frac{\alpha\hat{A} + \gamma_1\varepsilon\widehat{Y_R} + (\mu_2 c\widehat{L^f}\ \sigma_1 - \mu_2\mu_1 c\widehat{L^f_{SC}}\ \sigma_2)(\theta\gamma_1 - \gamma_2 + \gamma_2\kappa)}{1+\gamma_2\pi} \right) \\ \widehat{\mu_1} = \tau_0(\mu_1) - \tau_1\hat{A} \end{cases} \quad \text{(A.1)}$$

From (A.1), we obtain the following Jacobin matrix (J):

$$J = \begin{bmatrix} \frac{\partial\dot{A}}{\partial\hat{A}} & \frac{\partial\dot{A}}{\partial\mu_1} \\ \frac{\partial\widehat{\mu_1}}{\partial\hat{A}} & \frac{\partial\widehat{\mu_1}}{\partial\mu_1} \end{bmatrix} = \begin{bmatrix} \frac{-\alpha}{1+\gamma_2\pi} & \left[\frac{\mu_2 c\widehat{L^f_{SC}}\ \sigma_2(\theta\gamma_1 - \gamma_2 + \gamma_2\kappa)}{1+\gamma_2\pi} - \frac{\mu_2 c\widehat{L^f_{SC}}\ \sigma_2(\theta+\kappa-1)}{\pi} \right] \\ -\tau_1 & \tau_0 \end{bmatrix} \quad \text{(A.2)}$$

For equilibrium to be stable, the trace (T) of the Jacobian must be negative, and the determinant (D) must be positive. From (A.2), for the trace to be negative, i.e., for $T|J| = \left[-\frac{\alpha}{1+\gamma_2\pi} + \tau_0\right] < 0$, the necessary condition is the following one:

$$\tau_0 < \frac{\alpha}{1+\gamma_2\pi} \qquad \text{(A.3)}$$

Secondly, for the stability of the system (A.1), the determinant of the Jacobian (D) must be positive and is given by:

$$D = Det\,|J| = \frac{-\tau_0\alpha}{1+\gamma_2\pi} - \frac{\tau_1 c\mu_2 \widehat{L_{SC}^{f}}\,\sigma_2(\theta+\kappa-1)}{\pi} + \frac{\tau_1 c\mu_2 \widehat{L_{SC}^{f}}\,\sigma_2(\theta\gamma_1-\gamma_2+\gamma_2\kappa)}{1+\gamma_2\pi} > 0 \qquad \text{(A.4)}$$

$$D = \frac{-\tau_0\alpha}{1+\gamma_2\pi} - \frac{\tau_1 c\mu_2 \widehat{L_{SC}^{f}}\,\sigma_2(\theta+\kappa-1)}{\pi} + \frac{\tau_1 c\mu_2 \widehat{L_{SC}^{f}}\,\sigma_2(\theta\gamma_1-\gamma_2+\gamma_2\kappa)}{1+\gamma_2\pi} > 0 \qquad \text{(A.5)}$$

$$D = \frac{-\tau_0\alpha\pi-\tau_1 c\mu_2 \widehat{L_{SC}^{f}}\,\sigma_2(\theta+\kappa-1)(1+\gamma_2\pi)+\tau_1\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2\pi(\theta\gamma_1-\gamma_2+\gamma_2\kappa)}{\pi(1+\gamma_2\pi)} > 0 \qquad \text{(A.6)}$$

Focusing on the numerator, the stability of the system requires the following conditions:

$$-\tau_0\alpha\pi - \tau_1\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2(\theta+\kappa-1)(1+\gamma_2\pi) + \tau_1\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2\pi(\theta\gamma_1-\gamma_2+\gamma_2\kappa) > 0 \qquad \text{(A.7)}$$

$$\tau_1 > \tau_0 \frac{\alpha\pi}{\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2[\pi(\theta\gamma_1-\gamma_2+\gamma_2\kappa)-(\theta+\kappa-1)(1+\gamma_2\pi)]} \qquad \text{(A.8)}$$

Appendix B. Analysis of the equilibrium point

If the conditions of both Trace and Determinant are verified, the equilibrium point of the dynamic system is formally given by (see Figure 2):

$$\begin{cases} \dot{A} = \left(\frac{\varepsilon\widehat{Y_R}+(c\mu_2\widehat{L^f}\,\sigma_1-\mu_2\mu_1 c\widehat{L_{SC}^{f}}\,\sigma_2)\,(\theta+\kappa-1)}{\pi} - \frac{\alpha\hat{A}+\gamma_1\varepsilon\widehat{Y_R}+(c\mu_2\widehat{L^f}\,\sigma_1-\mu_2\mu_1 c\widehat{L_{SC}^{f}}\,\sigma_2)(\theta\gamma_1-\gamma_2+\gamma_2\kappa)}{1+\gamma_2\pi}\right) \\ \widehat{\mu_1} = \tau_0(\mu_1) - \tau_1\hat{A} \end{cases} \qquad \text{(B.1)}$$

$$\begin{cases} \frac{\varepsilon\widehat{Y_R}+(c\mu_2\widehat{L^f}\,\sigma_1-\mu_2\mu_1 c\widehat{L_{SC}^{f}}\,\sigma_2)\,(\theta+\kappa-1)}{\pi} - \frac{\alpha\hat{A}+\gamma_1\varepsilon\widehat{Y_R}+(c\mu_2\widehat{L^f}\,\sigma_1-\mu_2\mu_1 c\widehat{L_{SC}^{f}}\,\sigma_2)(\theta\gamma_1-\gamma_2+\gamma_2\kappa)}{1+\gamma_2\pi} = 0 \\ \widehat{\mu_1} = \tau_0(\mu_1) - \tau_1\hat{A} \end{cases} \qquad \text{(B.2)}$$

$$\begin{cases} \mu_1 = \frac{\varepsilon\widehat{Y_R}(1+\pi\gamma_2-\pi\gamma_1)}{\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1)} - \frac{\alpha\pi}{\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1)}\hat{A} + \frac{c\mu_2\widehat{L^f}\,\sigma_1(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1)}{\mu_2 c\widehat{L_{SC}^{f}}\,\sigma_2(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1)} \\ \mu_1 = \frac{\tau_1}{\tau_0}\hat{A} \end{cases} \qquad \text{(B.3)}$$

$$\begin{cases} \mu_1 = \dfrac{\varepsilon\widehat{Y_R}\left(1+\pi\gamma_2-\pi\gamma_1\right)-\alpha\pi\widehat{A}+c\mu_2\widehat{L^f}\ \sigma_1\left(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1\right)}{\mu_2 c\widehat{L_{SC}^f}\ \sigma_2(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1)} \\ \mu_1 = \dfrac{\tau_1}{\tau_0}\widehat{A} \end{cases} \quad \text{(B.4)}$$

$$\begin{cases} \widehat{A}^* = \dfrac{\tau_0[\varepsilon\widehat{Y_R}\left(1+\pi\gamma_2-\pi\gamma_1\right)+c\mu_2\widehat{L^f}\ \sigma_1\left(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1\right)]}{[\tau_0\alpha\pi+\tau_1\mu_2 c\widehat{L_{SC}^f}\ \sigma_2(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1)]} \\ {\mu_1}^* = \dfrac{\tau_1[\varepsilon\widehat{Y_R}\left(1+\pi\gamma_2-\pi\gamma_1\right)+c\mu_2\widehat{L^f}\ \sigma_1\left(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1\right)]}{[\tau_0\alpha\pi+\tau_1\mu_2 c\widehat{L_{SC}^f}\ \sigma_2(\theta+\kappa-1+\gamma_2\pi\theta-\theta\pi\gamma_1)]} \end{cases} \quad \text{(B.5)}$$

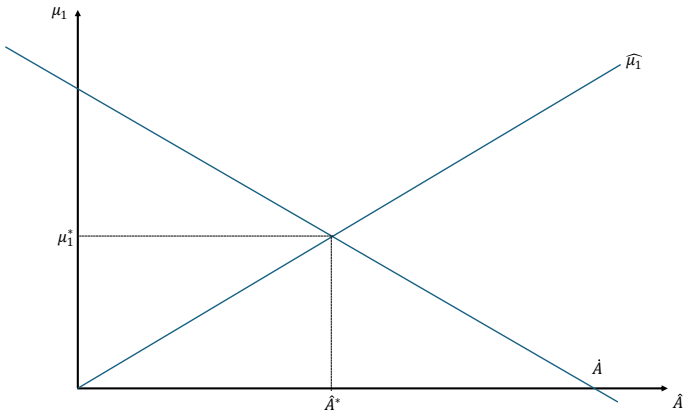

Figure 2. The equilibrium point.

Appendix C. Variables and parameters of the model

Table 2. Nomenclature and description of variables and parameters

Symbols	**Description**
Y	Domestic income
A	Autonomous expenditure
X	Exports
Q	Real Exchange Rate (RER)
M	Imports
P^*	International price
P	National price
q	Nominal exchange rate
θ	Export price elasticity
Y_R	The rest of the world's income
ε	Export income elasticity

κ	Import price elasticity
π	Import income elasticity
z	Mark up
W	Wages
W_m	Men's wage
W_f	Women's wage
λ	Labor productivity
λ_m	Labor productivity of men
λ_f	Labor productivity of women
ψ	Share of men's activities
$1-\psi$	Share of women's activities
L^f	Women total labor
L_M^f	Paid market work of women
L_C^f	Unpaid care work of women
L_{CO}^f	Unpaid domestic care time of women
L_{SC}^f	Unpaid care goes to women's self-care
μ_1	Structural constraint on women's time allocation
μ_2	Weakness of women's bargaining power
$\widehat{W_f}$	Growth rate of women's wage
$\widehat{W_m}$	Growth rate of men's wage
$\widehat{L_{CO}^f}$	Growth rates of unpaid care spent on other caregiving activities for others in the household
$\widehat{L_{SC}^f}$	Growth rates of women's self-care
L^m	Men total labor
L_M^m	Paid market work of men
L_{CO}^m	Unpaid domestic care time of men
L_{SC}^m	Unpaid care goes to men's self-care
$\overline{\mu_1}$	Degree of substitutability between the two care activities for men

σ_1	Weights of the growth rates of unpaid care spent on other caregiving activities to others in the household and the growth rates of women's total labor
σ_2	weight of the growth rates of women's self-care
$\hat{Y}$	Growth rate of domestic income
α	Share of autonomous expenditure in total income
$\hat{A}$	Growth rate of autonomous expenditure
γ_1	Share of export in total income
γ_2	Share of import in the total income
$\hat{X}$	Growth rate of exports
$\widehat{M}$	Growth rate of imports
$\widehat{Y_R}$	Growth rate of the rest of the world's income
$\widehat{Y^E}$	Growth rate with the equilibrium in the current account
$\dot{A}$	Changes in the growth rate of autonomous expenditure
$\widehat{\mu_1}$	Growth rate of structural constraint on women's time allocation
τ_0	Influence of existing levels of structural constraints
τ_1	Responsiveness of changes in the structural constraints to the growth of social infrastructure investment

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