Labour Supply and Social Stratification: the Impact of Globalization

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Abstract

To analyse the impact of globalization upon labour supply and social stratification in advanced economies, we build a model in which (i) households differ in their skill and capital endowments, and (ii) there is a minimal consumption under which they are excluded from the labour market. We make a distinction between North-North globalization (NNG) and North-South globalization (NSG). NSG changes income distribution in favour of skilled labour and capital owners and NNG generates tax competition. We show that the economy is divided between four types of household: the excluded, the rentiers, the ‘classical’ (whose working time increases with real wages) and the ‘non-classical’ (displaying the opposite relationship). Globalization modifies the sizes of social groups in a non-monotonic manner. NNG makes the groups of rentiers and excluded to expand whereas NSG has an inverted-U impact on the dimension of both groups. The simulations implemented from plausible values of the parameters show that globalization increases the number of excluded and rentiers, and decreases thereby the number of working households.

Keywords. Labour Supply, Capital mobility, Globalization, Rentiers, Social stratification, Tax competition.

JEL Classification. H2 / J22 /D31 / D33 / F16

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1. Introduction

We analyse the impact of globalization upon social stratification by focusing on the changes in income distribution and taxation resulting from North-South openness and capital mobility.

In the mid-eighties, advanced economies had already achieved most of their trade liberalization. Since then, the World has experienced a new and multidimensional globalization process characterised by two major features. Firstly, emerging economies (the South) have become key actors of international trade and production. The role of the South has been favoured by North-South trade liberalization and by the strategies of multinational firms (MNFs) that have transferred capital and technologies to less advanced countries. Secondly, the international mobility of capital has critically grown, and this mobility is now almost perfect across advanced economies (the North). In the North, these two dimensions have produced different outcomes. Firstly, North-South openness has led to a displacement of income in favour of capital and skill to the detriment of unskilled labour. Secondly, capital mobility has generated corporate tax competition.

The impact of globalization upon the skill premium and thereby inequality between skilled and unskilled workers in advanced countries has given rise to an abundant theoretical and empirical literature (see the reviews by Chusseau et al., 2008, and Chusseau & Hellier, 2013). If this impact was considered as weak or negligible until the mid-nineties (Borjas et al, 1992; Katz and Murphy, 1992; Krugman and Lawrence, 1993; Lawrence and Slaughter, 1993), this early diagnosis has subsequently been reconsidered, particularly because of the huge increase in the weight of emerging countries in world trade and production (Krugman, 2008). Empirical works have shown that imports of manufacturing from the South, offshoring to the South and FDI outflows to the South have lessened the demand for unskilled workers and thus the skill premium in the North (Chusseau & Dumont, 2013, for a review). In addition, the increase in the share of capital in total income within advanced economies and the decrease in the labour share are now well documented (e.g., CB0, 2011, Bentolina & Saint-Paul, 2003).

The literature provides several ways to model the increase in the skill premium and the return to capital that derives from North-South openness. Within a simple neo-classical framework, this can be made from either a one-sector or a multi-sector framework with the North being relatively better endowed with capital and skill and the South with unskilled labour. In these cases, North-South openness leads to an increase in the returns to capital and skill in relation to the payment for unskilled labour in the North. This directly stems from the
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fact that the passage from North in autarky to North-South openness results in augmenting the unskilled labour supply in relation to both capital and skill. In this vein, a numerous literature has developed Heckscher-Ohlinian frameworks to analyse the impact of North-South trade upon the skill premium and inequality in the North (reviewed in Hellier, 2013). Another modelling of the relationship between openness and inequality can be found in Melitz-type approaches (Melitz, 2003). By creating export-driven over-profits for the most productive firms, this type of model generates between-firm inequalities and possible changes in income distribution linked to labour market specificities: efficiency wages (Egger & Kreickemeier, 2012; Amiti & Davis, 2011), matching frictions (Helpman et al., 2010), bargaining (Felbermayr et al., 2008) etc. This type of model is however not centred on North-South globalization and it usually does not integrate capital.

In the economic literature, the impact of capital mobility upon corporate taxes has been essentially analysed through corporate tax competition (CTC). The basic idea of CTC is that capital mobility incites multinational firms to localise their capital, production and profits in the countries where the corporate tax is low. Consequently, governments are themselves incited to decrease the corporate tax rate so as to attract capital from abroad. This generates a ‘race to the bottom’ between countries in terms of taxation. Following the seminal work of Zodrow and Mieszkowski (1986), the analysis of tax competition has known a large development over the last 25 years, both theoretically and empirically. The major finding of Zodrow and Mieszkowski is that tax competition leads to sub-optimal situations in terms of social welfare characterised by low capital taxation and under-provision of public goods. This result was subsequently extended to different configurations (Wildasin, 1988; Bucovetsky & Wilson, 1991; Kanbur & Keen, 1991; Wilson, 1999 etc.). If the result in terms of optimality is conditioned by the hypothesis of a benevolent public planner, the decrease in the corporate tax rate is a general prediction, except when levies are utilised to improve firms’ profitability (Benassy-Quéré et al., 2007).

CTC has been tested and estimated in several ways. The results of the empirical literature critically depend on the method and indicators selected to measure corporate taxation. In summary, the CTC hypothesis is typically confirmed when focusing on strategic interactions (Devereux et al., 2008; Overesch & Rincke, 2009; Zodrow, 2010, for a review), on FDI (De Mooij & Ederveen, 2006, and Devereux & Maffini, 2007, for reviews; recent work by Barrios et al., 2012) and on statutory corporate tax rates (Benassy-Quéré et al., 2007; Cassette & Paty, 2008; Devereux & Fuest, 2012), and it is rejected when accounting for the corporate tax on
GDP ratio and for the effective tax rate (Slemrod, 2004; Hines, 2005; Mendoza & Tesar, 2005; Dreher, 2006; Devereux et al., 2008; Devereux & Fuest, 2012). Finally, the last thirty years have clearly known a downward convergence in corporate tax rates across countries.

In the recent economic literature on social stratification, two strands of approach can be broadly distinguished. The first starts from an exogenous definition of social stratification and tries to measure the level of stratification and its links with inequality (Yitzhaki & Lerman, 1991; Yitzhaki, 1994; Milanovic & Yitzhaki, 2002; Monti & Santoro, 2011). In the second, social stratification is endogenously generated. These approaches are centred on social mobility, and on educational and social polarization within intergenerational models of human capital accumulation (Chusseau & Hellier, 2013 for a review). Within a perfectly competitive framework, Becker and Tomes (1979) seminal article predicted that all the dynasties converge towards the same human capital and skill in the long term. The same result with albeit a slowdown in the convergence can be shown in the case of imperfections in the credit market (Loury, 1981; Becker & Tomes, 1986). From the nineties, a number of theoretical works have analysed the education-based social stratification. Several factors can generate the emergence of a lasting or permanent group of under-educated persons: credit market imperfections with a fixed cost of education (Galor & Zeira, 1993; Barham et al., 1995), an S-shaped education function (Galor & Tsiddon, 1997), neighbourhood effects (Benabou, 1993, 1994; Durlauf, 1994, 1996), etc. Finally, a limited number of works have shown that the shape of education systems can generate social stratification (Driskill & Horowitz, 2002; Bertocchi & Spagat, 2004; Su, 2004; Chusseau & Hellier, 2011; Brezis & Hellier, 2013).

This article develops a labour supply model to analyse the impact of globalization upon social stratification within a small, open advanced economy.

Social stratification is endogenously generated by the labour supply behaviours of heterogeneous households who differ in terms of skill and capital endowments. By assuming a minimal consumption below which households are excluded from the labour market, we firstly show that the economy is divided between four types of households, namely, the excluded, the rentiers, the ‘classical’ and the ‘non-classical’. Classical households are characterised by a labour supply that increases with the real wage whereas the non-classical display the opposite relationship.

To analyse the impact of globalization upon social stratification, we make a distinction between North-South globalization (NSG) and North-North globalization (NNG). NSG rests upon North-South trade and capital and technology transfers from the North to the South.
These transfers make both regions share the same technology, and North-South trade modifies income distribution in the North in favour of skilled labour and capital at the detriment of unskilled workers. NNG means perfect capital mobility across northern countries, which generates corporate tax competition and thus a downward shift in corporate tax rates.

Globalization modifies the sizes of social groups. The theoretical analysis shows that NSG and NNG do not have the same impact. NNG makes the groups of rentiers and excluded to expand whereas NSG has an inverted-U impact on the dimension of both groups. All in all, globalization has (i) a non-monotonic (inverted-U) impact upon the numbers of excluded and rentiers and (ii) an ambiguous impact on the groups of classical and non-classical households.

The simulations implemented from plausible values of the parameters provide more precise outcomes. They clearly show that both types of globalization increase the number of excluded and the number of rentiers. Globalization reduces the weight of classical households whereas it increases the weight of the non-classical.

Section 2 presents the bases of the model. Section 3 determines the derived social stratification and its main characteristics. Section 4 analyses the impacts of globalization upon social stratification and the working time. Section 5 provides simulations of these impacts from plausible values of the parameters and of factor payments. The main findings are discussed and we conclude in Section 6.

2. The model

2.1. General framework

We consider a small open advanced economy. This economy comprises $M$ households.

Each household $i=1...M$ is endowed with one unit of simple labour, a certain skill $h_i$ and a certain amount of capital $k_i$. Skill embodies the different characteristics that determine the individual’s productivity: education, experience, effort/dynamism at work, membership of influential networks etc.

Let $w_L$ be the wage per unit of simple labour and $w_H$ the wage per unit of skill. Then, household $i$’s real wage per unit of time (henceforth household i’s unit wage) is $w_i = w_L + w_H h_i$. Her/his wage is $W_i = (w_L + w_H h_i) t_i$ with $t_i$ her/his working time. Her/his income from capital is $r_i = r k_i$, with $r$ being the real return to capital. Both capital and skill are unevenly distributed across households, and household $i$ is thereby fully identified by the
couple of endowments \((h_i, k_i)\), and thus the couple \((w_i, r_i)\) for given values of the real wages \(w_L\) and \(w_H\) and of the return to capital \(r\). Finally, each household possesses one unit of time he can allocate to working and/or leisure.

As the model comprises three factors and two types of globalization, we select for the sake of simplicity a one-sector approach. Thus, the world economy produces one good the price of which is 1. Production utilises simple labour \(L\), skilled labour \(H\) and capital \(K\) with the Cobb-Douglas technology \(Y = AL^{\alpha_L}H^{\alpha_H}K^{\alpha_K}\), \(\alpha_L + \alpha_H + \alpha_K = 1\). With competitive markets, each factor is paid at its marginal productivity and the price of each factor is:

\[
w_L = \alpha_L AL^{\alpha_L-1}H^{\alpha_H}K^{\alpha_K}; \quad w_H = \alpha_H AL^{\alpha_L}H^{1-\alpha_H}K^{\alpha_K}; \quad r = \alpha_K AL^{\alpha_L}H^{\alpha_H}K^{-\alpha_K}
\]

(1)

The small open economy hypothesis signifies that the factor quantities that determine the country’s factor prices \((w_L, w_H\) and \(r)\) are those of the World.

Let \(\bar{c}\) be the minimum consumption level that ensures the minimum health and means from which households have a ‘normal’ social life and can thereby participate in the labour market. The lack of access to certain basic goods and services is a usual definition of exclusion, which thus depends on deprivation (Sen, 2000; Perez-Mayo, 2005; Borooah, 2007; D’ambrosio et al., 2011; Devicienti & Poggy, 2011). This is depicted by the following C.E.S. utility function with deprivation1:

\[
u_i = b(c_i - \bar{c})^{\frac{\sigma-1}{\sigma}} + (1-t_i)^{\frac{\sigma-1}{\sigma}}
\]

(2)

with \(\sigma > 1\), \((1-t_i)\) being the leisure time, \(c_i\) the consumption and \(\bar{c}\) the consumption under which households are excluded from the labour market.

Household \(i\) maximises the utility function (2) subject to the usual income constraint.

There is a corporate tax on the return to capital the rate of which is \(\tau\). This tax is levied directly from the firm in the country of production. The related levies are utilised to provide households for the lump-sum transfer \(r_G\). We thus have \(M \times r_G = \tau \sum_{i=1}^{M} r k_i\), and hence:

\[r_G = \tau \bar{k} \]

with \(\bar{k} = M^{-1} \sum_{i=1}^{M} k_i\) being the average capital per household.

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1 The most general form of this type of function has been firstly analysed in Pollak (1971) and Wales (1971).
Finally, households $i$’s after tax total income $I_i$ is:

$$I_i = w_i t_i + (1 - \tau)r_i + r_G = (w_L + w_H h_i) t_i + r k_i + \tau r (\bar{k} - k_i)$$

From the definition of excluded households and considering that $w_i = wh_i$ is household $i$’s highest possible wage.

**Lemma 1:** The households such that $w_i + (1 - \tau)r_i + r_G < \bar{c}$ are excluded from the labour market.

### 2.2. Working time

Consider household $i$ who is not excluded ($w_i + (1 - \tau)r_i + r_G > \bar{c}$). S/He maximises her/his utility $u_i = b(c_i - \bar{c})^{\sigma-1} + (1-t_i)^{\sigma-1}$ such that $w_i t_i + (1 - \tau)r_i + r_G \geq c$ and $t_i \geq 0$. This provides the following supply of working time (see Appendix 1):

$$t_i = \max \left\{ \frac{(bw_i)^{\sigma} - (1 - \tau)r_i - r_G + \bar{c}}{w_i + (bw_i)^{\sigma}}, 0 \right\}$$

**Lemma 2.** Consider working household $i$. Her/his working time $t_i$:

1) decreases with the return to capital $r$, the household’s capital endowment $k_i$ and the average capital endowment $\bar{k}$;
2) decreases with the corporate tax rate $\tau$ if $k_i < \bar{k}$ and increases with $\tau$ if $k_i > \bar{k}$;
3) decreases with $w_i$ if $w_i < \hat{w}$ and increases with $w_i$ if $w_i > \hat{w}$, with $\hat{w} = \hat{w}(r, k_i, \tau)$ being a function such that $\partial \hat{w} / \partial r < 0$, $\partial \hat{w} / \partial k_i < 0$ and $\partial \hat{w} / \partial \tau \geq 0$ if $k_i < \bar{k}$.

**Proof.** Appendix 2.

An increase in non-labour incomes reduces labour supply because it lessens the incentive to work. As a consequence, an increase in the return to capital $r$ reduces labour supply because it raises both the after tax private rents $(1 - \tau)r k_i$ and the social transfers to the household $r_G = \tau r \bar{k}$. A rise in the corporate tax $\tau$ lowers the labour supply of households who are poorly endowed with capital $(k_i < \bar{k})$ because this raises their total rents through the public transfers. In contrast, those who possess a rather large amount of capital $(k_i > \bar{k})$ suffer a decrease in their total rent, which incites them to work more. Finally, there is a wage
threshold \( \hat{w} = \hat{w}(r, k, \tau) \) below which the working time \( t_i \) is a decreasing function of wage \( w_i \) and above which \( w_i \) increases \( t_i \). In other words: the income effect dominates the substitution effect for \( w_i < \hat{w} \) and the substitution effect dominates the income effect for \( w_i > \hat{w} \). This result directly stems from the hypothesis of a minimum consumption necessary to be in the labour market. When \( w_i < \hat{w} \), the income is low and the household must allow a large part of her/his available time to working so as to go beyond the minimum consumption \( \bar{c} \). Then, a decrease in the wage per unit of time \( w_i \) incites the household to work more so as to maintain her/his income above \( \bar{c} \). In contrast, \( w_i < \hat{w} \) corresponds to a situation in which the household's income is comfortably above the minimum consumption \( \bar{c} \). Then, an increase in the unit wage \( w_i \) is necessary to incite the household to work more.

3. Social stratification

3.1 Types of households

**Definition 1.** We call:

1) *Excluded* the households who cannot attain the minimum consumption even when working during the whole of their disposable time;

2) *Rentiers* the households who are not excluded and choose not to work;

3) *Classical* the working households whose labour supply increases with their wage;

4) *Non-classical* the working households whose labour supply decreases with their wage.

It can be noted that the rentiers are not limited to very rich households whose capital income is so high that they prefer not to work. They gather all the household who can live without working and whose potential wage is not high enough to incite them to go to work. In particular, a number of valid retired workers belong to this category: their efficiency has decreased because of skill obsolescence (and presumably loss of dynamism) and their rents are high enough to convince them to move out of work.

**Proposition 1:** Consider an economy with a corporate tax \( \tau \) and a lump sum transfer to households \( r_G = \tau r \bar{k} \). Then, individuals are distributed between four groups:
1) the excluded are such that \( k_i < \frac{\bar{c} - r_G - w_i}{(1-\tau)r} \),
2) the non-classical are such that \( \frac{\bar{c} - w_i - r_G}{(1-\tau)r} \leq k_i < \frac{\bar{c} - r_G}{(1-\tau)r} - \frac{(\sigma - 1)b^{\sigma}w_i^{\sigma}}{\left(\sigma b^{\sigma}w_i^{\sigma - 1} + 1\right)(1-\tau)r} \),
3) the classical are such that \( \frac{\bar{c} - r_G}{(1-\tau)r} - \frac{(\sigma - 1)b^{\sigma}w_i^{\sigma}}{\left(\sigma b^{\sigma}w_i^{\sigma - 1} + 1\right)(1-\tau)r} < k_i < \frac{\bar{c} - r_G + b^{\sigma}w_i^{\sigma}}{(1-\tau)r} \),
4) the rentiers are such that \( k_i \geq \frac{\bar{c} - r_G + b^{\sigma}w_i^{\sigma}}{(1-\tau)r} \),

Proof. Appendix 3.

Proposition 1 defines the relations that separate each group of households. From these relations, Figure 1 draws the frontiers between each social group in the quadrant \((h_i, k_i)\).

![Figure 1. Social spaces in the quadrant \((h_i, k_i)\)](image)

### 3.2 Social spaces

We now assume that individuals are distributed in the interval \([0, h_{\text{max}}]\) in terms of human capital and \([0, k_{\text{max}}]\) in terms of capital. The space \([0, h_{\text{max}}] \times [0, k_{\text{max}}] \subset \mathbb{R}^2\) is called ‘Space of households’. Figure 2 depicts each social space within the space of households. The values \((k_E, k_C, k_R, h_E, h_C, h_R)\) are described in Appendix 4.
The dimensions of the spaces corresponding to the social groups, defined as the surfaces of each space in the plan \((h,k)\), are depicted in Table 1 (calculations in Appendix 4).

**Table 1. Social Spaces Dimensions**

<table>
<thead>
<tr>
<th>Spaces</th>
<th>Dimension in the plan ((h, k))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space of exclusion</td>
<td>(S_E = \frac{(\bar{c} - \tau r \bar{k})^2 - w_L}{2(1-\tau)rw_H} )</td>
</tr>
<tr>
<td>Space of rentiers</td>
<td>(S_R = k_{max}h_{R} - \frac{b^\sigma \left((w_L + w_{R}h_R)^{\sigma+1} - w_L^{\sigma+1}\right)}{(1-\tau)r(\sigma + 1)w_H} - \frac{\bar{c} - \tau r \bar{k}}{(1-\tau)}h_R )</td>
</tr>
<tr>
<td>Non-classical households</td>
<td>(S_{NC} = \frac{1}{(1-\tau)r} \int_0^h \left(\bar{c} - r_0 - \frac{(\sigma - 1)b^\sigma \left(w_L + w_{h}h\right)^{\sigma}}{\sigma b^\sigma \left(w_L + w_{h}h\right)^{\sigma-1} + 1} \right) dh - S_E )</td>
</tr>
<tr>
<td>Classical households</td>
<td>(S_c = k_{max}h_{max} - (S_R + S_{NC} + S_E) )</td>
</tr>
</tbody>
</table>

It must be noted that the social spaces dimensions give no information about the proportion of households inside each space, which depends on the distribution of human and physical capital between households. Obviously, if households are uniformly distributed in the household space (which is not the case in the real economy), then dividing each dimension by \(k_{max} \times h_{max}\) provides the exact proportion of households inside the corresponding space.
3.3. Incomes, corporate tax and social stratification

We shall henceforth assume that:

1) \( w_L + \tau r \bar{k} < \bar{c} \), which signifies that the space of exclusion does exist.

2) All excluded households have a capital endowment lower than the average capital endowment: \( k_i < \bar{k} \). The social transfer they receive is thus higher than the levies they pay, i.e., their rents \( (1-\tau)rk_i + \tau r \bar{k} = rk_i + \tau r(\bar{k} - k_i) \) increase with the tax rate \( \tau \).

3) All the rentiers have a capital endowment higher than the average \( k_i > \bar{k} \), which signifies that \( \sigma < \left( b w_i \right)^\tau + \bar{c}, \forall i \in S_r \).

We now analyse the impact of the three determinants of after-tax income of a household defined by its endowments \( (k_i, h_i) \), i.e., the return to capital \( r \), the corporate tax rate \( \tau \) and the unit wages \( w_H \) and \( w_L \).

**Lemma 3.** An increase (decrease) in the return to capital \( r \):

1) expands (reduces) the space of the rentiers, and

2) reduces (expands) the space of exclusion and the space of classical households.

*Proof:* Appendix 5.

The increase in capital income expands the space of rentiers because it reduces the incitation to work for capital owners. In addition, the increase in \( r \) augments the redistribution to the excluded, which makes some of them escape from exclusion.

**Lemma 4.** An decrease (increase) in the corporate tax rate \( \tau \):

1) expands (reduces) the space of the rentiers and the space of exclusion, and

2) reduces (expands) the space of classical households.

*Proof:* Appendix 5.

The increase in \( \tau \) reduces the number of rentiers because it lowers the amount of rents. As the space of rentiers shrinks, the space of classical households. It also lessens the number of excluded because it increases the redistribution benefits.
Lemma 5. An increase (decrease) in the unit wages $w_L$ and $w_H$

1) reduces (enlarges) the space of rentiers and the space of exclusion;
2) enlarges the working population.


As regards the spaces of classical and non-classical households, the impacts of changes in $w_H$, $w_L$, $r$ and $\tau$ depend on the initial factor payments and tax $(\bar{w}_H, \bar{w}_L, \bar{r}, \bar{\tau})$ and on the model parameters $(b, \sigma, \alpha_L)$. These impacts are simulated in Section 5.

4. Globalization and Social stratification

4.1. Globalization

We make a distinction between North-South globalization (NSG) and North-North globalization (NNG).

a) North-South Globalization

North-South globalization is characterised by two features:

1. Free trade between the two areas, with the size of the South increasing throughout the globalization process.
2. Capital and technological transfers from the North to the South.

Compared to the North, the South is assumed to display a high relative endowment of simple labour in relation to both skill and capital.

North-South openness thus results:

1. in the adoption by the South of the northern technology (the TFP can however remain lower in the South because of the lack of public equipment, of the time and cost necessary to adjust to the new technologies, etc.) , and
2. by an increase in the world endowment of $L$ in relation to both $H$ and $K$ and thus by a change in the factor payments $w_H, w_L$ and $r$.

We assume to simplify that this causes both ratios $L/H$ and $L/K$ to be multiplied by the same coefficient $\lambda > 1$. Because of the Cobb-Douglas technology, the wage per unit of simple labour $w_L$ is multiplied by $\lambda^{\alpha_L-1}$, the return to skill $w_H$ and the return to capital $r$ by $\lambda^{\alpha_L}$, and the price of the good remains equal to 1 (equations [1]).
We can thus represent the increase in the size of the South which defines NSG by an increase in parameter $\lambda$ from an initial value $\lambda = 1$. The real wage per unit of simple labour $x$ time is $w_L = \lambda^{\alpha_L-1}\overline{w}_L$, the real wage per unit of skill $x$ time $w_H = \lambda^{\alpha_H}\overline{w}_H$ and the real unit return to capital $r = \lambda^{\alpha_R}\overline{r}$, with $\overline{w}_L$, $\overline{w}_H$ and $\overline{r}$ being these values at the outset of globalization. The real lump sum redistribution benefit is $r_G = \lambda^{\alpha_R}\tau\overline{r}\overline{k}$.

We can finally determine the minimum skill from which NSG increases the unit wage:

**Lemma 6.** NSG increases (lowers) the unit wage $w_i$ of the households such that $h_i > (<) h(\lambda)$, with:

$$h(\lambda) = \frac{1 - \alpha_L}{\alpha_L} \frac{\overline{w}_L}{\overline{w}_H} \lambda^{-1}$$  \hspace{1cm} (4)

**Proof:** $w_i = \overline{w}_L\lambda^{\alpha_L-1} + \overline{w}_H h(\lambda) \Rightarrow \frac{\partial w_i}{\partial \lambda} = (\alpha_L - 1)(\overline{w}_L\lambda^{\alpha_L-2}) + \alpha_L \overline{w}_H h(\lambda) \lambda^{-1}$. Hence: $\frac{\partial w_i}{\partial \lambda} > 0$ \hspace{1cm} $h_i > h(\lambda) = \frac{1 - \alpha_L}{\alpha_L} \frac{\overline{w}_L}{\overline{w}_H} \lambda^{-1}$.

b) North-North globalization

NNG is characterised by perfect capital mobility between northern countries resulting in tax competition and thereby in a reduction in the corporate tax rate. The decrease in the statutory corporate tax due to capital mobility is a general result of both the theoretical and empirical literature on corporate tax competition. This move can be inverted when corporate levies are utilised to improve the profitability of firms through the providing of public equipment, subsidies and transfers (Benassy-Queré et al., 2007). As here corporate taxes are only utilised for redistribution (corporate levies that return to firms are ignored because we analyse social stratification) the hypothesis of a globalization driven decrease in $\tau$ is fully justified.

The reduction in the corporate tax rate that defines the NNG dynamics will be modelled by an increase in parameter $\eta$ from the initial value 1, with $\tau = \overline{\tau}/\eta$ being the corporate tax rate and $\overline{\tau}$ this rate at the outset of globalization. Consequently, $r_G = \lambda^{\alpha_R}\tau\overline{r}\overline{k}/\eta$. 
4.2. The impact on social stratification

a) North-South Globalization

**Proposition 2.** The relation between the dimension of the space of exclusion $S_E$ and the size of the South $\lambda$ is decreasing when $\bar{w}_L < \alpha_L\bar{c}$, and has an inverted-U shape when $\bar{w}_L > \alpha_L\bar{c}$.

**Proof:** Appendix 7.

Firstly note that $\bar{w}_L > \alpha_L\bar{c}$ is the most likely case. In fact, the share of simple work in total income $\alpha_L$ is typically not higher than $1/3$ in advanced economies, and the fact that someone endowed with simple labour only cannot buy such a low percentage of the minimal consumption is very improbable. Let us thus assume that $\bar{w}_L > \alpha_L\bar{c}$. Then, Proposition 2 indicates that the number of excluded is linked to NSG by an inverted-U relationship. This result is logical and mechanical. NSG causes an increase in $r$ and $H_w$, and a decrease in $L_w$. As the incomes of the excluded as well as those of the poorest non-classical households essentially come from $w_L$, NSG firstly lessens those incomes and make the poorest non-classical households move into exclusion. However, with the simultaneous rise in $w_H$ and $r$ and reduction in $w_L$, a moment comes when these moves make the income of the most skilled (and capital owning) excluded to increase. From then, the rise in $\lambda$ results in a growing number of excluded who attain the minimum consumption $\bar{c}$ when they spend all their available time working, which make them escape from exclusion.

**Proposition 3.** If the space of rentiers expands with the NSG intensity at the outset of globalization ($\partial S_R / \partial \lambda > 0$, $\lambda = 1$), then there is an inverted-U relationship between the dimension of the space of rentiers and the NSG intensity. In the opposite case ($\partial S_R / \partial \lambda < 0$, $\lambda = 1$), the space of rentiers continuously shrinks throughout the globalization process (increase in $\lambda$).

**Proof:** Appendix 7.

NSG has several different impacts upon the space of rentiers. An increase in the wage per unit of time ($w_L + w_H h_i$) lessens the number of rentiers whereas increases in private rents $r k_i$ and in net public rents $\tau r (k - k_j)$ augment it. Consequently, the decrease in $w_L$ enlarges this
space and the increase in $w_H$ shrinks it. The increase in $r$ enlarges the space of rentiers through the increase in $rk_i$ whereas it reduces it through the decrease in $\tau r(\bar{k} - k_i)$ provided that $\bar{k} < k_i$ for the rentier households. Consequently, one can expect that NSG expands the space of rentiers at its bottom side (i.e., rentiers with low human and physical capital) and would cut it at its top side (rentiers with high human capital). (see Appendix 7).

b) North-North Globalization (NNG)

NNG is modelled as a decrease in the country’s corporate tax $\tau$. From Lemma 4, we infer

**Proposition 4. North-North globalization:**

1) expands the space of exclusion and the space of rentiers, and
2) reduces the space of classical households.

Finally, the impacts of NSG (increase in $\lambda$) and NNG (decrease in $\tau$) upon the dimensions of the spaces of classical and non-classical households cannot be analysed in a simple way. They depend on the set of initial values $(\bar{w}_H, \bar{w}_L, \bar{r}, \bar{\tau})$, on the model parameters $(b, \sigma, \alpha_L)$, and on the intensity of the shifts in $\lambda$ and $\eta$. These impacts will be simulated in Section 5 from plausible values of the parameters and factor payments.

c) Total impact of Globalization

It is not possible to provide a simple analytical analysis of the impact of the combination of NSG and NNG upon each social space. This is due to the multiple dimensions of globalization (decrease in $w_L$ and $\tau$, increase in $w_H$ and $r$) and the complexity of their combined effect upon the households according to the share in their total gain of each type of income (wages for simple labour and human capital, capital income, social benefit), and thus according to their social group. The analysis will thereby be implemented in Section 5 by simulating different dynamics corresponding to plausible values of the income shares and the model parameters. From the above results of NSG and NNG, it is however possible to analyse the effects of globalization upon the spaces of exclusion and the space of rentiers.

In the case of excluded households, let us assume that $w_L > \alpha_L \bar{C}$, which means that NSG has an inverted-U shaped impact upon the space of excluded (Proposition 2). As long as $\lambda < \left(\frac{w_L}{\alpha_L \bar{C}}\right)^{\frac{1}{(1-\alpha_L)}}$, both NSG (increase in $\lambda$) and NNG (decrease in $\mu$) raise the number
of excluded (Propositions 2 and 3). When \( \lambda \) becomes higher than \( \left( \frac{w_L}{\alpha_L c} \right)^{1/(1-\alpha_L)} \), NSG and NNG have opposite impacts on the number of excluded. From then, it can be shown (see Appendix 8) that for the each couple of values \((\lambda, \eta)\) there is a minimum rate of increase in \( \eta \), depending on the rate of increase in \( \lambda \), from which the number of excluded expands. In other words, the decrease in the corporate tax must be sufficiently large to offset the lessening of the number of excluded due to NNG.

### 4.3. Working time

We can finally analyse the impacts of NSG and NNG upon working time in each working social group, i.e., the classical and non-classical. These impacts are not straightforward because:

1. NSG increases the unit wage \( w_i \) for individuals with rather high skill \( (h_i > h(\lambda)) \) and it decreases the unit wage of individuals with rather low skill \( (h_i < h(\lambda)) \), and the number of those being in the first case increase with time since \( \lambda \) rises (Lemma 6).

2. NSG increases the return to capital \( (1-\tau)\lambda^{\alpha_t} r \) and thus the rents \( \lambda^{\alpha_t} (1-\tau)\bar{r}_i k_i + \tau \lambda^{\alpha_t} \bar{r}k \).

3. NNG decreases rents \( r_i + \bar{r}r(k - k_i) / \eta \) for the households with a capital endowment lower than the average, and it increases rents for those with a capital endowment higher.

4. Finally, the increase in rents lowers the working time of both classical and non-classical households, whereas the increase in the unit wage rises the classical households’ working time and lessens the working time of non-classical households.

Consequently, the impact of globalization upon the working time depends on the strength of each effect described above, which typically differs across households.

**Proposition 5.** North-North globalization induces a decrease (increase) in the working time of the households with a capital endowment higher(lower) than the average.

**Proof:** Because of Lemma 2 (feature 2) and provided that NNG lessens the corporate tax rate.

### 5. Simulations

Two series of simulations will be implemented. In the first, we choose plausible values of the parameters, of the labour shares and of \( h_{\text{max}} \) and \( k_{\text{max}} \), and we (i) draw the four social spaces, (ii) calculate the dimension of each space before globalization \((\lambda = \eta = 1)\), and (iii) analyse
the impacts of NSG and NNG upon these dimensions by making $\lambda$ and $\eta$ vary. Such calculations must be seen as illustrations of the theoretical findings since, as previously underlined, they cannot portray the globalization-driven changes in the weight of each social group because these weights depend on the distribution of individuals inside the space of households, this distribution being typically not uniform. Consequently, a second series of simulations will be implemented to reveal the impacts of globalization upon the social groups from distributions of households in the space $(h,k)$ that correspond to what is observed in advanced countries.

5.1. Social spaces and working time: numerical illustration

a) Pre-globalization social spaces

We firstly diagrammatically determine each social space at the outset of globalization, i.e., for $\lambda = \mu = 1$. This simulation cannot portray the reality of income distribution and public redistribution since only corporate taxes are introduced and the distribution of households inside the space $[0,h_{\text{max}}] \times [0,k_{\text{max}}]$ is disregarded. The equations used for the determination of each space are those depicted in Figure 1. We select the following values of the model parameters:

<table>
<thead>
<tr>
<th>Table 2. The parameters and initial values for the simulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\bar{w}_H$</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

The values selected for $\bar{w}_L$, $\bar{w}_H$ and $h_{\text{max}}$ make the earnings multiplier between the least skilled ($h_i = 0$) and the most skilled ($h_{\text{max}} = 10$) household to be 11. The value $\alpha_L = 0.2$ signifies that simple labour accounts for 20% of total income. The corporate tax rate $\bar{\tau} = 0.3$ is in-between the present rates (which are of about 20-25%) and the rates of the eighties (about 40-50%). Coefficient $b$ is selected to have a little more than 90% of the disposable time (equal to 1) to be allocated for working in the case of a household with the highest skill ($h_i = 10$) and no capital ($k_i = 0$). The minimal consumption $\bar{c}$ is such that the space of exclusion does exist ($\bar{w}_L + \bar{c} \leq \bar{c}$) and the average capital ($\bar{k} = 100$) for redistribution ($\bar{\tau} + \bar{k} = 0.9$) to be a little lower than the wage $\bar{w}_L$ of a household without any skill. Finally, the
same simulations were carried out with different values of the parameters (\( \sigma \) varying from 0.5 to 3, \( \tau \) from 0.1 to 0.5, \( \varphi \) from 0.01 to 0.05, \( \alpha_L \) from 0.25 to 0.35, different values of \( b \)). All these simulations provide similar outcomes in terms of variation, with however differences in intensity.

Figure 3 draws the four social spaces at the outset of globalization, and Table 3 provides the dimensions and limit values of each space. The space of classical households is apparently much bigger than the other spaces. However, this does not depict the weight of each type of households because, in the real economy, a large majority of households are concentrated in the South-West part of space \([0, h_{max}] \times [0, k_{max}]\).

![Figure 3. Pre-globalization social spaces](image)

**Table 3. Dimension and limits of each space before globalization**

<table>
<thead>
<tr>
<th></th>
<th>( S_E )</th>
<th>( S_R )</th>
<th>( S_{NC} )</th>
<th>( S_C )</th>
<th>( S_{EL} )</th>
<th>( h_E )</th>
<th>( k_E )</th>
<th>( h_R )</th>
<th>( k_R )</th>
<th>( h_C )</th>
<th>( k_C )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.50</td>
<td>69122</td>
<td>108.94</td>
<td>30763.5</td>
<td>93710</td>
<td>0.34</td>
<td>32.37</td>
<td>10.99</td>
<td>196.18</td>
<td>2.25</td>
<td>99.51</td>
</tr>
</tbody>
</table>

**b) North-South globalization**

We make \( \lambda \) move from 1 to 1.2, and we depict the impact of this move upon the dimension of each social space. This corresponds to an increase in \( w_H \) of 5.6\%, a decrease in \( w_L \) of 12\%, and an increase in \( w_H / w_L \) of 20\%. In line with the empirical literature on the subject, NSG increases the return to skill and diminishes the wage of simple (unskilled) labour.
Figure 4 depicts the variations in the social spaces dimensions that derive from NSG. As expected, NSG increases both the space of excluded and the space of rentiers. Note that, if we make $\lambda$ increase beyond 1.2, the curves display the expected inverted-U shape with the turning point occurring for $\lambda = 2.8$ in the case of the space of exclusion, and 1.3 for the space of rentiers.

![Figure 4. NSG and the Social spaces dimensions](image)

Both spaces of non-classical and classical households shrink. These results are verified for a large range of simulations implemented by making the parameters, factor payments and limit values to vary within plausible intervals. In terms of rate of variation (Table 4), for a NSG that moves $\lambda$ from 1 up to 1.2, the increase in $S_E$ is the highest (+63.6%) and the rate of decrease in $S_C$ remains rather modest (-0.92%).

<table>
<thead>
<tr>
<th>$S_E$</th>
<th>$S_R$</th>
<th>$S_{NC}$</th>
<th>$S_C$</th>
<th>$h_E$</th>
<th>$k_E$</th>
<th>$h_R$</th>
<th>$k_R$</th>
<th>$h_C$</th>
<th>$k_C$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td>9</td>
<td>69406.2</td>
<td>105.15</td>
<td>30479.6</td>
<td>0.43</td>
<td>41.42</td>
<td>10.95</td>
<td>170.18</td>
<td>2.25</td>
</tr>
<tr>
<td>% change*</td>
<td>+63.6</td>
<td>+41.0</td>
<td>-3.5</td>
<td>-0.92</td>
<td>+26.5</td>
<td>+27.9</td>
<td>-0.36</td>
<td>-13.25</td>
<td>0</td>
</tr>
</tbody>
</table>

* in relation to the pre-globalization situation.
c) *North-North globalization*

We make $\eta$ vary from 1 to 1.5, which corresponds to a shift in the redistributive component of the corporate tax rate $\tau$ from 30 down to 20%.

Figure 5 draws the variations in the dimension of each space that derive from NNG and Table 5 depicts the dimensions and limits of each space at the end of NNG ($\eta = 1.5$). As expected, the space of exclusion and the space of rentiers expand. In addition the space of non-classical expands as well, which reveals the negative impact of the decrease in redistribution upon the poorest classical who now increase their working time to maintain their post-tax and redistribution income.

![Figure 5. NNG and the Social spaces dimensions](image)

*Table 5. Dimension and limits of each space at the end of NNG*

<table>
<thead>
<tr>
<th></th>
<th>$S_E$</th>
<th>$S_R$</th>
<th>$S_{NC}$</th>
<th>$S_C$</th>
<th>$h_E$</th>
<th>$k_E$</th>
<th>$h_R$</th>
<th>$k_R$</th>
<th>$h_C$</th>
<th>$k_C$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td>13.06</td>
<td>74543.5</td>
<td>132.52</td>
<td>25311</td>
<td>0.56</td>
<td>46.67</td>
<td>11.83</td>
<td>190</td>
<td>2.7</td>
<td>105.4</td>
</tr>
<tr>
<td>% change*</td>
<td>+228.36</td>
<td>+7.84</td>
<td>+21.6</td>
<td>-91.8</td>
<td>+64.7</td>
<td>+44.2</td>
<td>+7.64</td>
<td>-94.9</td>
<td>+20</td>
<td>+5.91</td>
</tr>
</tbody>
</table>

* in relation to the pre-globalization situation.

d) *Combined NSG and NNG*

We now make vary the couple $(\lambda, \eta)$ from (1, 1) to (1.2, 1.5) so as to combine North-South and North-North globalization.

Logically, both the space of exclusion and the space of rentiers expand. In addition, the space of non-classical increases, which means that the positive effect of NNG dominates the
negative effect of NSG. The extension of the space of rentiers combined with the increase in the space of non-classical shows that globalization makes certain classical households to become non-classical. In other words: the former poorest classical have become non-classical; they now increase (decrease) their working time when their unit wage lessens (increases).

Figure 6. Total globalization (TG) and the Social spaces dimensions

Table 6. Dimension and limits of each space at the end of total globalization (NSG+NNC)

<table>
<thead>
<tr>
<th></th>
<th>$S_E$</th>
<th>$S_R$</th>
<th>$S_{NC}$</th>
<th>$S_C$</th>
<th>$h_E$</th>
<th>$k_E$</th>
<th>$h_R$</th>
<th>$k_R$</th>
<th>$h_C$</th>
<th>$k_C$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td>17.87</td>
<td>74726</td>
<td>127.49</td>
<td>25128.6</td>
<td>0.65</td>
<td>54.581</td>
<td>11.76</td>
<td>167.24</td>
<td>2.70</td>
<td>104.77</td>
</tr>
<tr>
<td>% change</td>
<td>+224.9</td>
<td>+8.1</td>
<td>+17</td>
<td>-18.3</td>
<td>+91.2</td>
<td>+68.61</td>
<td>+7</td>
<td>-14.75</td>
<td>20</td>
<td>+5.28</td>
</tr>
</tbody>
</table>

5.2. Changes in Households positions

In the second series of simulations, we assume 1000 households distributed within the space $[0,h_{\text{max}}] \times [0,k_{\text{max}}]$. This distribution replicates what was observed in the early 90s in advanced economies. If the distribution by percentile of both labour incomes and financial wealth taken separately can be found for a large range of countries, the crossed distribution is typically not available. For the US, we however have the distribution of wealth per earnings level (intervals) with the weight of each earning interval in total earnings (Wolff, 2012). We
then build a crossed distribution earnings × financial wealth based upon the distributions in the US as revealed by the OECD (for earnings) and Wolff (2012) for financial wealth. This distribution corresponds to inequality-oriented countries. The simulations implemented here must be understood as illustrating the impact of the modelled dimensions of globalization upon social stratification ceteris paribus, for inequality-oriented countries.

a) Changes in the weight of each social group

We assume 1,000 households initially distributed in the space \((h,k) = [0,10] \times [0,1000]\) and we make \(\lambda\) vary from 1 to 1.2 and \(\eta\) from 1 to 1.5.

In what follows, we limit our simulation to the American case. The distribution of households is depicted in Table A2 and Figure A3 in Appendix 9. This distribution is in line (i) with the distribution of earnings in the US in the mid-2000s (OECD), and (ii) with the distribution of financial wealth per decile and per income group as provided by Wolff (2012).

![Graphs showing changes in social spaces](image-url)

**Figure 7.** The four social spaces: pre-globalization, NSG, NNG and NSG+NNG.
The impacts of the changes in $\lambda$ and $\eta$ upon the space frontiers are depicted on Figure 7. The Figure are centred on the $h \in [0,3]$ so as to focus on the moves of the frontiers. As expected, both NSG and NNG enlarge the space of rentiers and the space of exclusion, and they both shrink the space of classical households. In addition, Table 7 depicts the share of each social group in the population at the initial time (no globalization: $\lambda = \eta = 1$), at the end of NSG acting alone ($\lambda = 1.2$; $\eta = 1$), at the end of NNG acting alone ($\lambda = 1$; $\eta = 1.5$) and at the end of combined NSG and NNG ($\lambda = 1.2$; $\eta = 1.5$).

<table>
<thead>
<tr>
<th>Table 7. Share of each social group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-globalization</strong></td>
</tr>
<tr>
<td>Excluded</td>
</tr>
<tr>
<td>Rentiers</td>
</tr>
<tr>
<td>Classical</td>
</tr>
<tr>
<td>Non classical</td>
</tr>
</tbody>
</table>

Four main outcomes can be highlighted:

1) Both NSG and NNG increase the number of excluded.
2) Both NSG and NNG increase the number of rentiers.
3) Both NSG and NNG lessen the number of classical households.
4) The number of non-classical increases because of NNG-related lower redistribution.

b) Working time

We firstly compute the working time for each employed worker. From this, we calculate (i) the total working time of the economy, (ii) the working time per employed worker, and (iii) the average working time for top 5% incomes. We make these calculations in four cases: pre-globalization, NSG alone, NNG alone and full globalization (NSG+NNG). Table 8 depicts the main findings of these calculations.

<table>
<thead>
<tr>
<th>Table 8. Variation in working time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-Global.</strong></td>
</tr>
<tr>
<td>Total working time</td>
</tr>
<tr>
<td>Working time per employed worker</td>
</tr>
<tr>
<td>Average WT for top 5% incomes</td>
</tr>
</tbody>
</table>
Globalization induces a decrease in the total working time of the population. However, this general change covers several opposite moves:

1. The increase in the numbers of rentiers and excluded lessens the number of working individuals. As a consequence, the total working time decreases. This shows that globalization lessens the working time along its extensive margin.

2. In contrast, the working time per employed worker increases, moving from 0.81 up to 0.827. Globalization rises the working time along its intensive margin.

3. This increase in the working time per employed worker combines different changes. On the one hand, NSG has an ambiguous impact because the rise in $w_H$ moves working time up whereas the decrease in $w_L$ and the increase in $r$ pushes it down. On the other hand, NNG increases the working time of workers who possess less than the average capital endowment and decreases the working time of those possessing more than the average (Proposition 5). Because of the very uneven distribution of capital (in line with observed facts), only 11% of the households possess a capital higher than the average endowment. As a consequence, the increasing effect logically prevails.

6. Discussion and conclusion

From a model in which households differ in their skill and capital endowments, we have shown that labour supply (working time) behaviours generate four social groups, i.e., the excluded, the rentiers, the classical and the non-classical. Classical households are characterised by a working time that increases with their real wage whereas the non-classical display the opposite relationship.

We have subsequently introduced globalization by making a distinction between North-North and North-South globalization. NNG creates corporate tax competition whereas NSG increases the return to capital and skill at the expense of the payment for simple labour. The combination of both types of globalization modifies social stratification. The space of excluded tends to increase. In addition, when selecting plausible values of the parameters and of factor payments, the space of rentiers increases as well. Consequently, globalization results in an enlargement of both extremities of the household space, i.e., those who do not work because they are too poorly endowed with skill and capital to attain the minimal consumption, and those who do not work because their capital endowment is sufficiently high to discourage them working for the wage corresponding to their skill.
The space of exclusion enlargement can be illustrated by the increase in the poverty rate experienced by a number of advanced countries in the thirty last years. Note that the positive impact of the decline in the corporate tax rate upon exclusion that derives from less redistribution can be counteracted (i) by higher levies on consumption or on labour incomes, and (ii) by an increase in public deficit. This last possibility is however not sustainable.

One of the most noticeable predictions is the enlargement of the space of rentiers, thus the rise in their weight in the population of households. As rentiers do typically not belong to the lower class or the lower middle class, this prediction essentially concerns the upper middle class and the upper class. In the XXth century, one of the prominent social changes in advanced economies is the vanishing of the rentiers (Piketty, 2003; Piketty & Saez, 2003). In addition, certain studies suggest that, despite the huge increase in the income share of the very top of the income distribution in most advanced countries (Atkinson and Piketty, 2007), the class of rentiers is not yet reconstituted (Kopczuk & Saez, 2004). One can thereby ask the following questions: What forms can take this recovery of the rentiers and is this prediction realistic?

Firstly, the new rentiers can come from households whose return to capital has become high enough to incite them to retire earlier than expected. This behaviour results from the increase in their rents and the decrease in their skill (obsolescence, age-related decrease in dynamism etc.). Then, both the increase in the return to capital (rise in \( r \)) and the decrease in the real unit wage \( w_i \) incite older workers to retire earlier if they possess a sufficient amount of capital.

Secondly, the new rentiers can be children from rich families (who have inherited or received bequests) whose efficiency level is not high enough to allow them having a high position in the professional hierarchy. They thus prefer to live of their rents rather than having a job they consider unattractive.

Thirdly, they can also be individuals who have accumulated a huge amount of capital because of very high pay at the beginning of their professional carrier due to both very high efficiency and very high working time. When their efficiency begins to decrease, they can choose to become rentiers because they possess a substantial amount of capital. This is the case of the so-called ‘golden boys’ of the nineties who became rentiers when their dynamism and efficiency decreased because of age.

Note that, as the group of rentiers comprises workers who retire earlier, its enlargement is typically not immediate and it needs a certain time to happen.
Finally note that we do not analyse the intergenerational dynamics of social stratification. Our model focuses on the direct impact of globalization upon the respective returns to capital and labour, and thereby on working time and the incentive to work of heterogeneous households who differ in their given endowments of skill and capital. In the longer term, this approach should be combined with a precise analysis of the impacts upon the formation and accumulation of skill (particularly education) and capital.

**APPENDIX 1. The optimal working time**

$$\max_{c,t_i} u_i = b(c_i - \bar{c})^{\sigma - 1}\sigma + (1-t_i)^{\sigma - 1}\sigma \quad \text{s.t.: } w_i t_i + (1-\tau) r_i + r_G \geq c, \ t_i \geq 0$$

$$u_i = b(w_i t_i + (1-\tau) r_i + r_G - \bar{c})^{\sigma - 1}\sigma + (1-t_i)^{\sigma - 1}\sigma$$

$$\frac{\partial u_i}{\partial t_i} = \frac{\sigma - 1}{\sigma} b(w_i t_i + (1-\tau) r_i + r_G - \bar{c})^{\frac{1}{\sigma}} w_i - \frac{\sigma - 1}{\sigma} (1-t_i)^{\frac{1}{\sigma}} = 0$$

Hence:

$$t_i = \max \left\{ \frac{(b w_i)^{\sigma} - (1-\tau) r_i - r_G + \bar{c}}{w_i + (b w_i)^{\sigma}}, 0 \right\}$$

**APPENDIX 2. Analysis of the working time function**

**Proof of Lemma 2.**

$$t_i = \frac{(b w_i)^{\sigma} - (1-\tau) r_i - r_G + \bar{c}}{w_i + (b w_i)^{\sigma}} \quad ; \quad \frac{\partial t_i}{\partial r_i} = -\frac{1-\tau}{w_i + (b w_i)^{\sigma}} < 0; \quad \frac{\partial t_i}{\partial \tau} = -\frac{(\bar{c} - r_i) (w_i + (b w_i)^{\sigma})}{w_i + (b w_i)^{\sigma}} < 0, \quad r_i < \bar{c} \Leftrightarrow r_i < \bar{k}$$

Analysis of function $$t_i = t_i(w_i) = \frac{(b w_i)^{\sigma} - (1-\tau) r_i - r_G + \bar{c}}{w_i + (b w_i)^{\sigma}}, \quad (b w_i)^{\sigma} - (1-\tau) r_i - r_G + \bar{c} \geq 0$$

$$t_i \xrightarrow{w_i \to \infty} 1; \quad w_i + (1-\tau) r_i + r_G = \bar{c} \Rightarrow t_i = 1$$

$$\frac{\partial t_i}{\partial w_i} = \frac{\sigma b^\sigma w_i^{\sigma - 1} (w_i + (b w_i)^{\sigma}) - (1 + \sigma b^\sigma w_i^{\sigma - 1}) ((b w_i)^{\sigma} - (1-\tau) r_i - r_G + \bar{c})}{(w_i + (b w_i)^{\sigma})^2}$$

$$\frac{\partial t_i}{\partial w_i} = \frac{(\sigma - 1) (b w_i)^{\sigma} + (1 + \sigma b^\sigma w_i^{\sigma - 1}) ((1-\tau) r_i + r_G - \bar{c})}{(w_i + (b w_i)^{\sigma})^2}$$

1) $$(1-\tau) r_i + r_G - \bar{c} > 0 \Rightarrow \frac{\partial t_i}{\partial w_i} > 0$$

2) $$(1-\tau) r_i + r_G - \bar{c} < 0. \quad \frac{\partial t_i}{\partial w_i} < 0 \Leftrightarrow (\sigma - 1) b^\sigma w_i^{\sigma - 1} > (\sigma b^\sigma w_i^{\sigma - 1} + 1)(\bar{c} - (1-\tau) r_i - r_G).$$
Hence: \( \frac{\partial t_i}{\partial w_i} \geq 0 \iff \frac{(\sigma-1)b^\sigma w_i^\sigma}{\sigma b^\sigma w_i^{\sigma-1}+1} \geq e^{-(1-\tau)r_i-r_G} \). We denote: \( z(w_i) = \frac{(\sigma-1)b^\sigma w_i^\sigma}{\sigma b^\sigma w_i^{\sigma-1}+1} \). Figure A1 depicts the position of function \( z(w_i) \) in relation to \( e^{-(1-\tau)r_i-r_G} \).

\[ z(w_i) = \frac{b^\sigma (\sigma-1)}{b^\sigma - w_i^{\sigma-1} + w_i^{-\sigma}} \]

Figure A1. Function \( z(w_i) \)

\( \exists \) unique \( \hat{w}(r_i) \) such that \( w_i < \hat{w}(r_i, \bar{r}, \tau) \Rightarrow \frac{\partial t_i}{\partial w_i} < 0 \) and \( w_i > \hat{w}(r_i, \bar{r}, \tau) \Rightarrow \frac{\partial t_i}{\partial w_i} > 0 \)

On the curve \( r_i = \frac{e^{-(1-\tau)r_i-r_G}}{1-\tau} - \frac{b^\sigma (\sigma-1)}{(1-\tau)(b^\sigma w_i^{\sigma-1} + w_i^{-\sigma})}, \) \( r_i = 0 \Rightarrow (e^{-(1-\tau)r_i-r_G})(b^\sigma w_i^{-\sigma} + 1) = b^\sigma (\sigma-1)w_i^\sigma \).

Figure A2. The relation between the wage and the working time.
Figure A2 depicts the working time $t_i$ depending on the wage $w_i = w_L + w_H h_i$ in the cases $(1-\tau)r_i + r_G < c$ and $(1-\tau)r_i + r_G \geq c$. In the first case (Figure A1a) the household works if $w_i + (1-\tau)r_i + r_G \geq c$ and s/he is excluded if $w_i + (1-\tau)r_i + r_G < c$ (see the analysis of function $t_i = t_i(w_i)$). When s/he works with a wage $w_i = w_L + w_H h_i$ lower than $\hat{w}_j$, the household is non-classical whereas s/he is classical in the case $w_i > \hat{w}_j$. In the second case (Figure 1b) the household decides to live from its sole rents when the wage $w_i$ is smaller than $(1-\tau)r_i + r_G - c)^{1/\sigma}$, this value being the reservation wage of the household. If $w_i > (1-\tau)r_i + r_G - c)^{1/\sigma}$, then the household works and is classical.

**APPENDIX 3. Proof of Proposition 1: The four social spaces**

The distribution of households between the classical and the non-classical depends on the sign of the derivatives $\partial t_i / \partial w_i$, $i=1,...,M$. In this respect, a first distinction can be made between two cases, i.e., $(1-\tau)r_i + r_G - c > 0$ and $(1-\tau)r_i + r_G - c < 0$. In the first case, the household’s rents $(1-\tau)r_i + r_G$ are sufficient to cover the minimum consumption $c$. In the second case, the household must work to attain the minimum consumption $c$.

**Lemma A1:** Consider household $i$ such that $(1-\tau)r_i + r_G - c > 0$. Household $i$ has a reservation wage $w_i = b^{-1}((1-\tau)r_i + r_G - c)^{1/\sigma}$ and it is classical if $w_i > w_i$ and rentiers if $w_i \leq w_i$.

**Proof.** Suppose that $(1-\tau)r_i + r_G - c > 0$. Since $t_i = \frac{(bw_i)^{\sigma} - (1-\tau)r_i + r_G - c}{w_i + (bw_i)^{\sigma}}$, then $t_i > 0 \iff (bw_i)^{\sigma} > (1-\tau)r_i - r_G + c$, and thus $t_i > 0 \iff w_i > b^{-1}((1-\tau)r_i - r_G + c)^{1/\sigma}$. Hence, $w_i = b^{-1}((1-\tau)r_i - r_G + c)^{1/\sigma}$ is household $i$'s reservation wage. If $w_i > w_i$, then $t_i > 0$ and $\partial t_i / \partial w_i > 0$, i.e., household $i$ is classical.

From inequalities $w_i \leq w_i$ and $w_i > w_i$, we can state the following:
**Corollary.** Consider household $i$ such that $(1-\tau)r_i + r_G > \bar{c}$. This household is rentier if $k_i \geq \frac{\bar{c} - r_G + (bw_i)^\sigma}{(1-\tau)r}$ and classical if $k_i < \frac{\bar{c} - r_G + (bw_i)^\sigma}{(1-\tau)r}$.

**Lemma A2:** Consider household $i$ who is neither excluded nor a rentier. Then, this household is classical (non-classical) if $k_i > (\leq) \frac{\bar{c} - r_G - (\sigma-1)b\sigma w_i^\sigma}{(1-\tau)r} - \frac{\sigma-1)b\sigma w_i^\sigma}{(1-\tau)r(\sigma b\sigma w_i^{\sigma-1} + 1)}$.

**Proof.** Household $i$ is non-classical if: $\frac{\partial t_i}{\partial w_i} < 0 \iff k_i < \frac{\bar{c} - r_G - (\sigma-1)b\sigma w_i^\sigma}{(1-\tau)r} - \frac{\sigma-1)b\sigma w_i^\sigma}{(1-\tau)r(\sigma b\sigma w_i^{\sigma-1} + 1)}$ and classical if: $\frac{\partial t_i}{\partial w_i} > 0 \iff k_i > \frac{\bar{c} - r_G - (\sigma-1)b\sigma w_i^\sigma}{(1-\tau)r} - \frac{\sigma-1)b\sigma w_i^\sigma}{(1-\tau)r(\sigma b\sigma w_i^{\sigma-1} + 1)}$.

**Proposition 1.** Feature 1) derives from Lemma 1. Features 2) and 3) from Lemma A2, and feature 4 from Lemma A1 (corollary).

**APPENDIX 4. Limits and dimension of each social space**

1) **Space of exclusion**

The space of exclusion is below the line $k_i < \frac{\bar{c} - (w_L + w_Hh) - r_G}{(1-\tau)r}$. In Figure 2, this line cuts the $y$-axis ($h_i = 0$) at $k_E = \frac{\bar{c} - r_G - w_L}{(1-\tau)r}$ and the $x$-axis ($k_i = 0$) at $h_E = \frac{\bar{c} - w_L - r_G}{w_H}$. Hence, the space of exclusion dimension is $S_E = \frac{(\bar{c} - w_L - \tau r\bar{k})^2}{2(1-\tau)r w_H}$.

2) **Space of rentiers**

The rentiers are such that $k_i \geq \frac{b\sigma (w_L + w_Hh)^\sigma + \bar{c} - r_G}{(1-\tau)r}$. In Figure 2, the curve $k_i = \frac{\bar{c} - r_G + b\sigma w_i^\sigma}{(1-\tau)r}$ cuts the $y$-axis ($h_i = 0$) at $k_R = \frac{\bar{c} - r_G + b\sigma w_i^\sigma}{(1-\tau)r}$ and attains the value $k_i = k_{max}$ for $h_R = \frac{\frac{b^{-1}}{w_H}((1-\tau)r k_{max} + r_G - \bar{c})^{1/\sigma} - w_L}{w_H}$.

The dimension of the space of the rentiers is $S_R = k_{max} h_R - \int_0^{h_R} \left( \frac{b\sigma (w_L + w_Hh)^\sigma + \bar{c} - \tau r\bar{k}}{(1-\tau)r} \right) dh$. 
\[ S_R = k_{\max} h_R - \frac{b^\sigma}{(1-\tau)r} \left[ \left( w_L + w_H h \right)^\sigma \frac{\bar{c} - \tau \bar{r} - h_{\max} h_R}{(1-\tau)r} \right] dh = k_{\max} h_R - \frac{b^\sigma}{(1-\tau)r} \left[ \left( w_L + w_H h_{\max} \right)^{\sigma+1} - w_L^{\sigma+1} \right] \left(1+\sigma\right)w_H \left[ \bar{c} - \tau \bar{r} - h_{\max} h_R \right] \]

And finally: \[ S_R = k_{\max} h_R - \frac{b^\sigma}{(1-\tau)r} \left( w_L + w_H h_R \right)^{\sigma+1} \frac{\bar{c} - \tau \bar{r} - h_{\max} h_R}{(1-\tau)r} h_R \]

3) Space of non-classical households

The non-classical households are such that:
\[ \bar{c} - r_G - w_L \leq k_i < \frac{\bar{c} - r_G}{(1-\tau)r} - \frac{(\sigma-1)b^\sigma w_i^\sigma}{(1-\tau)r} \]

The curve \[ k_i = \frac{\bar{c} - r_G}{(1-\tau)r} - \frac{(\sigma-1)b^\sigma (w_L + w_H h_i)^\sigma}{(\sigma b^\sigma (w_L + w_H h_i)^{\sigma-1} + 1)(1-\tau)r} \]
cuts the \( y \)-axis \( (h_i = 0) \) at
\[ k_c = k_E + \frac{w_L \left( b^\sigma w_L^{\sigma-1} + 1 \right)}{(\sigma b^\sigma w_L^{\sigma-1} + 1)} \]
and the \( x \)-axis \( (k_i = 0) \) at the value \( h_C \) which is the root of
the equation in \( h \):
\[ (\bar{c} - r_G)\sigma b^\sigma (w_L + w_H h)^{\sigma-1} - (\sigma - 1)b^\sigma (w_L + w_H h)^\sigma + (\bar{c} - r_G) = 0. \]

The dimension of the space of non-classical households \( S_{NC} \) is:
\[ S_{NC} = \frac{h}{k_E} \left( \frac{(\sigma-1)b^\sigma (w_L + w_H h)^\sigma}{(\sigma b^\sigma (w_L + w_H h)^{\sigma-1} + 1) + 1} \right) dh = h - \frac{h}{k_E} \left( \frac{(\sigma-1)b^\sigma (w_L + w_H h)^\sigma}{(\sigma b^\sigma (w_L + w_H h)^{\sigma-1} + 1) + 1} \right) \]

4) Space of classical households

The dimension of the space of classical households is thus:
\[ S_c = k_{\max} h_{\max} - \left( S_R + S_{NC} + S_E \right) \]

Table A1 provides the limit values of each space (except \( h_C \)).

<table>
<thead>
<tr>
<th>( h_E )</th>
<th>( k_E )</th>
<th>( h_R )</th>
<th>( k_R )</th>
<th>( k_C )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \bar{c} - w_L - r_G )</td>
<td>( \bar{c} - r_G - w_L )</td>
<td>( \left(1-\tau \right)k_{\max} + r_G - \bar{c} )</td>
<td>( \left(1-\tau \right)b_{\max} )</td>
<td>( \left(1-\tau \right)k_E + b^\sigma w_L^{\sigma+1} + w_L )</td>
</tr>
</tbody>
</table>
APPENDIX 5. Impacts of $r$ and $\tau$ on $S_E$ and $S_R$ (proofs of Lemma 6 and 7)

1) Space of exclusion: $S_E = \frac{(\bar{c} - \tau r \bar{k} - w_i)^2}{2(1-\tau)rw_H}$

$$\frac{\partial S_E}{\partial r} = \frac{-2(1\tau)w_H(\bar{c} - \tau r \bar{k} - w_i)(\bar{c} - w_i)}{(2(1-\tau)rw_H)^2} < 0$$

$$\frac{\partial^2 S_E}{\partial \tau \partial r} = \frac{-2rw_H(\bar{c} - \tau r \bar{k} - w_i)\bar{c} - w_i - (2-\tau)\bar{k}}{(2(1-\tau)rw_H)^2} < 0$$

2) The rentiers are such that $k_i \geq \frac{b^\alpha(w_l + w_i h_i) + \bar{c} - r G}{(1-\tau)r} - \frac{\tau \bar{k}}{(1-\tau)}$, i.e., $k_i \geq z(r) = \frac{b^\alpha(w_l + w_i h_i) + \bar{c} - r}{(1-\tau)} - \frac{\tau \bar{k}}{(1-\tau)}$. As $\frac{\partial z}{\partial r} = -\frac{b^\alpha(w_l + w_i h_i) + \bar{c}}{(1-\tau)} r^{-2} < 0$, an increase in $r$ augments the number of households that verify $k_i \geq z(r)$ and enlarges thereby the space of rentiers ($\frac{\partial S_R}{\partial r} > 0$).

The rentiers are such that $(bw_i)^\alpha - rk_i + \tau (rk_i - \bar{k}) + \bar{c} \leq 0$. In the plan $(h_i, k_i)$, the curve $(bw_i)^\alpha - rk_i + \tau (rk_i - \bar{k}) + \bar{c} = 0$ separates the rentiers from the non-rentiers. By differentiating we find $\frac{d k_i}{d \tau} = \frac{(k_i - \bar{k})}{(1-\tau)}$. Since $k_i > \bar{k}$ for all the rentiers, an increase (decrease) in $\tau$ moves the curve $(bw_i)^\alpha - rk_i + \tau (rk_i - \bar{k}) + \bar{c} = 0$ upwards (downwards) in the plan $(h_i, k_i)$, i.e., a decrease (increase) in the space of rentiers ($\frac{\partial S_R}{\partial \tau} < 0$).

APPENDIX 6. Proof of Lemma 8: Impact of wage upon the social spaces

1) The rentiers are such that $(bw_i)^\alpha \leq r(1-\tau)k_i + \tau \bar{k} - \bar{c}$. Thus, an increase in $w$ reduces the space of the rentiers.

2) The excluded are such that $w_i < \bar{c} - r(k_i + \tau(\bar{k} - k_i))$. Thus, an increase in $w$ reduces the space of exclusion.

APPENDIX 7. Impacts of North-South globalization

1) Impact of NSG on the space of exclusion

$$S_E = \frac{(\bar{c} - \lambda^{\alpha_{t}} \tau \bar{k} - \lambda^{\alpha_{t}-1} \bar{w}_L)^2}{2(1-\tau)\lambda^{2\alpha_{t}} \bar{r}w_H} = \frac{(\lambda^{\alpha_{t}} \bar{c} - \tau \bar{k} - \lambda^{\alpha_{t}} \bar{w}_L)^2}{2(1-\tau)\lambda^{\alpha_{t}} \bar{r}w_H}$$

$$\frac{\partial}{\partial \lambda} \left[ \lambda^{\alpha_{t}} \bar{c} - \tau \bar{k} - \lambda^{\alpha_{t}} \bar{w}_L \right] = -\alpha_t \lambda^{\alpha_{t}-1} \bar{c} + \lambda^{\alpha_{t} \alpha_{t}} \bar{w}_L$$

Hence: $\frac{\partial S_E}{\partial \lambda} > 0 \iff \lambda < (\bar{w}_L / \alpha_t \bar{c})^{1/(\alpha_t)}$
And finally:
\[
\bar{w}_L / \alpha_L c > 1 \Rightarrow \text{inverted-U relationship between } S_E \text{ and } \lambda.
\]
\[
\bar{w}_L / \alpha_L c < 1 \Rightarrow \text{decreasing relationship between } S_E \text{ and } \lambda.
\]

2) Impact of NSG on the Space of rentiers

In the space of households, the rentiers gather all the households situated above the curve
\[
k = k_R(h) = \frac{b^\sigma \left( \lambda^{\alpha_L-1} \bar{w}_L + \lambda^{\alpha_L} \bar{w}_H h \right)^\sigma - \tau \lambda^{\alpha_L} \bar{r} + \bar{c}}{(1 - \tau) \lambda^{\alpha_L} F}.
\]

If \( \partial k / \partial \lambda < 0 \), then an increase in \( \lambda \) moves this curve downwards and enlarges the space of rentiers.

\[
k = \frac{b^\sigma \left( \lambda^{\alpha_L-1} \bar{w}_L + \lambda^{\alpha_L} \bar{w}_H h \right)^\sigma - \tau \lambda^{\alpha_L} \bar{r} + \bar{c}}{(1 - \tau) \lambda^{\alpha_L} F} \Rightarrow (1 - \tau)r_k = b^\sigma \left( \frac{\lambda^{\alpha_L-1} \bar{w}_L + \lambda^{\alpha_L} \bar{w}_H h}{\lambda^{\alpha_L} F} \right)^\sigma - \tau \bar{r} + \lambda^{-\alpha_L} \bar{c}
\]

\[
(1 - \tau) \frac{\partial k}{\partial \lambda} = b^\sigma \lambda^{\alpha_L-1} \left( \lambda^{-1} \bar{w}_L + \bar{w}_H h \right)^\sigma -1 \left( \left( \left( \sigma - 1 \right) \alpha_L - \sigma \right) \lambda^{-1} \bar{w}_L + (\sigma - 1) \alpha_L \bar{w}_H h \right) - \alpha_L \lambda^{-\alpha_L-1} \bar{c}
\]

\[
\frac{\lambda^{\alpha_L+1}(1 - \tau)F}{b^\sigma \left( \lambda^{-1} \bar{w}_L + \bar{w}_H h \right)^\sigma -1} \frac{\partial k}{\partial \lambda} = \lambda^{2\alpha_L} \left( \left( \left( \sigma - 1 \right) \alpha_L - \sigma \right) \lambda^{-1} \bar{w}_L + (\sigma - 1) \alpha_L \bar{w}_H h \right) - \frac{\alpha_L \bar{c}}{b^\sigma \left( \lambda^{-1} \bar{w}_L + \bar{w}_H h \right)^\sigma -1}
\]

Firstly note that:
\[
h \leq \frac{\sigma (\sigma - 1) \alpha_L \bar{w}_L}{\lambda (\sigma - 1) \alpha_L \bar{w}_H} \Leftrightarrow (\left( \sigma - 1 \right) \alpha_L - \sigma \lambda^{-1} \bar{w}_L + (\sigma - 1) \alpha_L \bar{w}_H h \leq 0 \Rightarrow \frac{\partial k}{\partial \lambda} \leq 0
\]

Consequently, the portion of curve \( k_R(h) \) corresponding to \( h \in \left[ 0, \frac{\sigma (\sigma - 1) \alpha_L \bar{w}_L}{\lambda (\sigma - 1) \alpha_L \bar{w}_H} \right] \) moves downwards and enlarges the space of rentiers, whereas the portion corresponding to
\[
h \in \left[ \frac{\sigma - (\sigma - 1) \alpha_L \bar{w}_L}{\lambda (\sigma - 1) \alpha_L \bar{w}_H}, h \lambda \right] = \frac{b^\sigma \left( (1 - \tau) r_{k_{\text{max}}} + r_G - \bar{c} \lambda^{-\alpha_L} \right) \lambda^{(1 - \sigma) \alpha_L / \sigma - \lambda^{-1} \bar{w}_L}}{\bar{w}_H}
\]

goes upwards and shrinks this space.

Suppose now that at the outcome of globalization, i.e. for \( \lambda = 1 \), the space of rentiers expands with NSG (\( \partial S_R / \partial \lambda > 0 \), \( \lambda = 1 \)). As the increase in \( \lambda \) reduces the portion of curve \( k_R(h) \) that enlarges the space of rentiers and augments the portion that shrinks this space, with the former tending towards 0 (\( \frac{\sigma - (\sigma - 1) \alpha_L \bar{w}_L}{\lambda (\sigma - 1) \alpha_L \bar{w}_H} \frac{\lambda^{(1 - \sigma) \alpha_L / \sigma - \lambda^{-1} \bar{w}_L}}{\lambda \to \infty} \to 0 \)) then the space of rentiers shrinks from a
certain value of $\lambda$ onwards. There is then an inverted-U relationship between the NSG intensity $\lambda$ and the dimension of the space of rentiers.

If the space of rentiers shrinks with $\lambda$ at the outcome of globalization ($\partial S_R / \partial \lambda < 0$, $\lambda = 1$), then this space will continuously shrink throughout the globalization process (increase in $\lambda$).

**APPENDIX 8.**

The space of exclusion gathers all the households situated below the curve
\[
h = \frac{\bar{c} \lambda^{-\alpha_L} - \tau r(k - k) / \eta - r(k - \lambda^{-1} \bar{w}_L)}{\bar{w}_H}
\]
within the space of households.

Consider now the relation $\eta = \eta(\lambda)$ that links the variation in $\eta$ to the variation in $\lambda$ for the couple of values $(\lambda, \eta)$. We can write:
\[
h = h(\lambda) = \frac{\bar{c} \lambda^{-\alpha_L} - \tau r(k - k) / \eta(\lambda) - r(k - \lambda^{-1} \bar{w}_L)}{\bar{w}_H}. \quad \text{If this function is such that} \quad \bar{w}_H \frac{\partial h}{\partial \lambda} > 0,
\]
then the combination of the variations in $\lambda$ and $\eta$ enlarges $S_E$. Hence, $S_E$ enlarges if:
\[
\bar{w}_H \frac{\partial h}{\partial \lambda} > 0 \iff -a_L \lambda^{-\alpha_L-1} \bar{c} + \tau r(k - k) \frac{\partial \eta}{\eta^2 \partial \lambda} + \lambda^{-2} \bar{w}_L > 0 \iff \frac{\partial \eta}{\partial \lambda} / \lambda > \frac{a_L \lambda^{1-\alpha_L} \bar{c} - \bar{w}_L \eta}{\tau r(k - k)}. \quad \text{We place ourselves in the case where the increase in $\lambda$ makes the number of excluded to decrease, i.e., $\lambda > (\bar{w}_L / a_L \bar{c})^{1/(1-\alpha_L)}$. Hence} \quad \frac{a_L \lambda^{1-\alpha_L} \bar{c} - \bar{w}_L \eta}{\tau r(k - k)} > 0.
\]

For the combination of the variations in $\lambda$ and $\eta$ to enlarge $S_E$, the rate of increase in $\eta$ must be higher than
\[
\frac{\alpha_L \lambda^{1-\alpha_L} \bar{c} - \bar{w}_L \eta \partial \lambda}{\tau r(k - k)} \times \lambda.\]
**APPENDIX 9.**

*Table A2. Distribution of Financial wealth (stocks shares) by income level in the US*

<table>
<thead>
<tr>
<th>Income level</th>
<th>% of households 2010</th>
<th>% Stock shares owned 2010</th>
<th>Cumulative 2010</th>
<th>Cumulative 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 250,000</td>
<td>3.6</td>
<td>50.3</td>
<td>50.3</td>
<td>40.6</td>
</tr>
<tr>
<td>[100,000,250,000]</td>
<td>14.4</td>
<td>26.1</td>
<td>76.4</td>
<td>68.6</td>
</tr>
<tr>
<td>[75,000,100,000]</td>
<td>10.1</td>
<td>6.5</td>
<td>82.9</td>
<td>77.4</td>
</tr>
<tr>
<td>[50,000,75,000]</td>
<td>18.1</td>
<td>8.4</td>
<td>91.3</td>
<td>89.3</td>
</tr>
<tr>
<td>[25,000,50,000]</td>
<td>27.7</td>
<td>5.5</td>
<td>96.8</td>
<td>97.6</td>
</tr>
<tr>
<td>[15,000,25,000]</td>
<td>14.0</td>
<td>1.2</td>
<td>98.0</td>
<td>98.9</td>
</tr>
<tr>
<td>&lt; 15,000</td>
<td>12.1*</td>
<td>2.0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>All</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Wolff (2012) p.80. * 90% of these 12.1% households (i.e. 10.9% of households) have no stocks share.

*Table A3. Distribution of Financial wealth (stocks shares) by income level*

<table>
<thead>
<tr>
<th>% of highest income level</th>
<th>Cumulative</th>
<th>% of k owned (stock)</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6</td>
<td>3.6</td>
<td>69.3845</td>
<td>69.3845</td>
</tr>
<tr>
<td>14.4</td>
<td>18</td>
<td>16.9728</td>
<td>86.3573</td>
</tr>
<tr>
<td>10.1</td>
<td>28.1</td>
<td>4.1047</td>
<td>90.462</td>
</tr>
<tr>
<td>18.1</td>
<td>46.2</td>
<td>4.7742</td>
<td>95.2362</td>
</tr>
<tr>
<td>27.7</td>
<td>73.9</td>
<td>4.0095</td>
<td>99.2457</td>
</tr>
<tr>
<td>14.0</td>
<td>87.9</td>
<td>0.7294</td>
<td>99.9751</td>
</tr>
<tr>
<td>12.1</td>
<td>100</td>
<td>0.0249</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure A4. Distribution of the 1000 households in the space $[0,h_{\text{max}}] \times [0,k_{\text{max}}]$
Figure A5. The inverted-U impact of NSG on the dimension of the space of rentiers

Figure A6. The inverted-U impact of NSG on the dimension of the space of excluded

References


