

Long run Welfare under Externalities in Consumption, Leisure, and Production: A Case for Happy De-Growth vs. Unhappy Growth

Ennio Bilancini* Simone D'Alessandro†

Preliminary Version

Abstract

In this paper we contribute to the debate on the relationship between growth and well-being by studying an endogenous growth model where we allow for externalities in consumption, leisure, and production. We analyze three regimes: a decentralized economy, a planned economy where a myopic planner fails to recognize the positive externalities in leisure, and a planned economy with a fully informed planner. We find three main results. First, in a decentralized economy we may be growing and working more than what is optimal from a welfare standpoint. Second, myopic intervention in the presence of multiple source of externalities can be more growth- and labor-prone than both the first best and the decentralized outcome. Third, under reasonable parameter values, the optimal path of the economy is characterized by a de-growth transition associated to production downscale, to a reduction in private consumption and to an ongoing increase in leisure and welfare.

JEL classification: Q13; E62; H21; H23.

Keywords: de-growth; endogenous growth; consumption externalities; leisure externalities; production externalities.

*Department of Economics, University of Modena and Reggio Emilia, Modena, Italy.
E-mail address: ennio.bilancini@unimo.it.

†Corresponding author: Department of Economics, University of Pisa, Via Ridolfi 10, Pisa, Italy. Tel.: +39 050 2216333; Fax: +39 050 598040. *E-mail address:* s.dale@ec.unipi.it.

1 Introduction

The importance of economic growth for enhancing well-being in rich countries has been challenged by different perspectives. Two of these, in particular, have received increasing attention in recent years: the struggle for relative social position and the decline of relational activities. The first has been widely studied in the literature on social status and consumption externalities (see, e.g., Clark et al., 2008, and references therein) while the second has been investigated especially in the literature on subjective well-being and relational goods (see, e.g., Bruni and Porta, 2007, and references therein).

We contribute to the debate on the relationship between growth and well-being by developing and analyzing an endogenous growth model in which we include externalities in consumption, leisure, and production. Externalities in consumption are modelled as stemming from the dynamics of relative social position while externalities in leisure are modelled as stemming from relational activities. Externalities in production are assumed to arise from aggregate increasing returns.

The aim of the paper is twofold. From the one hand, we try to shed light on the complex interrelation between those three kinds of externalities in order to evaluate the consequences of the possible implementation of policies under different regimes. On the other hand, we move a first step in the investigation of transitional degrowth paths which are compatible with welfare growth in an endogenous growth framework.

More specifically, we analyze three cases: (i) a decentralized economy with no government intervention, (ii) a planned economy where a myopic planner fails to recognize the positive externalities in leisure, and (iii) a planned economy with a fully informed planner. We find that, under reasonable parameter values, the optimal path of the economy is characterized by a de-growth transition associated to production downscale, and by a steady state with high levels of leisure and very low rate of growth. Moreover, we find that the steady state growth in (ii) is always higher than the steady state growth in (i) which in turn can be higher than the steady state growth of (iii). Furthermore, along the equilibrium paths, leisure time can be higher in (i) than in (ii), and in both it can be lower than in (iii). Finally, there exists the possibility that (ii) is inferior, in terms of welfare, to both (i) and the first best (iii). These findings suggest two things. First, in a decentralized economy we may be growing and working more than what is optimal from a welfare standpoint. Second, myopic intervention in the presence of multiple source of externalities can be more growth- and labor-prone than both the first best and the decentralized outcome.

The paper is organized as follows. The next section briefly reviews the issues on social positionality and relational activities which are relevant for our study. Section 3 illustrates the model. Section 4 presents a numerical

simulation and discusses the main results of the model. Section 5 provides our final remarks.

2 Theoretical framework

2.1 Consumption externalities through positionality

The first explicit and formal recognition of consumption externalities is associated with the work of Veblen (1899) and Pigou (1903). The modern modeling of consumption externalities is due to Duesenberry (1949) who translated Veblen's main insights into standard economic language. His basic intuition is that people care about their relative consumption and not, as assumed in standard economics, only about absolute consumption. This type of modeling consumption externalities is often referred to as the interdependent preferences approach and has been attracting an increasing number of scholars (Pollack, 1976, Hayakawa and Venieris, 1977, Corneo and Jeanne, 1997, 1998, Clark and Oswald, 1996, 1998, Holländer, 2001, Hayakawa, 2000). More precisely, the core of this approach consists of assuming that (or appropriately postulating preference relations so that) utility functions depend not only on the absolute level of consumption (or, alternatively, income), but also on a weighted average of the consumption (or, alternatively, income) of the whole population which is interpreted as a sort of representative consumer with whom one compares himself. Another representative example of this idea can be found in the important contribution by Frank (1985) about the demand for positional and non-positional goods (see also Robson, 1992, Direr, 2001). Other contributions along these lines are often referred to as the literature on *keeping up with Joneses* – i.e., struggling to keep up with the social position of the representative neighbor. Ljungqvist and Uhlig (2000) analyzed the impact of consumption externalities on the effect of short-run macroeconomic stabilization policy. Dupor and Liu (2003) defined different forms of consumption externalities and explored their relationship with equilibrium over-consumption. The paper by Cooper et al. (2001) deserves a special attention in this regard as the first attempt to introduce such kind of externalities in a growth model. More precisely, Cooper et al. (2001) allow for both positive production externalities – arising from a R&D sector – and negative consumption externalities – arising from the struggle for a higher social position. Interestingly, they find that positive GDP growth can go with negative utility growth. The paper by Liu and Turnovsky (2005) also studies the optimal growth in presence of both consumption and production externalities showing that the type of distortion depends on both the type and relative strength of externalities.

In this paper we model consumption externalities by making utility depend on the ratio between own consumption and others' consumption. We are aware that there are several alternative modelling choices which capture

the idea of consumption externalities due to positional issues and that they can potentially drive to different results (Bilancini and Boncinelli, 2008). However, we stress that this is not the case for the model studied in this paper. Indeed, what is crucial to our results is that rising average consumption has a negative effect on individuals' utility, no matter how or why.

Several empirical studies support the idea that consumption externalities play an important role in determining people's welfare (see, e.g., Senik, 2005, for a survey). For instance, Solnick and Hemenway (1998) conduct a survey study where approximately fifty percent of the respondents declare that they would be happy to give up half of their real purchasing power in order to have a higher relative standing. McBride (2001) exploits US survey data to study the same issue and finds similar evidence. Using experimental-survey methods Alpizar et al. (2005) obtain qualitatively similar results. Interestingly, they also show that consumption externalities are present in activities traditionally thought to be non-positional like vacations and insurances. Finally, in an important study about the determinants of reported happiness in Britain and US, Blanchflower and Oswald (2004) find that both absolute and relative position matter (see Ferrer-i-Carbonell, 2005, for a similar analysis on German panel data).

2.2 Leisure externalities through relational activities

The importance of relational activities as a fundamental determinant of individual utility has been stressed by various scholars (see, e.g., Gui and Sugden, 2005, and references therein) but the basic idea can be traced back to the work of Uhlener (2009). Indeed, most part of human activities does not pass through market systems but, instead, through social interactions. In particular, relational activities are co-produced and co-consumed by the agents involved in the interaction using pre-existing social ties. Relational activities which potentially affects well-being positively include companionship, empathic communication, emotion sharing, psychological support, solidarity, love relations, etc. On the small scale, these activities are co-produced and co-consumed by those involved in family relationships and networks of friendship. On the large scale, they are typically co-produced and co-consumed in social gatherings such as public meetings, festivals, sports, club meetings, etc. Evidently, all these activities require some kind of pre-existing social ties or norm. In line with this approach, we model relational activities as a flow of services which are jointly produced by the existing stock of social capital and by individual leisure. Moreover, we posit that social capital accumulation depends on the average time spent in leisure. This is intended to capture the fact that part of leisure time is in fact an investment in social ties and norms.

Empirical evidence is consistent with the idea that more and better relational activities go with a greater well-being. A series of work by John Helli-

well and his co-authors (see, e.g., Helliwell, 2006, Helliwell and Huang, 2007, Helliwell et al., 2009) has shown that social capital in general is positively correlated with subjective well-being – measured as reported happiness or reported life satisfaction. Further evidence more specific to relational activities is provided by Helliwell and Putnam (2004), Bruni and Stanca (2008), Powdthavee (2008), Bartolini et al. (2008, 2009). Evidence of a causal relationship going from relational activities to subjective well-being is provided by Becchetti et al. (2008).

3 The Model

3.1 Assumptions

Preferences. There are N infinitely lived identical households in the economy where N is constant through time. Each household is endowed with a unit of time that is divided between leisure, l , and labour $1 - l$. Household's utility function depends not only on private consumption c_i and leisure l_i , but also on the average consumption standard $\bar{c} \equiv \sum_{i=1}^N c_i / N$, and on the stream of relational goods x_i : $U_i = U_i(c_i, \bar{c}, l_i, x_i)$. Defined $U_c, U_{\bar{c}}, U_l, U_x$ as the marginal utility of each variable, we assume that $U_c, U_l, U_x > 0$ and $U_{\bar{c}} < 0$. Hence, we add to the standard leisure consumption trade-off, jealousy with respect to the average status and the enjoyment of relational goods.

For the sake of simplicity we assume a standard form of utility function,

$$u(c_i, \bar{c}, l_i, x_i) = \frac{(c_i \bar{c}^\gamma l_i^\omega x_i^\theta)^{1-\sigma}}{1-\sigma}, \quad (1)$$

where $\omega, \theta > 0$, $\gamma < 0$ and $\sigma \neq 1$. For $\sigma > 1$, an increase in the average consumption increases the marginal utility of private consumption. In the literature, this case is known as “keeping up with the Joneses”, and it implies that the intertemporal elasticity of substitution is less than unity – a condition which has strong empirical support.

Technology. Production of consumption goods employs capital and labour. In order to allow for endogenous growth we assume a Romer (1986) type of production. Hence,

$$y_i = A(\bar{k}) k_i^\alpha (1 - l)^\beta, \quad (2)$$

where $(1 - l_i)$ is the labour supply, $0 < \alpha < 1$ and $0 < \beta < 1$, and $A(\bar{k})$ is the externality in production which takes into account the diffusion of knowledge. Following Romer (1986), we also assume

$$A(\bar{k}) = A \bar{k}^{1-\alpha}, \quad (3)$$

where $\bar{k} = \sum_{i=1}^N k_i/N$. This configuration of external effects in production ensures constant returns to scale in the accumulable factor (i. e. capital) at the aggregate level. When $\alpha + \beta = 1$ production shows constant returns also in the private factors.¹

Under condition $\alpha + \beta = 1$, defining r the remuneration rate of capital and w the wage, in a competitive market equilibrium we have $r = \alpha A(\bar{k})k_i^{\alpha-1}(1-l_i)^\beta$ and $w = \beta A(\bar{k})k_i^\alpha(1-l_i)^{\beta-1}$.

Social Capital. Relational goods are a flow which is obtained applying leisure to a stock of social capital. We assume that

$$x_i = l_i^{(1-\xi)} V^\xi, \quad (4)$$

where V is the stock of social capital and $0 < \xi < 1$. From equation (1) and (4), we can rewrite the utility function as

$$u(c_i, \bar{c}, l_i, V) = \frac{(c_i \bar{c}^\gamma l_i^\phi V^\eta)^{1-\sigma}}{1-\sigma}, \quad (5)$$

where $\phi \equiv \omega + (1-\xi)\theta$ and $\eta \equiv \theta\xi$. Social capital accumulation depends on the average level of leisure in the economy $\bar{l} \equiv \sum_{i=1}^N l_i/N$. Hence,

$$\dot{V} = B\bar{l} - \delta_v V, \quad (6)$$

where $B > 0$ and δ_v is the depreciation rate of social capital. This simple formalization takes into account the public nature of social capital and the fact that its accumulation is done indirectly by societal investment of time.

3.2 Decentralized Economy

Each household maximizes the stream of utility from the initial period to infinity under three sources of externalities, production, consumption and leisure. In doing so, the household behaves atomistically, taking the aggregate quantities of capital and consumption as given (as in e.g. Liu and Turnovsky, 2005). Concerning leisure, each household fails to recognize the complementarity in the dynamics of social capital. In other words, each household takes V as given. Given a positive preferences discount rate ρ , the household's problem is

$$\max \int_0^\infty \frac{(c_i \bar{c}^{-\gamma} l_i^\phi V^\eta)^{1-\sigma}}{1-\sigma} e^{-\rho t} dt \quad (7)$$

under the household budget constraint

$$\dot{k}_i = rk_i + w(1-l_i) - \delta k_i - c_i, \quad (8)$$

¹In the following analysis we only consider the case $\alpha + \beta = 1$ even if generalizations are possible.

given a positive initial level of capital. By applying Pontryagin's Maximum Principle, in the symmetric equilibrium the following conditions must hold

$$\check{g}_k = (\alpha + \beta)A(1 - \check{l})^\beta - \delta - \frac{\check{c}}{\check{k}}, \quad (9)$$

$$\check{g}_c = \frac{\alpha A(1 - \check{l})^\beta - (\rho + \delta)}{1 - \psi}, \quad (10)$$

$$\frac{\check{c}}{\check{k}} = \frac{\beta A(1 - \check{l})^{\beta-1} \check{l}}{\phi}, \quad (11)$$

where the symbol $\check{\cdot}$ denotes the decentralized economy, $g_k \equiv \frac{\dot{k}_i}{k_i}$ and $g_c \equiv \frac{\dot{c}_i}{c_i}$, $\psi \equiv (1 + \gamma)(1 - \sigma)$. By substituting (11) in equation (9), we get the level of leisure which guarantees $\check{g} \equiv \check{g}_k = \check{g}_c$ and therefore determines the balanced growth path.

3.3 Myopically Planned Economy

Myopically social planner internalizes production and consumption externalities, but fails to recognize the leisure complementarity in the creation of relational goods. Hence, as in the decentralized economy, V is taken as given. Taking into account external effects in production – equation (3) – the accumulation of capital is given by

$$\dot{k} = Ak(1 - l)^\beta - \delta k - c. \quad (12)$$

The myopic social planner maximizes (7) under (12) starting from a positive stock of physical capital. The symmetric equilibrium must satisfy the following conditions:

$$\tilde{g}_k = A(1 - \tilde{l})^\beta - \delta - \frac{\tilde{c}}{\tilde{k}}, \quad (13)$$

$$\tilde{g}_c = \frac{A(1 - \tilde{l})^\beta - (\rho + \delta)}{1 - \psi}, \quad (14)$$

$$\frac{\tilde{c}}{\tilde{k}} = \frac{(1 + \gamma)\beta A(1 - \tilde{l})^{\beta-1} \tilde{l}}{\phi}, \quad (15)$$

where the symbol $\tilde{\cdot}$ denotes the myopically planned economy. As before, there is only one value of leisure, $l = \tilde{l}$, such that $\tilde{g} \equiv \tilde{g}_k = \tilde{g}_c$. Few remarks on the comparison between decentralized and myopically planned economy are worth doing. As it is well known, production externalities cause underinvestment in private capital and lower labour supply. This means that in

the decentralized economy the equilibrium growth rate is too low. However, consumption externalities play a role as well. In the case of jealousy ($\gamma < 0$), consumption externalities tend to increase the supply of labour and the rate of growth in the decentralized economy. Nevertheless, for a wide range of parameter values $\tilde{g} > \check{g}$ also under jealousy. This outcome provides a simple explanation of the fact that the implementation of public policies which favour economic growth is a crucial objective for social planner since higher growth rate should be associated to higher welfare. This result is due to the underestimation of the leisure complementarities in the formation of the flow of relational goods. With respect to equilibrium labour supply the results are less sharp since they are much more sensitive to parameter values. Production and consumption externalities work in opposite direction and it is difficult to recognize which of the two effects prevails. However, next section will show a reasonable case in which the myopically social planner obtains at equilibrium both higher labour supply and higher rate of growth – that is $\check{l} > \tilde{l}$ and $\tilde{g} > \check{g}$.²

3.4 Centrally Planned Economy

Fully informed social planner recognizes the complementarity of leisure and hence, the importance of the dynamics of social capital. The problem becomes to maximize equation (7) under (12) and (6). In the first best allocation, the symmetric equilibrium is given by

$$\hat{g}_k = A \left(1 - \hat{l}\right)^\beta - \delta - \frac{\hat{c}}{\hat{k}}, \quad (16)$$

$$\hat{g}_c = \frac{A \left(1 - \hat{l}\right)^\beta - (\rho + \delta)}{1 - \psi}, \quad (17)$$

$$\frac{\hat{c}}{\hat{k}} = \frac{(1 + \gamma)\beta A \left(1 - \hat{l}\right)^{\beta-1} \hat{l}(\rho + \delta - \hat{g}_c)}{\eta\delta_v + \phi(\rho + \delta - \hat{g}_c)}, \quad (18)$$

where the symbol $\hat{\cdot}$ denotes the centrally planned economy. There is again only one value of leisure $l = \hat{l}$, such that $\hat{g} \equiv \hat{g}_k = \hat{g}_c$.

It is straightforward to compare in terms of growth rate and labour supply the results of the centrally and the myopically planned economy. Equations (14) and (17) are identical and the equilibrium consumption growth rate is a decreasing function of l . Moreover, $\frac{\hat{c}}{\hat{k}} < \frac{\check{c}}{\check{k}}$ for any value of l if $\phi \leq 1$. This means that for any l , $\tilde{g}_k > \hat{g}_k$. Hence, at equilibrium, given equations (13) and (16), at equilibrium both the growth rate and the labour supply in the centrally planned economy are lower than those in the myopically

²For an investigation on the relations between those two kinds of externalities see Liu and Turnovsky (2005).

planned economy. Furthermore, for a wide range of parameter values, the supply of labour in the centrally planned economy is much lower than the one in the decentralized economy. The intuition is simple, the internalization of leisure complementarity strengthens the importance of leisure relative to consumption. In fact, relational goods become a good substitute for private consumption. Furthermore, if preferences show jealousy, relational goods do not suffer the negative externalities which characterized private consumption. Hence, the growth rate of the economy becomes much less crucial, since relational goods significantly contribute to household's welfare.

4 Results

In this section, we first discuss the long-run allocation in the three regimes, then we investigate the transitional dynamics by highlighting a case for happy de-growth versus unhappy growth.

4.1 Long-run steady state

Figure 1 shows a numerical simulation of the model. The fraction of time devoted to leisure (l) is measured on the horizontal axis, while the rate of growth is shown on the vertical axis. The long-dashed and the solid curves represent the growth rate of consumption in the decentralized and in the planned economy respectively – note that equations (14) and (17) are identical. The dotted, the dash-dotted and the dashed curves correspond to the capital growth rate in the decentralized, the myopically and the centrally planned economy, respectively. The points highlighted with a circle – $D = (\tilde{l}, \check{g})$, $M = (\bar{l}, \tilde{g})$, $C = (\hat{l}, \hat{g})$ – represent the long-run equilibrium of the leisure time share and growth rate in the three regimes.

Parameter values can be found in the caption of Figure 1. The fact that $\gamma < 0$ means that we are considering jealousy as a negative externalities in consumption. Moreover, $\sigma > 1$ implies that consumption externalities cause keeping up with the Joneses behaviour. The combined exponent for leisure in the utility function – see equation (5) – results to be $\phi = 0.32$, while the one of social capital is $\eta = 0.48$. Under those parameter values the result in term of growth rate and leisure are quite strong.

In terms of leisure, we find that at equilibrium $\tilde{l} < \check{l} < \hat{l}$. Two remarks about this outcome. First, the share of leisure in the decentralized economy is about one third of total time, and is higher than the leisure share in the myopic planned economy. This is because without the awareness of the complementarity of leisure in the accumulation of social capital, government would tend to increase labour supply in order to better exploit the advantage given by positive production externalities. Secondly, in the centrally planned economy there is a drastic increase in the leisure share. Even in a case in which consumption has about the same weight of the sum of leisure and

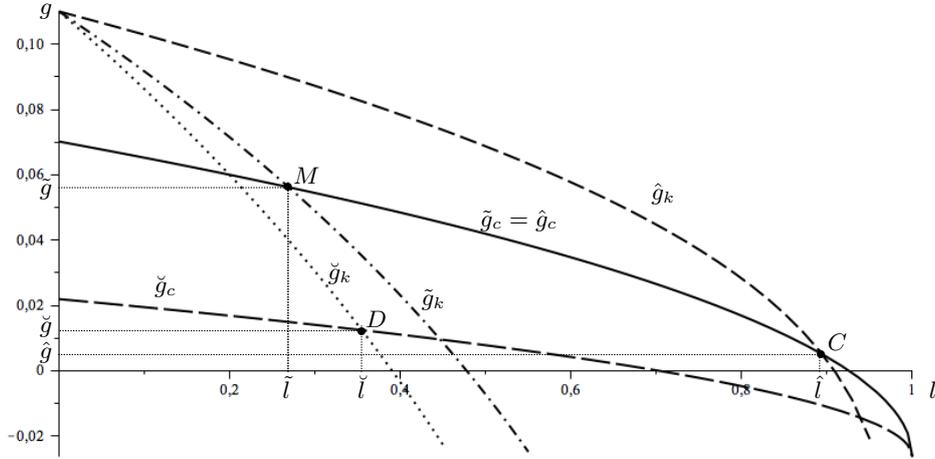


Figure 1: Comparison of long-run steady states. Parameter values: $\gamma = -0.3$, $\omega = 0.2$, $\theta = 0.6$, $\sigma = 1.2$, $\xi = 0.8$, $\alpha = 0.5$, $\beta = 0.5$, $A = 0.11$, $\delta = 0$, $\delta_v = 0.2$, $\rho = 0.03$. Points D , M and C denote the decentralized, the myopically and the centrally planned equilibria.

relational goods in the utility function $-1 + \gamma = 0.7$ and $\omega + \theta = 0.8$ – in the first best allocation leisure becomes the crucial factor enhancing well-being.

In terms of growth rate, we get $\hat{g} < \check{g} < \tilde{g}$. Myopically planned economy results in the highest rate of growth. The internalization of production externalities induces the social planner to find optimal to reduce the consumption-capital ratio and to increase investment in physical capital. By contrast, in the decentralized economy, the concern about the dynamics of social capital induces to lower the consumption-capital ratio and the labour supply. The resulting growth rate is very low in the steady state, about the 0.5%. Surprisingly, this growth rate is also lower than the decentralized economy despite the presence of strong production externalities, $(1 - \alpha) = 0.5$).

4.2 Happy Degrowth versus Unhappy Growth

The analysis of the steady states highlights that in the first best equilibrium the economy is characterized by a very low rate of growth, by a very low labour supply and by a very low consumption-capital ratio. How does this economy look like? What are the implications concerning the transition towards that equilibrium?

In the comparison between points M and C in Figure 1, a question which can be raised is how it is possible that C is welfare improving with respect to M . The answer relies in the social capital dynamics – equation (6). Let

us assume that the economy lays at M . *Ceteris paribus*, an increase in the average leisure – $l > \tilde{l}$ – has two consequences: i) the rate of growth diminishes, ii) the stock of social capital increases – that is $\dot{V} > 0$. The process of accumulation of social capital takes time, thus, during that period the economy faces a sharp reduction in the growth rate of the stock of physical capital. That is, along the transitional path, the economy is characterized by an ongoing substitution of social capital accumulation for physical capital accumulation. This path can also induce a downscale in production especially in economies with high level of capital stock. Moreover, private consumption has to reduce in order to converge to the optimal consumption-capital ratio – note that $\frac{\hat{c}}{\hat{k}} < \frac{\tilde{c}}{\tilde{k}}$. The increase of leisure and social capital implies an increase in the flow of relational goods. The increase in welfare caused by those factors can more than offset the negative effect of the reduction in consumption. Hence, in this phase households will experience an increase in their utility.

The same kind of reasoning can be applied to evaluate the welfare implications of a shift from D to M . If myopic governments push the economy towards a growth enhancing path, the result in term of welfare can be negative. The reduction in leisure induces a reduction in social capital and hence in the flow of relational goods. The increase in the rate of growth cannot be sufficient to offset the reduction in welfare due to the leisure and relational goods. Furthermore, as we pointed out above, the new equilibrium allocation resulting from myopic social planner can be worst in terms of welfare than the decentralized equilibrium. Hence, the exploitation of production externalities without taking into account the leisure complementarity in the accumulation of social capital has perverse results by departing from the socially optimal allocation C .

To summarize, myopic governments stimulating high growth rate can promote unhappy growth both in the transition and in the steady state. On the contrary, public policies should encourage high level of leisure and the enjoyment of relational goods instead of private consumption. In this case, the economic transition can follow a trajectory characterized by a downscale in production and a reduction of consumption, and a contemporary increase in welfare: a path of happy de-growth.

5 Concluding Remarks

In this paper we presented an endogenous growth model by allowing for externalities in production, consumption and leisure. We investigated three regimes: (i) a decentralized economy, (ii) a myopically planned economy and, (iii) a centrally planned economy. Two stocks drive the dynamics of the model, physical and social capital. Myopic governments fail to recognize that leisure spillovers contribute to the accumulation of social capital

and thus to the production of relational goods. By construction, when the social planner is fully informed and internalizes all sources of externalities it becomes possible to achieve the first best in terms of welfare. This entails both constant leisure levels and consumption-capital ratio along the optimal balanced growth path.

We found that the growth rate and the labour supply associated to regime (ii) are sharply higher than those associated to (iii). Moreover, if production externalities are important relatively to negative consumption externalities, the growth rate and the labour supply in (ii) are also higher than those in (i). Furthermore, labour supply in (i) is significantly higher than that obtained by a fully informed social planner for a wide range of parameter values. Finally, consumption-capital ratio in (i) is higher than that in (ii) which is in turn higher than that in the centrally planned economy.

The intuition is straightforward: when the social planner internalizes the effect of leisure on the dynamics of social capital accumulation, then the optimal share of leisure time increases. The consequent increase in the flow of relational goods causes a loss of the importance of both private consumption and economic growth. The social planner should shift from a regime based on work for growth to the one based on leisure for social capital accumulation.

This analysis suggests that the importance given to economic growth in contemporary societies might be exaggerated due to an under-evaluation of relational activities and leisure externalities. The social planner who does not appropriately consider aspects of human life which are crucial for well-being can worsen welfare. In particular, stimulating labour supply and physical capital accumulation may result in a long-run equilibrium associated with a welfare level which is lower than the welfare level associated with a *laissez-faire* regime.

Furthermore, a heuristic analysis of the transition underlines that myopic government can promote a path of unhappy growth, while the trajectory towards the first best allocation can induce a path of happy de-growth through a downscale in production, a decrease of consumption and an ongoing increase in welfare. The downscale in production along the transition is much likely when the initial level of capital is high. This suggests that rich economies can easily experience a de-growth convergence to the optimal allocation. Poor economies where levels of physical capital are low may instead increase leisure and social capital without facing a decline in production.

We obtain these results without considering negative externalities of growth on social capital, without considering environment or other external effects that work in the direction to lower the desirability of economic growth. As it is well known, ecological sustainability and energy shortages can easily undermine any process of economic growth.³ In our model

³See for instance the classical works by Meadows et al. (1972) Daly (1973) and

instead, the long-run first best equilibrium is characterized by low but positive growth rate. Anyway, the socio-economic system associated to the fully informed planner is much less dependent on economic growth, since leisure and the enjoyment of relational goods can sustain high level of welfare also without economic growth. In this respect, households could accept reduction in consumption more easily than in a growth based society.⁴

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Georgescu-Roegen (1976). A recent critical investigation on steady-state economy see Kerschner (2010), while problem of energy shortages are analysed in D’Alessandro et al. (2010) and references therein.

⁴For an interesting discussion on the possibility for democratic societies to accept reduction in consumption see Matthey (2010).

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