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Abstract

Using well-known results from public debt dynamics, it is shown that in case of degrowth a sustainable public debt is very unlikely to achieve. Degrowth requires that negative real interest rates have to be maintained which might imply accelerated inflation, or other severe goal conflicts of public finance will result.

Keywords: degrowth, sustainability, public debt, goal conflict

JEL Classification: H63, Q57, O44

1 Introduction

There is an ongoing debate whether a sustainable economic development within the boundaries of the natural environment might be possible even with positive growth rates ("green growth"). From both, theoretical and empirical perspectives, many authors are skeptical and advocate zero growth or even degrowth (see e.g. Ayres (1996), Daly (2013), Martínez-Alier et al. (2010)). An excellent critical review of this debate is provided by Van den Bergh (2011). There is not much literature about the economic implications of degrowth for the functioning of governmental policies such like social security system or public debt management (see. e.g. Malmaeus and Alfredsson (2017)). This paper aims to point to substantial goal conflicts of degrowth with sustainable public finance which arises from quite simple debt dynamics.

Sustainable public finance is here simply defined as the government's ability to permanently serve the public debt so that the debt/GDP ratio remains stable. In the European Monetary Union it is determined in the Maastricht treaty that this ratio should not exceed 60%. A permanently increasing ratio implies that there is the danger of Ponzi financing public expenditures, and finally getting overindebted so that a country defaults. At the first sight, it seems intuitive that at any GDP level a constant debt/GDP ratio could be maintained. Degrowth seems not to be an obstacle for sustainable public debt per se as long as the debt stock declines with the same rate as the GDP. However, it is shown that this implies permanently negative

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real interest rates. Moreover, in a shrinking economy (or even with zero growth but technical progress) one could expect that the real return of capital is increasing. To keep the real interest rate below zero, increasing inflation rates are necessary which will harm the economy and are not an indicator of sustainable development. In case of positive real interest rates, however, a constant debt/GDP ratio could be maintained only with a very harsh austerity policy which has permanently to be adjusted to the needs of public debt management, and thus creating huge potential for goal conflicts.

2 Some simple debt algebra

The following debt dynamic algebra is very basic and can be found in a similar form in textbooks like Carlin/Soskice (2015). A much more sophisticated algebra is provided by Escolano (2010) in the IMF technical notes, but with similar results. For the purpose of this paper, I will use the simplest version in order to derive the well-known relationship between real interest and growth rate which is a pivotal issue for the stability of the public debt. We start with defining the public debt services in period t:

$$DS_t = i_t D_t + repay_t \tag{1}$$

with i_t as the interest rate (more precisely the average interest rate of all kind of public debt contracts with different maturities: current yield), D_t as the debt level, and $repay_t$ as debt repayments in period t.

Total debt then evolves according to

$$D_{t+1} = D_t - repay_t + d_t \tag{2}$$

where d_t is the budget deficit in period t (see below).

The primary budget surplus is defined as

$$PBS_t = T_t - G_t \tag{3}$$

with T_t as the tax revenues, and G_t as the governmental expenditures, excluding the debt services.

The budget deficit is then

$$d_t = DS_t - PBS_t \tag{4}$$

The tax revenues are seen as proportional to the nominal GDP:

$$T_t = tax_t Y_t \tag{5}$$

with $Y_t = P_t Y_t^{real}$ as the nominal GDP, and the average tax rate tax_t as a policy variable.

Nominal growth is simply defined as

$$Y_{t+1} = (1 + g_t) Y_t \tag{6}$$

with $g_t = g_t^{real} + \pi_t$ as the nominal growth rate, and π_t as the inflation rate.

Combining all equations (1) - (5) leads to the well-known dynamic equation for the total debt:

$$D_{t+1} = (1 + i_t)D_t - tax_t Y_t + G_t$$

and defining $Q_t = G_t/Y_t$ as the public expenditure share of the GDP

$$= (1 + i_t)D_t + \underbrace{(Q_t - tax_t)}_{Z_t} Y_t \tag{7}$$

Equations (6) and (7) constitute a linear dynamic system. As we are interested in the stability of the debt/GDP ratio $q_t = D_t/Y_t$, we can divide eq. (7) by (6) and obtain the dynamic equation

$$q_{t+1} = \frac{1 + i_t}{1 + g_t^{real} + \pi_t} \cdot q_t + Z_t \tag{8}$$

which has a steady state solution q^*. Let us assume that the steady state is economically meaningful, i.e. $q^* > 0$. The stability of a steady state requires a negative eigenvalue of the equation:

$$\frac{1 + i_t}{1 + g_r^{real} + \pi_t} < 1 \quad \Longleftrightarrow \quad i_t - \pi_t = r_t < g_t^{real}$$

so that the dynamics globally converge to the steady state (see figure 1, left panel). However, this stability condition implies that degrowth or even zero growth ($g_t^{real} \leq 0$) requires a *negative* real interest rate r_t.

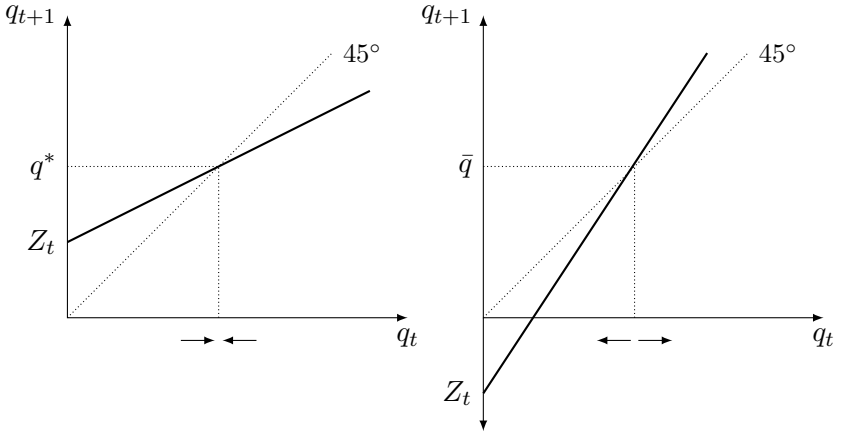

Figure 1: Stability of the steady state

Even if the eigenvalue of the dynamic equation is less than one, it does not guarantee that the steady state level q^* is at its politically desired level $\bar{q}$, e.g. 60%. In order

to achieve a predefined level $\bar{q}$, the governmental tax and expenditure policy, as expressed in Z_t, has to be adjusted accordingly by solving eq. (8) with $q_{t+1} = q_t = \bar{q}$:

$$Z_t = \frac{g_t^{real} - r_t}{1 + g_t^{real} + \pi_t} \bar{q} \tag{9}$$

which is negative in case of degrowth ($g_t^{real} < 0$).

If we accept the standard assumption that physical capital has declining marginal returns and/or assume that technical progress enlarges the marginal productivity of capital and therefore the real interest rate, one could push down this rate only by *accelerating inflation rates*. This cannot seriously be a goal of economists who are interested in sustainability. The real interest rate can be influenced – but not be determined – by the central bank. It is an endogenous outcome of financial markets which are partially driven by real developments (such like technical progress), changing risk perceptions, central bank policy, among other determinants. The goal of central banks is typically to keep the inflation rate on an optimal level, not to spur inflation because it is needed to achieve negative real rates for managing public debt.

Empirically we see a trend of declining productivity growth and also declining real interest rates in the USA, Japan, and Europe which could be seen as symptoms of a "secular stagnation" (see Sajedi and Thwaites (2016)). Therefore, it might be possible to see negative real interest rates permanently. However, even the current rates are significantly above the level which is needed if we would have degrowth of e.g. 1% per annum. Moreover, it is by no means clear whether this trend is pursued.

So let us consider the case of positive real interest rates and thus an *unstable* steady state $\bar{q}$ which means an eigenvalue larger than one (see figure, right panel). Policy variables in this simple algebra are tax_t and Q_t or simply Z_t which can be interpreted as a measure of budget discipline or austerity: increasing Z_t imply less discipline, declining Z_t indicates austerity policy. However, Z_t determines the intercept in equation (8) and has thus no impact on the stability of a steady state. The only way to maintain a certain level of $\bar{q} > 0$ is a harsh austerity policy with $Z_t < 0$ (see equation (9) and right panel of graphic) which is then permanently adjusted according to fluctuations of $Y_t, i_t, g_t^{real}, \pi_t$ which then results in fluctuations around $\bar{q}$. Permanent adjustments are necessary because $\bar{q}$ is unstable and therefore a misalignment could lead to a "debt trap" of permanently increasing q levels and finally to overindebtedness and default.

3 Conclusion

A harsh austerity policy where expenditures and taxes are determined by the requirement of eq. (9) is supposedly not the desired political prospect which proponents of degrowth might have. There are not much leeways anymore to adjust taxes and expenditures according to economic or ecological needs. Thus, we can conclude that degrowth imposes severe goal conflicts because negative real interest

rates (and thus eventually accelerating inflation) in case of a negative eigenvalue or harsh austerity policy in case of positive eigenvalues are necessary to maintain a certain public debt/GDP ratio. Especially in case of an ecological tax reform where the tax base might fluctuate in time, this could be a very difficult task with a lot of trade-offs. On the other hand, an ecological tax reform would also break the strong tie between GDP and tax revenues (see eq. (5). A shrinking economy with stable eco-tax revenues is at least possible from a technical point of view. But this implies an increasing tax burden per unit of income which also has its limits. Moreover, the purpose of eco-taxes is to provide an incentive for a shrinking tax base which will enforce the goal conflicts discussed in this paper.

If drastic austerity should be avoided, it is necessary to set the politically determined goal $\bar{q}$ close to zero (nearly no public debt). Even with $\bar{q} = 0$ a permanent adjustment of Z_t will be required in case of positive real interest rates but the fiscal pressure might be minimized. However, this would nullify nearly all financial securities (sovereign bonds) in the banking sector and thus leading to inherent financial instabilities as these securities play an important role as a collateral, for liquidity transfers, and for hedging risks. It should be emphasized that pointing to goal conflicts in case of degrowth is not automatically a plea for positive growth rates. But it highlights the dependencies of public policy on growth.

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