Economics Letters 147 (2016) 42–45

Contents lists available at ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

Demonstration effect and dynamic efficiency

Emmanuel Thibault

Toulouse School of Economics (IDEI and University of Perpignan), Manufacture des Tabacs - 21, Allée de Brienne - 31 000 Toulouse, France

HIGHLIGHTS

- I show that the dynamic inefficiency arising in a standard Diamond (1965) economy can be cured using the demonstration-effect approach popularized by Cox and Stark (2005).
- Family transfers are positive if there is dynamic inefficiency. There exists a saddle path that converges to a steady state in which the capital stock can be made arbitrarily close to the Golden Rule one.
- However, family transfers are nil under dynamic efficiency. Unlike public debt, both capital accumulation and welfare are not worsened.

ARTICLE INFO

Article history:
Received 31 March 2016
Received in revised form
8 August 2016
Accepted 18 August 2016
Available online 22 August 2016

JEL classification:
C 62
D 91
O 41

Keywords:
OLG model
Dynamic efficiency
Intergenerational family transfers

ABSTRACT

Can dynamic inefficiency be remedied by intergenerational family transfers? The issue matters for the connection between fiscal policy and economic growth. Yet family transfers have mostly been narrowly cast as altruistic. I show that an alternative motive – the demonstration effect, whereby parents transfer to mold preferences of children – can generate vastly different results: family transfers are positive under dynamic inefficiency. These transfers are instrumental to depress capital accumulation so as to approach the Golden Rule capital stock. Intuitively, family transfers from youth to old age reduce capital accumulation. However, family transfers are nil under dynamic efficiency. Unlike public debt, both capital accumulation and welfare are not worsened.

1. Introduction

In a celebrated article, Diamond (1965) shows that the long-run capital stock can be too large in a competitive economy. In that case, the interest rate is lower than the rate of growth and, consequently, the economy is dynamically inefficient. Can dynamic inefficiency be remedied by intergenerational family transfers? Since the influential paper of Barro (1974), family transfers – crucial for the connection between fiscal policies (such as the public debt) and economic growth[1] – have mostly been narrowly cast as altruistic.[2] Most of the time, the debate revolves around "internal" criticisms who seek to establish the full set of (technical) necessary and sufficient conditions for obtaining the Barro's debt neutrality theorem relatively to the properties of the underlying (Diamond, 1965) economy.[3]

Surprisingly enough, there have been very few "external" criticisms and especially the altruistic motivation of family transfers has never really been investigated. In this note, I show that the dynamic inefficiency arising in a standard (Diamond, 1965) economy can be cured without altruistic motivation as long as parents can shape the preferences of their children. Using the demonstration-effect approach – whereby parents transfer to mold preferences of children – popularized by Cox and Stark (2005), I establish two results.[4] First, family transfers are positive

E-mail address: emmanuel.thibault@tse-fr.eu.

1 In Diamond (1965) people are pure life cyclers, dynamic inefficiency can arise and then there is a case for fiscal policy such as public debt. In Barro (1974) agents are linked across generations by altruistic bequests, debt is neutral and the market equilibrium is dynamically efficient.

2 See the survey of Michel et al. (2006).

3 See Abel (1987), Weil (1987), Galor and Ryder (1991) and Thibault (2000) or the nice survey of Weil (2008).

4 Using recent household survey microdata, Cox and Stark (2005) empirically emphasizes the relevancy of the demonstration-effect approach. Interestingly, Jellal and Wolff (2000) shows that upstream transfers are expected to increase with low returns from alternative financial assets and with the donor's life expectancy. The latter effect creates a greater incentive for daughters to care for parents. This theoretical intuition is empirically confirmed by Mitrut and Wolff (2009). Consequently, the demonstration-effect approach can also be useful to study the issue of the long-term care financing (see Canta and Pestieau, 2013, or Canta et al., 2016).

http://dx.doi.org/10.1016/j.econlet.2016.08.016

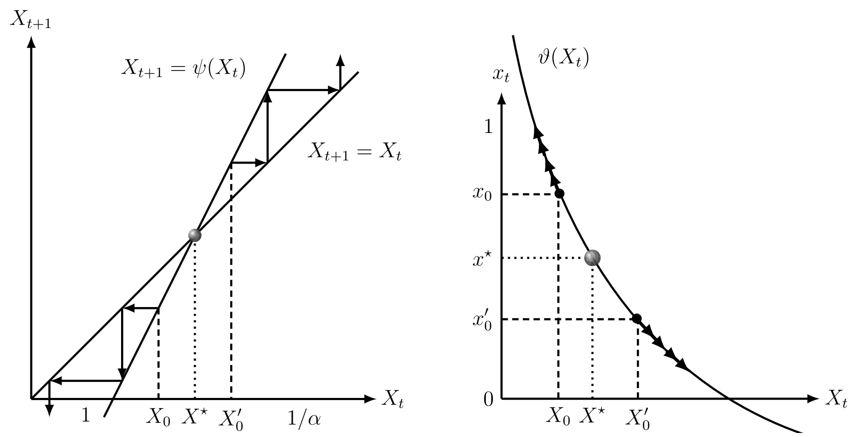

Fig. 1. The dynamics of X_t and x_t.

if and only if there is dynamic inefficiency. Second, when transfers are positive, there exists a saddle path that converges to a steady state in which the capital stock can be made arbitrarily close to the Golden Rule one. Intuitively, family transfers allow perpetual transfers from young to old. This behavior reduces the desire of consumers to transfer goods from youth to old age (which would ultimately drives down the interest rate). This market-based approach cures inefficiency due to too low interest rate. Unlike traditional remedies (such as public debt), family transfers do not worsen capital accumulation and welfare under dynamic efficiency.

2. The economy

Consider a perfectly competitive economy evolving over infinite discrete time. A homogeneous good is produced at each period t using two factors physical capital, K_t, and labor, L_t via a Cobb–Douglas technology $AK_t^\alpha L_t^{1-\alpha}$ with $\alpha \in (0, 1)$ and $A > 0$. Capital fully depreciates after one period. As markets are perfectly competitive, each factor is paid its marginal product, i.e. $w_t = (1-\alpha)Ak_t^\alpha$ and $R_t = \alpha A k_t^{\alpha-1}$, where w_t and R_t are the wage and the interest factor, respectively, at time t and $k_t = K_t/L_t$.

Population is constant and consists of agents who live for two periods. Agents born in t supply a fixed amount of labor, receive w_t, consume c_t and save s_t when they are young. They earn and consume d_{t+1} when they are old. Preferences are represented by the logarithmic life-cycle utility function, $U_t = \ln c_t + \ln d_{t+1}$. At each t young agents are allowed to transfer a fraction x_t of their income w_t to their parents, so that

$$U_t = U(x_t, x_{t+1}, s_t) = \ln[(1-x_t)w_t - s_t] + \ln[R_{t+1}s_t + x_{t+1}w_{t+1}].$$

Following Cox and Stark (2005), I posit that the demonstration can be imperfect by assuming that with probability π a child simply imitates his parent's action, while with probability $1-\pi$ he chooses an action to maximize his expected utility, anticipating that his own child may be an imitator. Therefore agents born at t maximize $\pi U(x_t, x_t, s_t) + (1-\pi)U(x_t, x_{t+1}, s_t)$ with respect to x_t and s_t.

The capital stock in period $t+1$ is financed by the savings of the generation born in t, i.e. $k_{t+1} = s_t$. Two different dynamics of capital accumulation are thus possible depending on whether family transfers are positive or not.

2.1. Dynamics with no intergenerational family transfers

Without family transfers (i.e. $x_t = x_{t+1} = 0$), agents maximize $U(0, 0, s_t) = \ln[w_t - s_t] + \ln R_{t+1}s_t$ with respect to s_t. This coincides with the standard (Diamond, 1965) economy; using the first order condition it is straightforward to see that $s_t = w_t/2$. Thus, the dynamics of capital accumulation are given by: $k_{t+1} = (1-\alpha)Ak_t^\alpha/2$. Starting from $k_0 > 0$, the economy exhibits monotone convergence towards $k^D = [(1-\alpha)A/2]^{1/(1-\alpha)}$.

2.2. Dynamics with positive intergenerational family transfers

When transfers are positive, the optimal pair $(x_t^\star, s_t^\star)$ must verify the two following first order conditions:

$$-\frac{w_t}{(1-x_t^\star)w_t - s_t^\star} + \frac{\pi w_{t+1}}{R_{t+1}s_t^\star + x_t^\star w_{t+1}} = 0 \quad (1)$$

$$-\frac{1}{(1-x_t^\star)w_t - s_t^\star} + \frac{\pi R_{t+1}}{R_{t+1}s_t^\star + x_t^\star w_{t+1}} + \frac{(1-\pi)R_{t+1}}{R_{t+1}s_t^\star + x_{t+1}w_{t+1}} = 0. \quad (2)$$

As π is time-invariant, the planning problem faced by each generation is the same as that faced by its predecessors so that (1) and (2) must be satisfied at each period.

Let $x_t = \vartheta(X_t) = 1/[(1-\alpha)X_t] - \alpha/(1-\alpha)$. Using this change of variable we have $R_{t+1}s_t + x_t w_{t+1} = AX_t^{-1}k_{t+1}^\alpha$ and $(1-x_t)(1-\alpha) = 1 - X_t^{-1}$. After simplifications, I obtain from (1):

$$k_{t+1} = \varphi(k_t, X_t) = Ak_t^\alpha\left(1 - \frac{1+\pi}{\pi X_t}\right). \quad (3)$$

Furthermore, using the fact that $R_{t+1}/[R_{t+1}s_t + x_\tau w_{t+1}] = \alpha X_\tau/k_{t+1}$ I obtain after simplifications from (2):

$$X_{t+1} = \psi(X_t) = \frac{(1-\alpha)\pi}{\alpha(1-\pi)}X_t - \frac{1+\pi}{\alpha(1-\pi)}. \quad (4)$$

The dynamics of X (and then of x_t), described by (4) are independent of k and, thus, straightforward. They are represented in Fig. 1.

Characterizing these dynamics in terms of X (rather than in terms of x) allows us to work with an arithmetic–geometric sequence that has a unique stationary point: $X^\star = (1+\pi)/(\pi-\alpha)$. As $1/X_t = \alpha + (1-\alpha)x_t$, $0 < x^\star < 1$ if and only if $1 < X^\star < 1/\alpha$. Consequently, transfers are positive if and only if $\pi > \underline{\pi} = 2\alpha/(1-\alpha)$.