Chapter VI

Charity, The Spirit of Capitalism and Wealth Accumulation

But do not go to war with Political Economy.

(1) Because the Political Economists are a powerful and dangerous class;

(2) Because it is impossible for ladies and gentlemen to fill up the interstice of legislation if they run counter to the common motives of self-interest.

(3) (You won't agree to this.) Because Political Economists have really done more for the laboring classes by their advocacy of Free Trade, etc., than all the philanthropists put together.

I wish it was possible as a matter of taste to get rid of all philanthropic expressions, 'missions,' etc., which are distasteful to the educated. But I suppose they are necessary for collection of money, and no doubt as a matter of taste there is a good deal that might be corrected in the Political Economists. The light of feelings never teaches the best way of dealing with the world *en masse*, and the daylight never finds the way to the heart either of man or beast.

You see I want to have all the humanities combined with Political Economy. Perhaps it may be replied that such a combination is not possible in human nature. Excuse my speculation.

By Benjamin Jowett, M.A., Master of Balliol College, Oxford.
[From George Stigler, Memoirs of an Unregulated Economist, pp. 6-7]

This chapter studies charity contributions and wealth accumulation by extending the capitalist-spirit model to consider the social-status implications of charity and wealth in Becker (1974, 1976a, 1976b), Cole, Mailath and Postlewaite (1992), and Fershtman and Weiss (1993). In this new model, a representative agent derives utility from both consumption and social status, with the latter determined by his wealth and charity donation. This dynamic, general equilibrium framework enables us not only to re-examine many issues such as tax policy and charity contributions (Clotfelter, 1985), and the crowding-out effect of government support (Kingma, 1989), but also to study the dynamics of charity donation and wealth accumulation. Above all, I intend to answer the following question: if a society tends to be more altruistic, or if the social status is determined more by charity contributions than by wealth, will capital accumulation be reduced and charity donation be increased in the long-run?

I organize this chapter as follows. In section VI.1, I set up the model and study the properties of equilibrium and stability of the dynamic system. Section VI.2 deals with the effects of accumulation spirit, altruist sentiment, and tax deduction of charity contributions on capital accumulation and charity donation. Section IV focuses on the effects of government funding on private charity and capital accumulation. ~~I conclude this chapter in section VI.4~~.

VI.1 <u>The Model</u>

Let a representative agent have the following instantaneous utility function defined on consumption and social status or prestige:

$$U(c,s), \tag{6.1}$$

where c is consumption, and s is the social status.

Following ~~Kurz (1968)~~, Becker (1974, 1976a, 1976b), Kingma (1989), Cole, Mailath and Postlewaite (1992), and Fershtman and Weiss (1993), I define the social status to be a function of the wealth and charity contributions:

$$s = s(k,a), \tag{6.2}$$

where k is the capital stock or wealth and a is charity contributions.

The inclusion of charity into the utility function is a typical way to represent the altruist sentiment or sympathy. Adam Smith (1759, 1976) says:

> How selfish so ever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure

> of seeing it. Of this kind is pity or compassion, the emotion which we feel for the misery of others, when we either see it, or are made to conceive it in a very lively manner. That we often derive sorrow from the sorrow of others, is a matter of fact too obvious to require any instances to prove it; for this sentiment, like all the other original passions of human nature, is not confined to the virtuous and humane, though they perhaps feel it with the most exquisite sensibility. The greatest ruffian, the most hardened violator of the laws of society, is not altogether without it. (p. 9)

This approach also reflects a social-status argument. According to Becker (1974), "charitable behavior can also be motivated by a desire to avoid scorn of others or to receive social acclaim." (in Becker, 1976b, p.273.) Kingma (1989) argues that an agent makes a contribution to charity to relieve his guilt or increase his social standing (p. 1199).

The inclusion of wealth into the social status function is already justified in chapter 1. Wealth provides man not only consumption means but also political power and social prestige. Possession of wealth is, to a considerable degree, a measure and standard of a person's success in a society. This argument has been put forward by Weber, Mill, Marshall, Cassel, and Veblen. To further illustrate this point, I add Adam Smith (1976):

> The rich man glories in his riches, because he feels that they naturally draw upon him the attention of the world, and that mankind are disposed to go along with him in all those agreeable emotions with which the advantages of his situation so readily inspire him. At the thought of this, his heart seems to swell and dilate itself within him, and he is fond of his wealth, upon this account, than for all the other advantages it procures him (pp. 50-51).

Without further details of justification for the utility function, I turn to the analysis of the model itself. For analytical simplicity, I choose the following separable utility function instead of the more general form in (6.1) and (6.2):

$$u(c)+\beta v(k)+\alpha w(a), \qquad \alpha \text{ and } \beta > 0, \tag{6.3}$$

where β and α are the social-status weights assigned to wealth and charity, respectively. α can also be interpreted as the altruist sentiment and β the capitalist spirit. It is further assumed that $u(c)$, $v(k)$, and $w(a)$ are increasing, concave, and differentiable.

The representative agent's capital accumulation is given by:

$$\dot{k} = (1-\tau_y)f(k)-(1+\tau_c)c-(1-\tau_a)a, \tag{6.4}$$

where $f(k)$ is the net output with $f'(k) > 0$ and $f''(k) < 0$; τ_y is the income tax rate; τ_c is consumption tax; τ_a is the rate of tax deduction on charity donation. In this setup, I distinguish the income tax rate and the rate of tax deduction on charity contributions in order to allow a more general treatment. The special case of this set-up is when these two rates are the same.

The representative agent maximizes:

$$\int_0^\infty [u(c)+\beta v(k)+\alpha w(a)]e^{-\rho t}dt, \tag{6.5}$$

subject to the budget constraint of (6.4) and with the initial capital stock given by $k(0)$.

The Hamiltonian for this optimization is:

$$H(c,a,k,\lambda) = u(c)+\beta v(k)+\alpha w(a)+\lambda(1-\tau_y)f(k)-(1+\tau_c)c-(1-\tau_a)a, \tag{6.6}$$

where λ is the shadow price of the capital stock.

The necessary conditions for an optimum are:

$$u'(c) = \lambda(1+\tau_c), \tag{6.7}$$

$$\alpha w'(a) = \lambda(1-\tau_a), \tag{6.8}$$

$$\dot{\lambda} = \lambda\rho-\lambda(1-\tau_y)f'(k)-\beta v'(k), \tag{6.9}$$

$$\dot{k} = (1-\tau_y)f(k)-(1+\tau_c)c-(1-\tau_a)a. \tag{6.4}$$

Conditions (6.7) and (6.8) are the familiar marginal conditions for allocation between consumption and charity, and they can be written as the equality between the marginal rate of substitution and the cost ratio:

$$\frac{u'(c)}{\alpha w'(a)} = \frac{1+\tau_c}{1-\tau_a}.$$

From (6.7) and (6.8), I can solve consumption and charity donation as the functions of λ, τ_c, α, τ_a:

$$c = c(\lambda,\tau_c), \tag{6.10}$$

$$a = a(\lambda,\alpha,\tau_a), \tag{6.11}$$

with the following properties:

$$\frac{\partial c}{\partial \lambda} = \frac{(1-\tau_c)}{u''(c)} < 0, \tag{6.12a}$$

$$\frac{\partial c}{\partial \tau_c} = \frac{\lambda}{u''(c)} < 0, \tag{6.12b}$$

$$\frac{\partial a}{\partial \lambda} = \frac{(1-\tau_a)}{\alpha w''(a)} < 0, \tag{6.12c}$$

$$\frac{\partial a}{\partial \tau_a} = \frac{-\lambda}{\alpha w''(a)} > 0, \tag{6.12d}$$

$$\frac{\partial a}{\partial \alpha} = \frac{-w'(a)}{\alpha w''(a)} > 0. \tag{6.12e}$$

Substituting c and a in (6.10) and (6.11) together with the properties of (6.12a)-(6.12e) into (6.9) and (6.4) yields:

$$\dot{\lambda} = \lambda\rho - \lambda(1-\tau_y)f'(k) - \beta v'(k), \tag{6.13}$$

$$\dot{k} = (1-\tau_y)f(k) - (1+\tau_c)c(\lambda,\tau_c) - (1-\tau_a)a(\lambda,\alpha,\tau_a). \tag{6.14}$$

Now I turn to the equilibrium and stability of the dynamic system in (6.13) and (6.14). Let $\bar{\lambda}$, $\bar{k}$, $\bar{c}$ and $\bar{a}$ denote the equilibrium values of λ, k, c, and a, respectively. At equilibrium, $\dot{\lambda} = \dot{k} = 0$, which implies that:

$$\bar{\lambda}\rho - \bar{\lambda}(1-\tau_y)f'(\bar{k}) - \beta v'(\bar{k}) = 0 \tag{6.15}$$

$$(1-\tau_u)f(\bar{k}) - (1+\tau_c)\bar{c}(\bar{\lambda},\tau_c) - (1-\tau_a)\bar{a}(\bar{\lambda},\alpha,\tau_a) = 0. \tag{6.16}$$

It is noted that, to maintain equilibrium condition (6.15), we need:

$$\bar{\lambda}\rho - \bar{\lambda}(1-\tau_y)f'(\bar{k}) - \beta v'(\bar{k}) > 0. \tag{6.17}$$

Linearizing the dynamic system of equations (6.13) and (6.14) around the steady state values, I obtain:

$$\begin{bmatrix} \dot{\lambda} \\ \dot{k} \end{bmatrix} = \begin{bmatrix} \beta v'(\bar{k}) & -\lambda(1-\tau_y)f''(\bar{k}) - \beta v''(\bar{k}) \\ -(1+\tau_c)(\frac{\partial c}{\partial \lambda}) - (1-\tau_a)(\frac{\partial a}{\partial \lambda}) & (1-\tau_y)f'(\bar{k}) \end{bmatrix} \begin{bmatrix} \lambda - \bar{\lambda} \\ k - \bar{k} \end{bmatrix}. \tag{6.18}$$

In (6.18), the trace of the 2x2 matrix is equal to the positive time discount rate ρ [use condition (6.17)]. Hence there is at least one positive eigenvalue. The determinant of the 2x2 matrix does not have a definite sign. Again, from the previous analysis, there may exist multiple equilibria for the dynamic system derived from a utility function defined on both consumption and the capital stock. Therefore, it is quite possible that some equilibria are critical with two positive eigenvalues. But for the present analysis, I will again focus on a perfect-foresight equilibrium, namely, there are one positive eigenvalue and one negative eigenvalue corresponding to one state variable and one jumping variable in the dynamic system. Since the determinant of the 2x2 matrix in (6.18) is the product of the two eigenvalues, the perfect-foresight equilibrium requires that:

$$\Delta_s \equiv \beta v'(\bar{k})(1-\tau_y)f'(\bar{k})[\lambda(1-\tau_y)f''(\bar{k})+\beta v''(\bar{k})] < 0. \tag{6.19}$$

Condition (6.19) is the standard prerequisite for rational-expectation analysis in intertemporal models, and it will be used repeatedly in the following exercises of comparative statics.

VI.2 Comparative Statics

To find out how charity, consumption and capital accumulation are affected by the altruist sentiment α, the capitalist spirit β, the time discount rate ρ, and various tax variables, I totally differentiate equations (6.15) and (6.16):

$$\begin{bmatrix} \beta v'(\bar{k}) & -\lambda(1-\tau_y)f''(\bar{k})-\beta v''(\bar{k}) \\ -(1+\tau_c)(\frac{\partial c}{\partial \lambda})-(1-\tau_a)(\frac{\partial a}{\partial \lambda}) & (1-\tau_y)f'(\bar{k}) \end{bmatrix} \begin{bmatrix} d\lambda \\ dk \end{bmatrix} =$$

$$\begin{bmatrix} -\bar{\lambda}d\rho-\bar{\lambda}f'(\bar{k})d\tau_y+v'(\bar{k})d\beta \\ f(k)d\tau_y+c[1+E(e,\tau_c)]d\tau_c+a[E(a,\tau_a)-1]d\tau_a+(1-\tau_a)(\frac{\partial a}{\partial \alpha})d\alpha \end{bmatrix}, \tag{6.20}$$

where $E(c,\tau_c)$ is the elasticity of consumption with respect to consumption tax:

$$E(c,\tau_a) = \frac{(1+\tau_c)}{c}(\frac{\partial c}{\partial \tau_c}) < 0, \tag{6.21}$$

and $E(a,\tau_a)$ is the elasticity of charity donation with respect to the rate of the tax deductible:

$$E(a,\tau_a) = [\frac{(1-\tau_a)}{a}](\frac{\partial a}{\partial \tau_a}) > 0. \tag{6.22}$$

From (6.20), a few observations can be derived. First, to test whether the established negative relationship between capital accumulation and the time discount rate still holds here, I use Cramer's rule in (6.20) to obtain:

$$\frac{d\lambda}{d\rho} = \frac{-(1-\tau_y)f'(\bar{k})\bar{\lambda}}{\Delta_S} > 0, \tag{6.23}$$

$$\frac{dk}{d\rho} = \frac{-\bar{\lambda}[(1+\tau_c)(\frac{\partial c}{\partial \lambda})+(1-\tau_a)(\frac{\partial a}{\partial \lambda})}{\Delta_s} < 0, \tag{6.24}$$

which are true because Δ_s is negative from (6.19), $(\partial c/\partial \lambda)$ and $(\partial a/\partial \lambda)$ are negative from (6.12a) and (6.12c). Therefore, (6.24) confirms the result in the traditional optimal growth model. With (6.23), it is easy to see that consumption and charity donation are also negatively related to the time discount rate:

$$\frac{dc}{d\rho} = (\frac{\partial c}{\partial \lambda})(\frac{d\lambda}{d\rho}) < 0,$$

$$\frac{da}{d\rho} = (\frac{\partial a}{\partial \lambda})(\frac{d\lambda}{d\rho}) < 0.$$

To state it differently: since a rise in the time discount rate reduces long-run capital accumulation, it also reduces consumption and charity contributions.

The capitalist spirit parameter, β, is an important variable. In passing it should be noted that if parameter β is zero, then long-run capital accumulation is independent of charity and altruist sentiment. This is clear from (6.15). When $\beta=0$, long-run capital accumulation is determined by: $f'(k)=\rho/(1-\tau_y)$, which is the modified golden rule with income taxation and is independent of the altruist sentiment or the social-status weight assigned to charity, α. More importantly, I have:

Proposition 6.1: A rise in the capitalist spirit leads to more capital stock, more charity donation and more consumption in the long run.

From (6.20),

$$\frac{d\lambda}{d\beta} = \frac{v'(\bar{k})(1-\tau_y)f'(\bar{k})}{\Delta_S} < 0, \tag{6.25}$$

$$\frac{dk}{d\beta} = \frac{v'(\bar{k})(1+\tau_c)(\frac{\partial c}{\partial \lambda})+(1-\tau_a)(\frac{\partial a}{\partial \lambda})}{\Delta_S} > 0, \tag{6.26}$$

$$\frac{dc}{d\beta} = (\frac{\partial c}{\partial \lambda})(\frac{d\lambda}{d\beta}) > 0, \tag{6.27}$$

$$\frac{da}{d\beta} = (\frac{\partial a}{\partial \lambda})(\frac{d\lambda}{d\beta}) > 0. \tag{6.28}$$

The intuition for this proposition is the following: When the capitalist spirit rises, people will cut consumption and charity donation in the short run and increase their investment. With more capital stock built up over time, more output will be produced; hence more consumption and charity donation.

The effect of the social-status weight attached to charity or the altruist sentiment can be shown as:

Proposition 6.2: A rise in the altruist sentiment reduces long-run capital accumulation and consumption. Its impact on charity donation is ambiguous in the long run.

From (6.20),

$$\frac{d\lambda}{d\alpha} = \frac{\lambda(1-\tau_y)f''(\bar{k})+\beta v''(\bar{k})(1-\tau_a)(\frac{\partial a}{\partial \alpha})}{\Delta_s} > 0, \tag{6.29}$$

$$\frac{dk}{d\alpha} = \frac{\beta v'(k)(1-\tau_a)(\frac{\partial a}{\partial \alpha})}{\Delta_s} < 0, \tag{6.30}$$

$$\frac{dc}{d\alpha} = (\frac{\partial c}{\partial \lambda})(\frac{d\lambda}{d\alpha}) > 0, \tag{6.31}$$

$$\frac{da}{d\alpha} = (\frac{\partial a}{\partial \lambda})(\frac{d\lambda}{d\alpha})+(\frac{\partial a}{\partial \alpha}). \tag{6.32}$$

The surprising thing is the contrast between proposition 6.1 and proposition 6.2. If the charity sentiment increases, in the short run, charity donation will rise and investment will be cut. But in the long run, as capital and output are reduced, consumption will also be lower and charity donation may be cut as well. This is why in (6.32) the net effect of α on charity donation is ambiguous because the second term on the right-hand side of (6.32) is always positive, while the first term is always negative.

The spirit of capitalism in the Weberian sense of accumulation for the sake of accumulation many not be so highly regarded in our moral judgement as the altruistic sentiment; but the lesson from the above analysis is quite clear: it is the money-making spirit that leads to more consumption and more charity contributions. Thus the implications from propositions 6.1 and 6.2 undoubtedly render support for what Benjamin Jowett has said about philanthropists and the political economists, cited by George Stigler (1989) as the argument why economists are good people even though they promote the self-interested money-making philosophy. (See the quotation in the beginning of this chapter.) Indeed, the money-making economic man seems to be cold-blooded compared to a philanthropist. But if a society becomes more philanthropic, and if a higher social esteem is accorded to charity donation, the society becomes poor as a whole and charity donation may eventually decline.

The idea embodied in these two propositions is an ancient one. Here I first cite a statement from a famous Chinese philosophy, Xun Kuang (c.313-238, B.C.): "Man will observe rituals and be benevolent when his barns and storehouses are well packed, and he will care about honor and disgrace when he has enough clothing and food." The famous Chinese historian, Sima Qian (145-87, B.C.) says: Benevolence and righteousness can lie only inside the duke's mansion. When one becomes rich, benevolence and righteousness follow. Or as Plato puts it in *Republic*: Have your clothes and food, then cultivate your virtue.

In practice, money-making has often been a means to finance charity. Without giving countless modern and contemporary examples, I cite an old story from Pirenne (1937, p. 49): "The Life of St. Guy (eleventh century) relates that he applied himself to business in order that he might have more money to bestow in alms."

Taxation and charitable giving have been examined in many studies; see Feldstein (1975), Feldstein and Clotfelter (1976), and Clotfelter (1980, 1985). Here the social-status model offers a different perspective to the relation between taxes and charity contributions. I first take up the income tax.

Proposition 6.3: An income tax reduces capital accumulation, consumption and charity donation.

This can be easily checked in (6.20) and I omit it here. The intuition is quite simple. A higher income tax reduces the incentive for capital accumulation. With less capital stock in the long run, the society has less output, less consumption and less charity donation.

Proposition 6.4: Tax deduction on charity has an ambiguous effect on capital accumulation and charity donation in the long run.

In the very short run, tax deduction provides an incentive for more charity donation and even more income to the representative agent. But this stimulating effect may be so big that investment is cut as a result of this incentive. More specifically, from (6.20),

$$\frac{d\lambda}{d\tau_a} = \frac{[\lambda(1-\tau_y)f''(\bar{k})+\beta v''(\bar{k})]\bar{a}[E(a,\tau_a)-1]}{\Delta_S}, \tag{6.33}$$

$$\frac{dk}{d\tau_a} = \frac{\beta v'(k)\bar{a}[E(a,\tau_a)-1]}{\Delta_S}, \tag{6.34}$$

$$\frac{dc}{d\tau_a} = (\frac{\partial c}{\partial \lambda})(\frac{d\lambda}{d\tau_a}), \tag{6.35}$$

$$\frac{da}{d\tau_a} = (\frac{\partial a}{\partial \lambda})(\frac{d\lambda}{d\tau_a})+(\frac{\partial a}{\partial \tau_a}). \tag{6.36}$$

Now if $[E(a,\tau_a)-1]<0$, or if $E(a,\tau_a)<1$ [recall that $E(a,\tau_a)$ is always positive from (6.12d)], $d\lambda/d\tau_a$ is negative and $dk/d\tau_a$ is positive. Then capital accumulation will increase as a result of a higher tax deduction on charity contributions. This is true because charity donation responds to tax deduction positively, but less proportionally to the incentive. Therefore some deducted tax income is allocated to charity and some is allocated to investment and capital formation. Since capital and output are increased, consumption will also rise, $dc/d\tau_a$. In this case, both the income effect (more output) and the substitution effect (less costly for charity donation as a result of tax deduction) lead to more charity contributions: $(\frac{da}{d\tau_a}) > 0$.

But if $[E(a,\tau_a)-1]>0$, or if $E(a,\tau_a)>1$, $d\lambda/d\tau_a$ is positive and $dk/d\tau_a$ is negative. Then capital accumulation will be reduced as a result of a higher tax-deduction rate on charity contributions; that is to say, the incentive is so large that people even sacrifice investment to contribute more to charity. In this case, long-run consumption will be reduced as well: $dc/d\tau_a<0$. For charity contributions in the long run, it may increase or decrease because the price effect raises charity donation while the income effect (a lower output and a lower capital stock) reduces it.

Proposition 6.5: A consumption tax has an ambiguous effects on capital accumulation and charity donation.

From (6.20),

$$\frac{d\lambda}{d\tau_c} = \frac{[\lambda(1-\tau_y)f''(\bar{k})+\beta v''(\bar{k})]\bar{c}[E(c,\tau_c)+1]}{\Delta_S}, \tag{6.37}$$

$$\frac{dk}{d\tau_c} = \frac{\beta v'(k)\bar{c}[E(c,\tau_c)+1}{\Delta_S}, \tag{6.38}$$

$$\frac{dc}{d\tau_c} = (\frac{\partial c}{\partial \lambda})(\frac{d\lambda}{d\tau_a})+\frac{\partial c}{\partial \tau_c}, \tag{6.39}$$

$$\frac{da}{d\tau_c} = (\frac{\partial a}{\partial \lambda})(\frac{d\lambda}{d\tau_c}). \tag{6.40}$$

Therefore, if $E(c,\tau_c)<-1$ [recall that $E(c,\tau_c)$ is always negative from (6.12b)], $d\lambda/d\tau_c$ will be negative and $dk/d\tau_c$ positive. In this case, a higher consumption tax results in more capital accumulation and more charity contribution. This is true because private consumption is reduced more proportionally than the tax increase and the extra income from the reduced consumption is allocated to charity and capital formation. Furthermore, as long-run capital and output increase in this case, the reduction in consumption as a result of a higher tax will be partially offset by the rise in income.

But if $E(c,\tau_c)>-1$, $d\lambda/d\tau_c$ will be positive and $dk/d\tau_c$ negative. In this case, a higher consumption reduces both capital accumulation and charity donation. The reason is just the opposite to what I have offered above.

VI.3 Effects of Government Funding on Private Charity and Investment

Many existing studies have modeled and empirically tested the effects of government funding on charitable contributions. For example, Roberts (1984) finds a dollar-for-dollar crowd-out, while others find partial government crowd-out (Abrams and Schmitz, 1978, 1985) or no crowd-out (Reece, 1979). More recently, Kingma (1989) presents a reexamination of both theoretical and empirical issues in this area. In this section, I extend the basic model in section VI.1 to include both private charity and government support and show the effects of government support on private charity and capital accumulation.

The utility functions used in many existing studies cited above have taken various forms. Kingma (1989) synthesizes them by defining a representative agent's utility function on consumption, own charity donation, others' charity donation, and government support. Here I follow Feldstein (1980) and Kingma and modify the representative agent's utility function in (6.1) as follows:

$$u(c)+\beta v(k)+\alpha w(a,g), \tag{6.41}$$

where g denotes government support. The function w(a,g) needs to be specified more carefully. In the existing studies, there exist two assumptions regarding the cross derivative $\partial^2 w/\partial a\partial g$:

$$\frac{\partial^2 w}{\partial a \partial g} > 0, \tag{6.42}$$

and

$$\frac{\partial^2 w}{\partial a \partial g} < 0. \tag{6.43}$$

The case that private charity and government support are perfect substitutes in the utility sense is just a special case of (6.43) because, in this case, $w(a,g) = w(a+g)$ *and* $\frac{\partial^2 w}{\partial a \partial g} = \frac{\partial^2 w}{\partial g^2} = \frac{\partial^2 w}{\partial a^2}$, which is negative by the concavity of the utility function. I call (6.42) the complementary case of private charity and government support and (6.43) the substitution case.

With the modification in (6.41), the optimal condition (6.8) is changed to be

$$\frac{\beta \partial w(a,g)}{\partial a} = \lambda(1-\tau_a). \tag{6.44}$$

Now from (6.7) and (6.44), I can solve consumption and charity donation as the functions of λ, τ, β, τ_a *and* g:

$$c = c(\lambda,\tau_c), \tag{6.10}$$

$$a = a(\lambda,\alpha,\tau_a,g). \tag{6.45}$$

Note that the consumption function remains the same, but the properties of the charity-donation function are different:

$$\frac{\partial a}{\partial \lambda} = \frac{[\frac{(1-\tau_a)}{\alpha \partial^2 w(a,g)}]}{\partial a^2} < 0, \tag{6.45a}$$

$$\frac{\partial a}{\partial \tau_a} = -\frac{\left[\frac{\lambda}{\alpha \partial^2 w(a,g)}\right]}{\partial a^2} > 0, \tag{6.45b}$$

$$\frac{\partial a}{\partial \alpha} = \frac{[\frac{\partial w(a,g)}{\partial a}]}{\left[\frac{\alpha(\partial^2 w(a,g)}{\partial a^2}\right]} > 0, \tag{6.45c}$$

$$\frac{\partial a}{\partial g} = -\frac{\left[\frac{\partial^2 w(a,g)}{\partial a \partial g}\right]}{\left[\frac{\alpha(\partial^2 w(a,g)}{\partial a^2}\right]}. \tag{6.45d}$$

(6.45d) does not have a definite sign because the numerator can be either negative or positive depending on the complementary case or substitution case between private charity and government support as specified in (6.42) and (6.43), respectively.

Substituting c and a in (6.10) and (6.45) with the properties of (6.12a), (6.12b), (6.45a)-(6.45d) yields:

$$\dot{\lambda} = \lambda\rho - \lambda(1-\tau_y)f'(k) - \beta v'(k), \tag{6.13}$$

$$\dot{k} = (1-\tau_y)f(k) - (1+\tau_c)c(\lambda,\tau_c) - (1-\tau_a)a(\lambda,\alpha,\tau_a,g). \tag{6.46}$$

The equilibrium conditions become:

$$\bar{\lambda}\rho - \bar{\lambda}(1-\tau_y)f'(\bar{k}) - \beta v'(\bar{k}) = 0 \tag{6.15}$$

$$(1-\tau_y)f(\bar{k}) - (1+\tau_c)\bar{c}(\bar{\lambda},\tau_c) - (1-\tau_a)\bar{a}(\bar{\lambda},\alpha,\tau_a,g) = 0. \tag{6.47}$$

Now the effects of government support on private charity and private capital accumulation can be derived from (6.15) and (6.47):

$$\frac{d\lambda}{dg} = \frac{(1-\tau_a)[f''(\bar{k}) + \beta v''(\bar{k})](\frac{\partial a}{\partial g})}{\Delta_S}, \tag{6.48}$$

$$\frac{dk}{dg} = \frac{(1-\tau_a)\beta v'(\bar{k})(\frac{\partial a}{\partial g})}{\Delta_S}. \tag{6.49}$$

From (6.48) and (6.49), for the complementary case of (6.42), $\partial a/\partial g$ is positive, dk/dg is negative, and $d\lambda/dg$ is positive. For the substitution case of (6.43), $\partial a/\partial g$ is negative, dk/dg is positive, and $d\lambda/dg$ is negative. Therefore,

Proposition 6.6: When private charity and government support are complementary in the utility function, a rise in government support reduces private capital accumulation and consumption, and it has an ambiguous effect on the long-run charity donation; when private charity and government support are substitutes, a rise in government support increases private capital accumulation and consumption, and it also has an ambiguous effect on private charity in the long run.

Equations (6.48) and (6.49) have already shown the effects of government funding on long-run capital accumulation for both cases. I only need to examine its effect on consumption and private charity. combining (6.12a) and (6.48). I obtain: $\frac{dc}{dg} = (\frac{\partial c}{\partial \lambda})(\frac{d\lambda}{dg})$, which is positive or negative depending on whether government support and private charity are substitutes or complementary.

To see the ambiguous effects of government support on private charity, I use equations (6.45a), (6.45d) and (6.48) to obtain:

$$\frac{da}{dg} = (\frac{\partial a}{\partial \lambda})(\frac{d\lambda}{dg}) + \frac{\partial a}{\partial g}. \tag{6.50}$$

In (6.50), if government support and private charity are substitutes, the second term on the right-hand side, $\partial a/\partial g$, is negative, but the first term is positive from (6.45a) and (6.48). Thus the net effect is ambiguous. Similar arguments apply to the complementary case. The reasoning for proposition 6 is quite clear. If government spending and private charity are substitutes, a rise in government support gives rise to a reduction in private charity contributions in the short run. Responding to this reduction, private investment and consumption will increase. In the long run, with more capital stock and output, consumption and even private charity contributions will be higher than before as a result of a higher private income, even though there exists a short-run reduction in the private charity contributions. Likewise, when government funding and private charity are complementary, a rise in government support will increase private charity in the short run. At the same time, private investment and consumption will be sacrificed. In the long run, with less capital stock and less output, private consumption will definitely be reduced, and private charity contributions may also be reduced as a result of a lower output.

This theoretical finding sheds light on why empirical tests have given us ambiguous results. Regardless of whether government support and private charity are substitutes or complementary, there always exist both crowd-in effect and crowd-out effect on private charity donation when government funding changes. In particular, the ambiguity appears to be more significant in the long run with the presence of capital accumulation, although the short-run effects are clear-cut for both cases. Since most empirical studies on this issue have not developed a dynamic framework with private investment (see Kingma, 1989, for a detailed review of the literature), a new empirical test involving the dynamics of charity contribution and wealth accumulation seems to be justified.

VI.4 Conclusion

In an extended growth model, I have examined the effects of the capitalist spirit and the altruist sentiment on long-run capital accumulation and private charity donation. It has been shown clearly that a higher capitalist spirit in the long run leads to more capital accumulation, more consumption and more charity contributions; when the altruistic sentiment rises in a society, it has an ambiguous effect on private charity contributions in the long run; in addition, this rising altruistic sentiment definitely reduces private wealth and consumption in the long run.

In this study, three more results are worth while to be emphasized. First, a tax deduction on charity contribution may lead to more or less charity donation and more or less capital accumulation depending on the elasticity of charity with respect to tax deduction. Second, government support may crowd in or crowd out private charity regardless of whether government funding and private contribution are substitutes or complementary, because government support also impacts on private capital accumulation and output production. Finally, if the capitalist spirit parameter is not incorporated into the model, then charity contributions, tax incentives for charity and government support will not affect the long-run capital accumulation. This is why the capitalist-spirit model provides an interesting framework to study the relationship between charity and wealth accumulation.