Francois Quesnay: A Reinterpretation 2. The Theory of Economic Growth

Author(s): W. A. Eltis

Source: *Oxford Economic Papers*, Nov., 1975, New Series, Vol. 27, No. 3 (Nov., 1975), pp. 327-351

Published by: Oxford University Press

Stable URL: https://www.jstor.org/stable/2662173

FRANÇOIS QUESNAY: A REINTERPRETATION
2. THE THEORY OF ECONOMIC GROWTH

By W. A. ELTIS

QUESNAY believed that population and output had been falling in France for a century. He thought that the population was 16 million in 1758, and that it had been 24 million a hundred years earlier, and about 19·5 million in 1701.[1] His detailed Tableau in Chapter 7 of *Philosophie rurale* was intended to show that France could support a population of 29·9 million, while the population in his final Tableau of 1766 was said to be 30 million.[2] These figures, and what growing and declining population and output meant in both human and national terms explain Quesnay's great concern with the causes of economic growth—and its opposite. He wished to explain the decline in France's output, population, and wealth that he believed had occurred, and to discover how this trend could be reversed. The invention of the *Tableau Économique*, the subject of a previous paper,[3] provided the tool with which both these objectives could be realized.

It will be evident that Quesnay had to use the Tableau to show two kinds of progression: to explain decline when the France of Louis XIV and Louis XV was under discussion, and to show growth when proposals to correct the weaknesses in the French economy were being put forward. The starting-point for the sequences of Tableaux which showed decline was a Tableau in equilibrium with a rate of return on annual agricultural advances of 100 per cent, and in one case of even 150 per cent. The economy then fell from this state of 'bliss' for one of several reasons. Quesnay used so favourable a starting-point because he believed that agricultural advances really had yielded rates like this in the past[4]—when Sully had applied the correct policies to agriculture and the finances of France which the Physiocrats were rediscovering. The downward progressions could then show realistically how Sully's successors had

---

[1] See *François Quesnay et la Physiocratie*, Institut National d'Études Démographiques, Paris, 1958, pp. 513–14. (This two-volume publication will be referred to subsequently as *Quesnay*.) Recent research suggests that the population may have fallen until 1720, but by much less than Quesnay believed. It is widely agreed that it increased slowly after this (with interruptions in years of famine) at an average rate of perhaps 0·2 or 0·3 per cent per annum, and reached about 22 million by 1760 and 27 million by the end of the century. It is believed that agricultural output increased at a similar rate. See J-C. Tutain, *La Population de la France de 1700 à 1959*, Cahiers de l'Institut de Science Économique Appliquée, Supplément no. 133, Janvier 1963; and J. Dupâquier, 'Sur la population Française au 17ᵉ et au 18ᵉ siècle', *Revue historique*, vol. xcii, Jan.–Mar 1968.

[2] See *Quesnay* (1756), p. 712, and (1766), p. 795.

[3] W. A. Eltis, 'François Quesnay: a Reinterpretation. 1. The Tableau Économique', *Oxford Economic Papers*, vol. 27 (2), July 1975, pp. 167–200.

[4] See *Quesnay* (1767), p. 978.

impoverished France, and Colbert was blamed in particular for the industrial and commercial bias of his policies. The upward progressions used the France of the 1750s and 1760s as their starting-point, and these assumed an initial rate of return on annual agricultural advances of about 30 per cent, which was rapidly raised as 'correct' policies were applied to the economy.

The equilibrium of the Tableau can be disturbed in a number of ways to produce growth or decline, and it can be assumed that the sequences of Tableaux that Quesnay actually published were intended to demonstrate the causes of decline and the methods of achieving growth that he considered most important. He certainly believed that the Tableau was a powerful tool of analysis and exposition, and it is reasonable to suppose that he used it to explain what mattered most. He published two sequences of Tableaux in 1766 and 1767 to illustrate the applicability of the final version to practical problems,[1] and it was suggested in the previous paper on Quesnay's *Tableau Économique* that he was probably responsible for the many sequences of Tableaux that demonstrate the causes of growth and decline in *Philosophie rurale*, the book he wrote in collaboration with Victor de Riqueti, Marquis de Mirabeau, in 1763.[2] He was certainly at least part author of these. The accounts of the Tableau in disequilibrium in Part VI of *L'Ami des hommes* which Quesnay and Mirabeau published in 1760 add further information about Quesnay's theory of economic growth.[3]

An examination of this evidence suggests that there are three causes of disequilibrium which Quesnay and Mirabeau considered particularly important. First, the proportion of incomes that is spent on the products of agriculture may be less or more than the one-half that produces stationary state equilibrium. Second, a change in methods of taxation may affect the rate of return that farmers actually receive on their advances with consequent decline or growth in these, and third, the rate of return may be raised in agriculture by increasing the price of food as a result of better marketing policies at home and overseas. Quesnay and Mirabeau used the Tableau to outline the dynamic effects of these three causes of disturbance, and they did this because they believed that the causes of French impoverishment were too much consumption of manufactures and services,

---

[1] These are '(Premier) Problème Économique', 1766 (*Quesnay*, pp. 859–77); and 'Second Problème Économique', 1767 (*Quesnay*, pp. 977–92). These are translated into English with the omission of one passage in R. L. Meek, *The Economics of Physiocracy*, Allen and Unwin, 1962, pp. 168–202. This book will be referred to subsequently as Meek.

[2] See Eltis (op. cit.), p. 190, n. 2. Sequences of Tableaux are to be found in *Philosophie rurale*, Amsterdam, 1764 (reprinted in 1972 by Scientia Verlag Aalen), vol. i, pp. 405–11, vol. ii, pp. 179–98, 298–325, and 354–75, and vol. iii, pp. 33–53.

[3] Tableaux in disequilibrium are to be found in *L'Ami des hommes*, Avignon, 1756–60 (reprinted in 1970 by Scientia Verlag Aalen), Part VI, pp. 192, 204, 214, and 254.

and they attributed particular importance to excessive *luxe de décoration*, and methods of taxation which caused agricultural advances to diminish. In their opinion, the best way to restore the situation was to substitute taxes which did not fall on the capital of farmers for those that did, and to adopt commercial policies which restored the profitability of agriculture.

The effect of these on the growth of the economy can be shown quite straightforwardly with the assistance of the Tableau, and they will be outlined in turn below. Quesnay and Mirabeau usually gave an account of growth or decline by publishing two Tableaux, one for the beginning and one for the end of a period where the equilibrium of the economy was disturbed. Each Tableau described an economy in stationary state equilibrium, and their method of analysis was therefore generally that of comparative statics. The one exception to this is the analysis of the effects of a propensity to consume the products of agriculture which differs from one-half, and it will be shown below that this must continue to produce growth or decline for so long as the discrepancy persists. The other causes of growth and decline can all produce once-for-all effects which can be analysed with the methods of comparative statics, but they can also produce indefinite growth or decline. Both possibilities will be outlined in the present account of Quesnay's argument.

Quesnay and Mirabeau used the final version of the Tableau, or the précis of the final version in their accounts of growth and decline in *Philosophie rurale* and the later articles, and these versions are obviously superior to the original Tableau for the analysis of dynamic processes because they can show rates of return which differ from 100 per cent, and because they are more flexible and less cumbersome. The original version of the Tableau should, however, be used for the first of the problems which will be considered, the effect on the rate of growth of a propensity to consume the products of agriculture of more or less than one-half, for the final Tableau will only give an accurate account of the expenditure flows that go to each sector where the propensity to consume is exactly one-half.

The effect of the propensity to consume agricultural products on the rate of growth[1]

This is best analysed by focusing attention on the financial receipts of the agricultural producers. These receive money from the landlords and the artisans of the sterile class via the Tableau's zigzags, and in addition to this they receive money from the industrial sector for the sale of raw materials for its advances. The agriculturists use the money they receive

---

[1] Accounts of the effect of this on growth are to be found in *Philosophie rurale*, vol. iii, pp. 33–53, and *L'Ami des hommes*, Part VI, pp. 192–202.

to buy manufactured goods for their own consumption and to pay rent. This relationship is set out in detail in Table I, where it is assumed that the rate of return on annual agricultural advances is 100 per cent, as in the original Tableau. In Table I, it is assumed that the Tableau is in equilibrium initially with a propensity to consume the products of agriculture, q, of one-half. Annual agricultural advances are 1,000 million livres in the initial year, and with a rate of return of 100 per cent rents are also 1,000 million livres. The agriculturists then receive 1,000 million livres in the

TABLE I

Declining production where the propensity to consume agricultural products (q) is less than 0·5

Annual agricul- tural advances A	Rents $R = A$	Farmers' receipts from circu- lation of revenue Z_a	Industry's receipts from circu- lation of revenue Z_i	Farmers' purchases from industry $(1-q).Z_a$	Industry's purchases for advances $\frac{1}{2}.Z_i$	Farmers' financial surplus $(+)$ or deficit $(-)$
						millions of livres
		Initial equilibrium relationships where $q = 0·5$				
1,000	1,000	1,000	1,000	500	500	0
		q becomes 0·4: successive years				
1,000	1,000	842	1,105	505	552·5	$-110·5$
945	945	796	1,044·5	477·5	522	$-104·5$
893	893	752	987	451	493·5	$- 98·5$
844	844	711	933	426·5	466·5	$- 93$
797·5	797·5	671·5	881·5	403	441	$- 88$

$$Z_a = R.\left(\frac{2q-q^2}{1-q+q^2}\right), \quad Z_i = R\left(\frac{1-q^2}{1-q+q^2}\right). \quad \text{See Eltis (op. cit.), Fig. 2, p. 183.}$$

course of the year from the circulation of the revenue, i.e. from the Tableau's zigzags as in all of Quesnay's accounts of the original Tableau, and 500 million livres from the sale of raw materials to the industrial sector (i.e. half of what this sector receives from the circulation of the revenue). The agriculturists use this 1,500 million livres for two purposes —to buy industrial products for their own consumption via the Tableau's zigzags which costs them 500 million livres, and to pay rent to the landlords which costs a further 1,000 million livres. Then the 1,500 million livres the agricultural class receives is just sufficient for its full financial needs when the Tableau is in equilibrium as it is in the top line of Table I where farmers have no financial surplus or deficit.[1]

[1] The expenditure flows of the original Tableau on which Table I is based are explained in general terms in Eltis (op. cit.), pp. 184–8, while the precise equations are set out on pp. 197–9.

Suppose now that q, the propensity to consume agricultural products, becomes 0·4 so that the propensity to consume manufactures is 0·6. The effects of this are oulined in the second line of Table I. Here the Tableau's zigzags bring 842 million livres instead of 1,000 million to the agricultural sector, and 1,105 million instead of 1,000 million to the industrial—all sums of money being quoted to the nearest half million livres. The agricultural class receives a further 552·5 million livres from the industrialists for sales of raw materials, i.e. half of the 1,105 million livres the industrial class receives which is what Quesnay says this class puts aside for its advances. However, the agricultural class spends six-tenths of the 842 million livres it receives from the zigzags or 505 million livres on manufactures for the consumption of its workers and entrepreneurs. When its full transactions are taken into account as in Table I, it receives $842+552\cdot5 = 1,394\cdot5$ million livres, and it spends 505 million livres on consumer goods and owes rents of 1,000 million livres so it requires 1,505 million livres. The agricultural class therefore has a financial deficit of 110·5 million livres which is shown in the final column of Table I. If it pays the 1,000 million livres agreed to the landlords, the farmers must sell 110·5 million livres of their advances for the next year to get enough money to pay their rents. In the sequence of Tableaux that deals with this case in *Philosophie rurale* Quesnay and Mirabeau actually assume that half the deficiency is met by the landlords who accept lower rents than those previously agreed.[1] Then half the farmers' deficit of 110·5 million livres is met by a fall in annual advances from 1,000 to 945 million livres, and half by a reduction in rents so these will also become 945 instead of 1,000 million livres in the following year. It will be noted that the assumption that Quesnay and Mirabeau make in this case is the only one which keeps annual agricultural advances and rents in line with each other, which is necessary if the basic relationships of the Tableau are to hold from year to year.

While annual agricultural advances and rents both fall from 1,000 million livres in the first year of a lower propensity to consume to 945 million livres in the second, Table I shows that the advances of the industrial sector increase from 500 million to 552·5 million livres. What has happened in general terms is that the circulation of demand has brought more money than before to the industrial sector, and less to the agricultural with the result that a higher proportion of the harvest has been allocated to the industrialists and a smaller proportion to the farmers themselves. This has produced the present situation where industrial advances are larger than usual, 552·5 instead of 500 million livres, and agricultural advances and rents are both 5·5 per cent lower. Looking further ahead, the 5·5 per cent fall in annual agricultural advances reduces

[1] *Philosophie rurale*, vol. iii, pp. 33–53.

agricultural output by 5·5 per cent in the following year, while the reduction in rents reduces demand for both food and manufactures by 5·5 per cent. The increase in the advances of the industrial sector will raise the following year's physical output of manufactures, but this has no effect on the Tableau's circular flows, and the amount of money the manufacturers receive for their increased production depends solely on the expenditure of rents and the subsequent zigzags, and these must bring 5·5 per cent less to the industrial class than in the previous year because rents are 5·5 per cent lower. In fact, an examination of Table I shows that each quantity is 5·5 per cent lower than in the previous year. Both sectors receive 5·5 per cent less from the circulation of the revenue, the industrial sector's purchases of raw materials (for advances) are reduced 5·5 per cent from 552·5 to 522 million livres, and the financial deficit of the farmers also falls 5·5 per cent from 110·5 to 104·5 million livres. However, the correction of this deficit requires a further 52 million livres reduction in both annual agricultural advances and rents in the third year, and this is again a fall of 5·5 per cent. Indeed it will be clear from Table I that with the present assumptions, all quantities in the Tableau must fall at an annual rate of 5·5 per cent after the first year because annual agricultural advances fall at this rate, and because of this the advances of the sterile sector which rose from 500 to 552·5 million livres in the first year fall back below 500 million livres after only two further years. Hence an increased propensity to buy manufactures increases the wealth of the industrialists for only two years, and after this, all classes become poorer at a rate of 5·5 per cent per annum because this is the rate at which annual agricultural advances are falling.

The converse situation where the propensity to consume agricultural products rises from 0·5 to 0·6 is outlined in Table II. Here with the same assumptions as in the previous case, annual agricultural advances increase at a rate of 4·2 per cent per annum, and all other quantities grow with them. In the first year of the higher propensity to consume their products, farmers receive 1,105 instead of 1,000 million livres from the Tableau's zigzags, and when their other transactions are taken into account, they have a financial surplus of 84 million livres. If Quesnay's and Mirabeau's assumption that this is divided equally with the landlords is followed, their annual advances will then increase 4·2 per cent from 1,000 to 1,042 million livres in the second year, and this initiates growth at this rate which will continue for so long as the propensity to consume agricultural products remains 0·6. The advances of the sterile class are initially reduced from 500 to 421 million livres by the lower propensity to consume its products, but growth at 4·2 per cent will restore these to 500 million livres after five years and raise them above this initial level from that point onwards.

The industrialists will therefore become better off than they were originally after the sixth year as a result of a fall in the propensity to consume their products.

It will be evident that a propensity to consume agricultural products of more than 0·5 must produce growth, and that there must be declining output followed soon afterwards by declining population where this propensity is less than 0·5. There is naturally a formula which relates g_a, the

TABLE II

Growth where the propensity to consume agricultural products (q) exceeds 0·5

Annual agricultural advances	Rents	Farmers' receipts from circulation of revenue	Industry's receipts from circulation of revenue	Farmers' purchases from industry	Industry's purchases for advances	Farmers' financial surplus (+) or deficit (−)
						millions of livres
		Initial equilibrium relationships where q = 0·5				
1,000	1,000	1,000	1,000	500	500	0
		q becomes 0·6: successive years				
1,000	1,000	1,105	842	442	421	+84
1,042	1,042	1,151·5	877·5	460·5	439	+88
1,086	1,086	1,200	914·5	480	457·5	+91·5
1,132	1,132	1,251	953	500·5	476·5	+95
1,179·5	1,179·5	1,303·5	993	521·5	496·5	+99
1,229	1,229	1,358·5	1,035	543·5	517·5	+103·5
1,281	1,281	1,416	1,078·5	566·5	539·5	+108

rate of growth of annual agricultural advances, to q, the proportion of income spent on agricultural products, and if x is written for $(q-0·5)$, i.e. x is the excess of the propensity to consume agricultural products over one-half:

$$g_a = \tfrac{1}{2}.x.\left(\frac{1-1\tfrac{1}{3}x-1\tfrac{1}{3}x^2}{1+1\tfrac{1}{3}x^2}\right) \tag{1}[1]$$

and where x is small so that terms in x^3, x^4, etc., can be disregarded:

$$g_a = \tfrac{1}{2}.x-\tfrac{2}{3}.x^2 \tag{2}$$

[1] If annual agricultural advances are initially A, so that rents (R) are also initially A, the financial surplus of the agricultural sector in Table I will be the $A\left(\dfrac{2q-q^2}{1-q+q^2}\right)$ it receives from the circulation of the revenue, *plus* half the receipts of the sterile sector, i.e. $\tfrac{1}{2}.A.\left(\dfrac{1-q^2}{1-q+q^2}\right)$ for sales of raw materials, *minus* $(1-q)$ times $A.\left(\dfrac{2q-q^2}{1-q+q^2}\right)$ for purchases of manufactures *minus* R (which equals A) for the payment of rent, and this comes to $A.\left(\dfrac{2q+q^2-2q^3-1}{2-2q+2q^2}\right)$. If half of this is added to the next period's advances, these grow from A at a rate of $\dfrac{2q+q^2-2q^3-1}{4-4q+4q^2}$. (1) is arrived at by substituting $0·5+x$ for q in this expression.

Thus the rate of growth varies with x, the excess of the propensity to consume agricultural products over one-half, provided that this excess is not very great, and quite small deviations from one-half produce very significant rates of growth or decline.[1] The maximum growth rate that the above formula (the completely accurate (1)) permits is 6·73 per cent per annum, which is reached where $x = 0.249$, i.e. where the propensity to consume the products of the agricultural sector is approximately three-quarters. There is virtually no limit to the rate of decline of output that the formula can produce, and a propensity to consume agricultural products of only one-quarter (i.e. an x of -0.25) will produce an annual reduction in agricultural advances and rents of 14·42 per cent if the land-lords bear half the losses. Even a very modest departure of the propensity to consume agricultural products from one-half will suffice to produce massive growth or decline in output in eighteenth-century terms, in one or two generations.

Quesnay did not actually believe that the rates of growth or decline that can be inferred from his Tableau would be achieved in the economies he wrote about, because of a number of further factors the Tableau does not take fully into account which will be discussed later in this paper. It is, however, best to start by confining the argument to the actual working of the Tableau, and this produces the formula for the rate of growth that is set out above.

There is no doubt that Quesnay fully recognized that the Tableau produced the result that there would be *continuing* decline in production where the propensity to consume the products of agriculture was less than one-half, and vice versa, and the following passage (among many) which is taken from the Maxims that were published with the 1759 or 3rd edition of the Tableau brings this out very clearly:

It can be seen from the distribution delineated in the *Tableau* that if the nation's expenditure went more to the sterile expenditure side than to the productive expenditure side, the revenue would fall proportionately, and that this fall would increase in the same progression from year to year successively. It follows that a high level of expenditure on luxury in the way of ornamentation and conspicuous consumption is ruinous. If on the other hand the nation's expenditure goes to the productive expenditure side the revenue will rise, and this rise will in the

---

[1] The rates of growth and decline that are arrived at in *Philosophie rurale* (vol. iii, pp. 33–53) as a result of a q of 0·6 and 0·4 are rather different from those produced by the above formula, but the précis Tableau is used there, in spite of the fact that this gives answers which differ from those of the original Tableau's zigzags where q does not equal one-half. I. Hishiyama ('The Tableau Économique of Quesnay—its analysis, construction and application', *Kyoto University Economic Review*, vol. xxx, Apr. 1960) arrives at a different result by simply assuming that the total at the foot of the advances column in the original Tableau will always be precisely the following year's advances, which fails to take the full financial transactions of the agricultural class into account.

same way increase successively from year to year. Thus it is not true that the type of expenditure is a matter of indifference. (1759)[1]

Those who are only familiar with modern theories of growth will find it remarkable that the rate of growth can be a function of *what* is consumed rather than the ratio of investment to consumption. Just how different Quesnay's argument is can be seen from the following passage from one of the early Encyclopedia articles:

[A nation which is reduced to subsisting on industrial activity] can only extend and sustain its trade, its industry and its shipping through saving; while those which have landed property increase their revenues through their consumption. (1758)[2]

This follows quite naturally if each livre spent on food produces an addition to rents, while no other form of expenditure has similar favourable 'external' effects. Quesnay was far from alone in believing that consumption of the 'correct' goods produced growth, for it was a central argument in the *Wealth of Nations* that the rate of growth depended partly on the ratio of 'productive' to 'unproductive' consumption. Ricardo followed Smith here, though they both had a borderline between the productive and unproductive sectors of the economy that differed substantially from Quesnay's, and their argument did not lead to specific calculations like those that follow from his very precise model.

Taxation and the rate of growth

The propensity to consume the products of agriculture is not, of course, the only factor that can produce growth or decline in Quesnay's argument, and according to the Physiocrats a major factor responsible for the supposed decline in France's population and wealth, in addition to excessive *luxe de décoration*, was the use of methods of taxation which fell on the capital of farmers, i.e. on agricultural advances. One of the two articles which Quesnay published to illustrate the application of the final version of his Tableau to practical problems was concerned with the effects of indirect taxation, and there are two sequences of Tableaux in *Philosophie rurale*, of which one is wholly Quesnay's, and two Tableaux in *L'Ami des hommes* which demonstrate these.[3] There is no doubt that Quesnay thought that taxation which fell on agricultural advances was immensely harmful to production in the actual conditions of eighteenth-century France, and that the Tableau could be used to illustrate this.

[1] *Quesnay's Tableau Économique*, edited by M. Kuczynski and R. L. Meek, Macmillan, 1972, 3rd edition, p. 12 (M). (M) after a page reference signifies that the translation is Professor Meek's.

[2] *Quesnay*, p. 499 (E). (E) after a page reference signifies that the responsibility for the translation is the present author's.

[3] See Quesnay's 'Second Problème Économique', of 1767; *Philosophie rurale*, vol. i, pp. 393–411, and vol. ii, pp. 298–325. (The first passage is from Chapter 7 which Quesnay drafted); and *L'Ami des hommes*, Part VI, pp. 204–11, and 254–70.

With Quesnay's model the taxation of the revenue of the landlords has a wholly neutral effect on the economy, because it has no effect at all on the Tableau. It is clearly a matter of complete indifference to the workers and entrepreneurs of agriculture and industry whether the revenue is spent by the landlords themselves, or the Church, or the King and his Ministers. Their sole interest is that it be spent. If the King needs 30 per cent of the revenue for the government of the country and for military purposes (and Quesnay generally assumed that the government should

TABLE III

How taxation of rents at 30 per cent affects growth

| Annual agricultural advances | Rents | Marketed farm output | Taxation of | | Tax revenue | Farmers' financial surplus (+) or deficit (−) |
			Farm output	Rents		
Initial year						millions of livres
1,000	1,000	2,000	0	300	300	0
Second year						
1,000	1,000	2,000	0	300	300	0

have two-sevenths of the revenue, the Church one-seventh, and the landlords themselves four-sevenths), the arrangement that suits agriculture best is that illustrated in Table III where the landlords pay 30 per cent of their revenues directly to the government which can then spend this instead of the landlords themselves. In Table III the Tableau in its final form is assumed with a rate of return on annual agricultural advances of 100 per cent. Then if annual agricultural advances are 1,000 million livres in the initial year, rents will also be 1,000 million livres, and agricultural output is worth 2,500 million livres, of which, in stationary state equilibrium, 1,000 million livres go to the farmers to allow them to maintain their advances, another 500 million livres go to them for their 'interest' costs, and the remaining 1,000 million livres go to the landlords. However, of the 2,500 million livres that agriculture produces, half the agricultural wages or advances of 1,000 million livres are obtained by farmers from their own crops, so this 500 million livres of agricultural output does not need to be sold, leaving 2,000 million livres to be marketed.[1] It will be evident from Table III that if rents are taxed at 30 per cent while sales of farm produce are untaxed, farmers' incomes will be unaltered, for it

---

[1] The expenditure flows of the final version of the Tableau on which Table III is based are explained in detail in Eltis (op. cit.), pp. 192–4.

is immaterial to them whether the revenue is spent by the landlords or the state. There is therefore no effect on the following year's annual agricultural advances (unless these are changing for some other reason) so the Tableau is in no way disturbed by the tax on rents, and constant output can be maintained from year to year as in Table III. It is obviously assumed that the government spends the same proportion of its income on agricultural products as the landlords.

TABLE IV

How the taxation of rents and marketed farm output at 10 per cent affects growth

Annual agricultural advances	Rents	Marketed farm output	Taxation of		Tax revenue	Farmers' financial surplus (+) or deficit (−)
			Farm output	Rents		
Initial year						millions of livres
1,000	1,000	2,000	200	100	300	−200
Second year						
900	900	1,800	180	90	270	−180
Third year						
810	810	1,620	162	81	243	−162

Suppose now that the landlords oppose a situation where they bear the entire costs of taxation, and that an alternative system is therefore adopted where an equal rate of tax is applied universally. The simplest case to take to obtain the essence of Quesnay's analysis is the one illustrated in Table IV where the rate of return on advances and the other initial conditions are the same as in Table III. The government seeks to obtain 300 million livres a year by taxing the landlords at 10 per cent which is expected to raise 100 million livres, and in addition by taxing all marketed agricultural output at 10 per cent which is expected to yield another 200 million livres. The landlords apparently have their taxes reduced from 300 million to 100 million livres, but as Quesnay says of them in his similar but more complex example of 1767:

> Poor calculators that they are, they do not have an inkling that by entering into this plausible arrangement they are providing the spade which will be used to dig their own graves. (1767)[1]

The difficulty becomes rapidly apparent. When 2,000 million livres of agricultural products are marketed (and the cash flows of the Tableau will

[1] *Quesnay*, p. 987 (M).

not allow the harvest to be sold for more than this—so the tax cannot be passed on), 200 million livres must be paid to the government so the farmers will receive 200 million livres less than in the previous year when the Tableau was in equilibrium. They therefore have a financial deficit of 200 million livres in Table IV. If they split this loss equally with the landlords as is assumed in Table IV, their advances for the next year will be reduced from 1,000 to 900 million livres, while rents will also be reduced from 1,000 to 900 million livres. With agricultural advances down 10 per cent to 900 million livres, the following year's taxable agricultural output will be 1,800 million instead of 2,000 million livres, and a 10 per cent tax on this will now yield only 180 million livres which, together with the 90 million livres the government now obtains from the landlords through the 10 per cent direct tax on rents, produces a total tax revenue of 270 million livres in place of the previous year's 300 million livres. Thus agricultural advances, rents and total tax revenues will all be 10 per cent lower than in the previous year. Moreover, Table IV shows that annual agricultural advances will continue to fall at an annual rate of 10 per cent for so long as sales of agricultural produce are taxed at 10 per cent and landlords expect farmers to bear half the cost of this, and rents and total tax revenue will both fall with agricultural advances. There will thus be a continuing decline of all incomes at an annual rate of 10 per cent, and this is half the rate at which annual agricultural advances are taxed, for the 10 per cent tax on sales of food is, in effect, a 20 per cent tax on agricultural advances. The economy's annual rate of decline is thus half the rate at which agricultural advances are taxed, and it is half this rate because of the assumption that landlords accept a reduction in rents each year equal to half the farmers' financial deficit.

The argument can be put in the following way, which incidentally makes it quite clear why the farmers cannot pass a tax on sales of food on to another class. In the conditions assumed, the state uses its full powers to obtain 10 per cent of that part of each harvest which is marketed, and the landlords then take what is, in effect, one-half of the remainder, whatever this may be, or 45 per cent. This leaves the farmers just 45 per cent of each marketed harvest in place of the 50 per cent that they need to maintain constant output where annual agricultural advances yield 100 per cent. (They would need two-thirds of each harvest to maintain constant output if agricultural advances yielded 50 per cent.) With Quesnay's assumptions, if the farmers receive 45 per cent of the marketed harvest in place of the 50 per cent that they need to maintain constant output, production will fall in proportion, i.e. at an annual rate of one-tenth. As agricultural output falls 10 per cent per annum, government revenue

(which is one-tenth of output) and rents (which are half the remainder) will fall at the same rate.

The decline in the National Product will continue until the landlords have sufficient appreciation of what is going on to accept a reduction in rents that corresponds to the full tax burden. When this happens, the landlords will agree to accept just 40 per cent of the harvest after the state has taken 10 per cent, and this will leave the farmers the 50 per cent of each marketed harvest that they need to maintain constant output. In Quesnay's view, the landlords are likely to appreciate this quite quickly, but the National Product, rents and government revenues will all fall during the year or years before they realize that the tax must not be allowed to fall on the farmers who work their land, and they will fall at a rate corresponding to half the effective rate of taxation that agricultural advances have to bear.

There are a number of points to note about this simplified account of Quesnay's argument. First there has been no reference to the industrial sector of the economy which is also taxed in Quesnay's examples. This can safely be omitted because the taxation of industrial output should have an approximately neutral effect on growth with Quesnay's assumptions. Industrial products are in no way *inputs* necessary for agriculture so their price has no effect on the proportion of agricultural output which can be reinvested by farmers, which is what determines the growth rate. Moreover, the government can be expected to spend any money it takes from industry so the aggregate demand for food will be unaffected. The essentials of Quesnay's argument can therefore be set out without reference to the 'sterile' sector of the economy, which obviously much simplifies the exposition.

A second point to note is that the above account greatly exaggerates the revenue the government will receive by assuming that it will actually obtain 10 per cent of the value of the food that is marketed. In his article of 1767 Quesnay estimated that the cost of collecting this kind of tax was generally about half the money paid to the tax collectors,[1] so the government might only receive about 100 million instead of 200 million livres in the first year from the tax on sales of food, the tax collectors, etc., receiving the other 100 million. This would not affect what is spent in the following year if the tax collectors spend what the government does not, but Quesnay in fact argues that they are likely to form monetary fortunes, and these are '... a clandestine form of wealth which knows neither king nor country'.[2] and their formation will certainly slow down the flows of the Tableau. The costs of collecting direct taxes on the rents of the landlords are always assumed to be very slight.

[1] *Quesnay*, p. 983.
[2] *Quesnay's Tableau Économique*, 3rd edition (1759), Maxims, p. 13 (M).

4520.3   A a

A third point to note is that the above account has understated the adverse effects of falling agricultural incomes on growth because it has been assumed throughout that annual agricultural advances yield 100 per cent. This is only possible with *la grande culture* which depends on the existence of rich farmers. As agricultural advances are taxed away, farms will increasingly revert to *la petite culture* which yields only about 30 per cent on annual advances,[1] and this will accelerate the decline in production, rents, and tax revenues.

Finally, as tax revenues fall as a result of the continuing decline in agricultural advances, the reversion to less capital intensive methods of farming, and the higher cost of collecting indirect taxation, the state will be under continuous pressure to raise rates of taxation, and this will especially be the case in times of war when revenue cannot easily be dispensed with. Clearly any increase in rates of taxation as government revenues fall will cause the fall in the National Product to accelerate.

It follows very strongly from the above argument that given Quesnay's assumptions, there is an overwhelming case for taking tax revenue from the 'net product' of agriculture rather than its produce, since this is where it must come from in any case in the end. Any departure from this rule will have highly adverse effects on growth. As Quesnay wrote in 1767:

> The nobility and the clergy have demanded limitless exemptions and immunities, which they have claimed are bound up with their property and their estate. Sovereigns have also thought it appropriate to grant complete exemptions to their officers, and to all those who are invested with posts or employments in all the different branches of government administration. As a result of this state of affairs the revenue of the Exchequer has been reduced to such a low level, and the proprietors have put forward so much opposition to its direct increase, that sovereigns have had recourse to indirect taxes of various kinds, which have extended further and further in the proportion that the nation's revenue has diminished as a result of the deterioration which is the inevitable consequence of these taxes themselves. The landed proprietors, who did not foresee these consequences, and who during the time that they were destroying their revenue did not understand, did not even perceive the cause of the reduction in their wealth, gave their approval to these indirect taxes, by means of which they believed they could evade taxation, which ought to have been laid directly and immediately on the revenue of their property, where it would have caused no decline in the annual reproduction and would not have required to be successively increased; whereas in fact, as a result of the progressive increase and disastrous effects of the indirect taxes, successive increases in both indirect and direct taxes alike become necessary in order to meet the state's needs. In addition, the landed proprietors have not only got out of the payment of the *two-sevenths* of the revenue which belongs to the sovereign, but have also brought upon themselves indirect taxes, causing a progressive and inevitable deterioration which destroys their own revenue, that of the sovereign, and the wealth of the nation. (1767)[2]

[1] See Eltis (op. cit.), pp. 170–3, for an account of Quesnay's propositions about the relative profitability of *la grande culture* and *la petite culture*, and the capital intensities needed with these alternative methods of farming.   [2] *Quesnay*, p. 982 (M).

Quesnay's final comment on what this meant in human terms looks forward to what was to happen twenty years later:

> The increase of beggars, which is a consequence of the indirect taxes which destroy wages or subsistence by obliterating part of the reproduction of the nation's annual wealth. This increase of beggars is a large added burden on the cultivators, because they dare not refuse to give alms, being too exposed to the dangers which the discontent of vindictive beggars may draw down upon them. (1767)[1]

It is obviously an exaggeration to suppose that any taxation of sales of food must lead to the day of the vindictive beggar. The argument has superimposed taxation of the advances of farmers on a Tableau which was otherwise in equilibrium, i.e. on a stationary state. Taxation of farm incomes need not produce actual falls in production if another factor, for instance, a propensity to consume food which exceeds one-half, is simultaneously producing growth in farm incomes. Quesnay's analysis of the factors which produce growth and decline always takes a Tableau in equilibrium as the starting-point, and this is disturbed for one reason only, so he invariably shows the effect on a stationary state of one kind of departure from equilibrium proportions. The total effect on growth will be the sum of *all* departures from equilibrium proportions, so the taxation of farmers' receipts will be perfectly compatible with growth if its adverse effects, and these are undoubtedly very strong with his assumptions, can be outweighed by favourable effects from other directions. In Quesnay's view, there was a most important possible favourable effect (in addition to a high propensity to consume the products of agriculture) which could produce growth, namely an increase in the profitability of agriculture, and the effect of this on growth will now be outlined.

The profitability of agriculture and the rate of growth

The most obvious way to increase the profitability of agriculture is to increase its technical efficiency, and this requires either the application of new knowledge, which played no part in Quesnay's argument, or an increase in the capital of farmers, which he discussed at great length. However, with his analysis, farm capital can be increased only if growth is in any case occurring, and up to now this has been producible only by a propensity to consume the products of agriculture which exceeds one-half. If the technical efficiency of agriculture cannot readily be increased until growth is actually proceeding, then the profitability of agriculture must be increased in some other way, and Quesnay suggested that this could be achieved by improving the conditions in which its products were marketed, which was the only policy lever for raising farm incomes that made practical sense to him.

[1] *Quesnay*, p. 992 (M).

The first of Quesnay's two articles which illustrate the application of the final version of the Tableau to practical problems was concerned with the favourable effects that a higher price of food and better marketing policies should have on agricultural advances and rents, and there is a similar sequence of Tableaux in *Philosophie rurale* which follows through in a most detailed way the effects over a nine-year period of the cumulative reinvestment of such extra advances as are obtained from an initial improvement in farmers' incomes.[1] In the mid-eighteenth century the free movement of food within France itself was only allowed intermittently, and sales abroad were generally only allowed in years of plenty. The object of these policies for which Colbert was blamed was to provide cheap food for the cities to help manufacturers. In his article of 1766 Quesnay argued that full internal and external free trade in the products of agriculture could be expected to increase the rate of return on annual agricultural advances from about 30 to about 50 per cent, for this should substantially *increase* the prices French farmers obtained for their products, turn the terms of trade in France's favour, and greatly reduce fluctuations in prices which affected farm incomes adversely. This was the easy way, because it only required 'correct' decisions at Versailles to set in motion a favourable sequence of Tableaux. Louis XV had in fact issued an edict permitting grain exports, subject to certain restrictions, in July 1764, largely as a result of the arguments and influence of the Physiocrats, and freer internal movements of food were also permitted for a time. Unfortunately, by 1767 the price of bread had risen 30 per cent and wages had not kept pace, whatever their long-run behaviour might have been, with the result that opposition to the edict became strong, especially in the cities, and it was suspended in 1770.[2] Turgot, however, managed to establish complete internal free movements of agricultural products in his brief tenure of the Finance Ministry from 1774 to 1776.

There is no need to go into the precise details of Quesnay's analysis of the effects of free trade in agricultural products because what is really important is the effect of an increase in farm incomes on growth. More favourable marketing conditions are just one way of bringing this about. Suppose that for some reason the rate of return on annual agricultural advances is raised from 30 to 50 per cent, and that as has been assumed hitherto in this paper, only half the increase in agricultural incomes goes to the landlords, while half is retained by the farmers. Then half the 20 per

---

[1] See Quesnay's '(Premier) Problème Économique' (*Quesnay*, pp. 859–77); and 'Progression de la réparation de l'agriculture par l'abolissement des causes de son dépérissement', *Philosophie rurale*, vol. ii, pp. 354–78.

[2] See Georges Weulersse, *Le Mouvement Physiocratique en France (de 1756 à 1770)*, Paris, 1910, vol. i, pp. 111–19, 154–5, 180–5, 199–212 and 223–6, and in addition Livre Quatre, 'La Realisation du programme Physiocratique'.

cent increase in the rate of return will go to the farmers with the result
that annual agricultural advances will increase 10 per cent, and this will
raise agricultural output 10 per cent in the following year and raise agri-
cultural advances again if farmers are allowed to retain half the fruits
of growth.

The argument corresponds to the one which showed that the taxation of
agricultural receipts at a rate of 10 per cent should reduce output by 10
per cent per annum. In the present case advances yield 50 per cent, so
farmers must reinvest 1,000 out of each 1,500 livres of agricultural sales
to maintain constant output. However, the landlords were content to take
300 out of each 1,300 livres when agricultural advances yielded 30 per
cent, and if they are content to take 400 out of 1,500 livres when the rate
of return rises to 50 per cent, then the farmers will be left with 1,100 out
of 1,500 livres which is 10 per cent more than the 1,000 out of 1,500 livres
that they need to maintain constant output. With Quesnay's assumptions
this will produce an initial 10 per cent rate of growth in agricultural
advances and therefore in rents, government revenues and industrial
production also, and growth will continue for so long as landlords are con-
tent to leave farmers with half the increase in the returns to agriculture.

Where Quesnay discusses the effects on growth of an increase in farm
incomes he does not actually make the mechanical assumption that half
the benefits go to the farmers, but he assumes instead that farmers have
fixed period leases, and obtain the whole benefit from an increase in the
rate of return during the remainder of their leases, after which this goes
in its entirety to the landlords.[1] In the passage cited from *Philosophie
rurale* of which Professor Meek says 'All the evidence, stylistic and other-
wise, points to Quesnay as its author',[2] the period of leases is assumed to
be nine years, and farmers reinvest all the extra income they receive until
their leases expire. The effect of an increase in the rate of return on annual
agricultural advances from 30 to 50 per cent in these conditions is outlined
in Table V. This Table is drawn up with the same assumptions as Tables
III and IV. However as the rate of return on advances is only 50 per cent
instead of 100 per cent, marketed farm output is advances *plus* 50 per cent
instead of advances *plus* 100 per cent. The farmers need to retain an
amount equivalent to their advances to maintain constant output, and
any excess they produce over this together with the previous level of rents
is their potential surplus.[3] Thus in year 1, the first year when a 50 per cent
rate of return is earned, their output is 1,500 million livres which exceeds
advances which are 1,000 million livres and rents of 300 million livres by

[1] See *Quesnay* (1766), pp. 870–1. [2] Meek, p. 38.

[3] It is assumed for simplicity that farmers' transactions with the industrial sector just
balance, to bring out the principal effects of the higher rate of return in agriculture as sharply
as possible.

200 million livres, and this is the farmers' financial surplus. With the assumption of nine-year leases, one-ninth of the farms are in the final year of their leases, and in these cases the rent agreed for the next nine years will be based on the new 50 per cent rate of return, so one-ninth of the 200 million livre financial surplus will be absorbed in higher rents. The other eight-ninths, 178 million livres, will be reinvested as in Table V, with the result that the second year's advances are raised by eight-ninths of the

TABLE V

Effect on growth of an increase in r the rate of return on annual agricultural advances from 30 per cent to 50 per cent in Year 1

Year	Advances A	Rents R	Marketed farm output $A(1+r)$	Farmers' financial surplus S	Unexpired leases h	Addition to	
						Advances $h.S$	Rents $(1-h).S$
							millions of livres
0	1,000	300	1,300	0	..	..	..
1	1,000	300	1,500	200	8/9	178	22
2	1,178	322	1,767	267	7/8	234	33
3	1,412	355	2,118	351	6/7	301	50
4	1,713	405	2,569	451	5/6	376	75
5	2,089	480	3,133	564	4/5	451	113
6	2,540	593	3,810	677	3/4	508	169
7	3,048	762	4,572	762	2/3	508	254
8	3,556	1,016	5,334	762	1/2	381	381
9	3,937	1,397	5,905	571	0	0	571
10	3,937	1,968	5,905	0	..	..	..

farmers' financial surplus of the first year. In the second year, a financial surplus will only be earned by the farmers whose leases have not yet come up for renewal, and one-eighth of these come up for renewal at the end of the year, so only seven-eighths of the surplus will be reinvested. Similarly, six-sevenths will be reinvested in the third year, five-sixths in the fourth year until finally, in the ninth year the last leases expire, and the entire remaining farm surpluses are absorbed into rents. After this, in the tenth year of a 50 per cent rate of return in agriculture, rents will be 50 per cent of advances, so there will no longer be a financial surplus for farmers. There will therefore be no further growth in farm incomes and output, but Table V shows that in the nine years where there is growth, annual agricultural advances increase incredibly at an annual rate of 16·4 per cent from 1,000 million livres to 3,937 million livres, while rents increase at an annual rate of 23 per cent from 300 million to 1,968 million livres. The alternative assumption of an equal division of gains between rents and advances produced indefinite growth at an initial rate of 10 per cent per

annum. Whichever assumption is used therefore produces growth that is quite capable of counteracting adverse effects from other causes, and thus achieving *la réparation de l'agriculture*. The actual growth rates produced by the argument are obviously implausibly high, as were the rates of decline that indirect taxation caused, but it is best to set out exactly what rates of growth and decline result from the direct application of the assumptions of the Tableau before the appropriate correction factors are applied.

A Quesnay growth formula

Combining what has been said about growth so far, g_a the rate of growth of annual agricultural advances will depend on three sets of factors. First, if the propensity to consume the products of agriculture exceeds one-half by x, annual agricultural advances will grow at a rate of approximately $\frac{1}{2}x - \frac{2}{3}.x^2$ (from (2)), if the dynamic assumption that all gains and losses in farm incomes are shared equally between farmers and landlords is made. Second, if annual agricultural advances are taxed at an effective rate of T_a, they will decline at a rate of $\frac{1}{2}.T_a$ if gains and losses are shared equally by farmers and landlords; it was argued above that a 10 per cent tax on sales of food, which was in effect a 20 per cent tax on agricultural advances, would produce a 10 per cent rate of decline in incomes and advances in these conditions. Finally, if the actual rate of return on annual agricultural advances is r and rents are based on a rate of return of r^*, then agricultural advances should grow at an annual rate of $\frac{1}{2}(r-r^*)$ if farmers are allowed to reinvest half the excess, as in the example that has been outlined, and growth from this source will continue until r^* becomes as high as the new and higher r. Combining the three effects:

$$g_a = \tfrac{1}{2}x - \tfrac{2}{3}x^2 + \tfrac{1}{2}.(r - r^* - T_a) \tag{3}$$

Quesnay believed that the French National Product had declined because x was negative, and because of T_a, while there was no compensation from an r in excess of r^*, i.e. a more favourable rate of return in agriculture than the one on which rents were based. He believed, however, that the situation could be rapidly restored because it was open to the government to make T_a zero, and to make r exceed r^* for nine years at any rate, which would produce considerable growth. It is now thought that there was, in fact, slow growth during much of his lifetime,[1] so there may have been favourable underlying factors that play no part in the formula, or x may have been positive and not negative. Growth was slow, however, there was great agricultural distress, and French governments went through a

See p. 327, n. 1.

series of financial crises which contributed to the events of 1789, so Quesnay's proposals were very much to the point.

The formula can very easily produce extraordinarily rapid rates of growth or decline, and Quesnay was fully aware of this, and a number of correction factors are applied in *Philosophie rurale* to produce more plausible rates of growth. These involve departures from the strict calculations of the Tableau in equilibrium, but this was not designed to deal with dynamic progressions in detail so some adjustment is appropriate. The principal adjustment, which is really all that is needed, is to bring the *original* advances of agriculture, i.e. its fixed capital, fully into the argument. It has been assumed so far that agricultural output is proportional to A, the *annual* advances or circulating capital of farmers, and that in addition to this, farmers earn enough to cover 'interest' which can be regarded as the replacement of such fixed capital as wears out. It has therefore been assumed, in effect, that agricultural output can be doubled in the short period by doubling employment and seed corn without also doubling expenditure on horses, ploughs, etc., which are part of the farmers' fixed capital. The assumption that 'interest' is earned allows these to be replaced at a higher rate, but it does not allow for actual investment in more horses and ploughs as output expands. It is clear that more fixed capital is needed as output expands, as this is central to Quesnay's argument about the productivity of *la grande culture*, and the financing of any long-term growth process must require that fixed capital be increased at the same rate as circulating capital. Quesnay does not introduce this complication in the relatively small progressions and regressions that are shown in most of his published sequences of Tableaux, but the growth in farm incomes in the nine-year period where farmers continually reinvest what they gain until their leases expire is so great that the calculation in *Philosophie rurale* concerned with this problem does allow for the need to expand fixed capital in line with circulating capital. It is assumed in this calculation that the fixed capital of farmers is four times their circulating capital, i.e. that it is four times *annual* advances, so total farm capital is five times *annual* advances.[1] Elsewhere in his writings, Quesnay sometimes assumes that fixed capital is five times annual advances so that total capital is six times annual advances.[2] With the assumption of *Philosophie rurale* that total farm capital is five times annual agricultural

[1] *Philosophie rurale*, vol. ii, Table opposite page 366 (translated in Meek, p. 145), which shows the 'PROGRESSION of the Cultivators' Profit' from 1761 to 1770 on the assumption that four-fifths of the 'increase in the net product' is added to 'original advances' and one-fifth to annual advances.

[2] See *Quesnay* (1766), p. 795. See Eltis (op. cit.), pp. 172–3, for a more detailed account of the relative requirements for *annual* advances and *original* advances in Quesnay's argument.

advances, only one-fifth of any increase in the incomes that farmers receive can go to increase annual agricultural advances, and the remaining four-fifths has to be invested in new fixed capital which must grow at an equal rate in the long run. Applying the same principle, any shortfall in farm incomes can be partly made good at the expense of fixed capital in the long run, and this means that in periods of decline, annual agricultural advances need fall by only one-fifth of any fall in farm incomes, and Quesnay points out that fixed capital is run down where advances decline.[1] The long-term rise or fall of rents will depend on the rate at which circulating capital or annual agricultural advances rise or fall, and all the other important trends in the economy depend on this, and once the need for fixed capital is fully allowed for it becomes evident that annual agricultural advances will not grow or decline as rapidly as has so far been supposed.

The actual formula for the rate of growth of annual agricultural advances can be adjusted very simply to the need to expand the fixed capital of farmers in line with their circulating capital. If the ratio of total capital to circulating capital is V, and this is five or six in Quesnay's work, all growth rates will simply be reduced by a factor of V. Thus in the calculation in *Philosophie rurale* where fixed capital is four times circulating capital, V is five, and the rate of growth of annual agricultural advances is one-fifth that so far supposed. More generally, with the need to invest in fixed capital allowed for, (3) will become:

$$g_a = \frac{1}{2V}\left(x - 1\tfrac{1}{3} . x^2\right) + \frac{1}{2V}\left(r - r^* - T_a\right) \tag{4}$$

In terms of modern growth theory, it would be said that (3), the earlier formula which neglected the need to expand fixed capital in line with annual advances, understated the capital–output ratio by a factor of V. (4) recognizes the existence of fixed capital, and that this raises the capital–output ratio V times, and a V-times increase in the capital–output ratio reduces the growth produced by given investment by a factor of V.

(4) recognizes the need to increase the fixed capital of farmers at the same rate as annual agricultural advances, but there has been no reference yet to the need to increase the money supply and landlords' own capital (*avances foncières*) at this rate. Quesnay assumes that countries will automatically obtain sufficient money for their needs through international trade (and it will not be farmers who pay for it) and there is no reference to the possibility that insufficient *avances foncières* might restrict progress. The growth of farmers' advances will therefore be the growth rate that matters.

Much more plausible growth rates are obtained with (4) than with the

---

[1] *Quesnay* (1767), p. 987.

earlier formula, which neglected the need to expand fixed capital. Thus if V is five, a propensity to consume the products of agriculture of 0·6 will produce a growth rate of about 0·8 per cent per annum instead of over 4 per cent, while a propensity of 0·4 will produce an annual rate of decline of only about 1·1 per cent. Similarly, the taxation of farm income at 20 per cent will produce an annual rate of decline of 2 per cent and not 10 per cent, while an increase in the rate of return on advances from 30 to 50 per cent will produce growth at just 2 per cent per annum. In the alternative calculation of the effect of the reinvestment of farm profits until all leases come up for renewal, the annual rate of growth in the nine-year period is 3·3 per cent, and not the incredible 16·4 per cent calculated previously. These slower and more plausible rates of growth and decline would be more than sufficient to account for any supposed decline or increase in population, incomes, and wealth in France in the seventeenth and eighteenth centuries. They would moreover, as Quesnay says, allow a Kingdom to reach '. . . a high degree of strength and prosperity in a short period of time',[1] where correct policies are pursued.

It is pointed out in *Philosophie rurale* that an 'essential condition' that must be fulfilled if the calculated growth is to be achieved is that it must be possible to increase population and farm animals in step with the progression, which will be realized only if this 'indispensable condition' can be met.[2] Hence it is recognized that the maximum achievable rate of population growth, etc., sets an ultimate constraint to growth, and this could even affect the slower rates of growth produced by the modified formula. This could be particularly important in North America, for Quesnay's account of the effects of the reinvestment of the extra profits of agriculture over a nine-year period concludes with a few words about what could be achieved in a new colony:

> Nevertheless, if the rapid advance of the simple arithmetical progression shown above is applied to vigorous colonies with a large territory, which can be cultivated with the labour of animals, assisted by large advances supplied by a wealthy metropolis, it can be seen that such colonies may be able to make very great progress in a short time. 1. Because new land when it has been cleared yields a large product. 2. Because in such places little or no taxes are paid. 3. Because the cultivators are themselves proprietors, so that all the profits from cultivation are all the time continually used to increase the wealth employed in cultivation . . . (1763)[3]

With no taxation of the products of agriculture, and no diversion of growing farm incomes to landlords, r^* and T_a will be zero, and the basic growth formula will become:

$$g_a = \frac{1}{V} \cdot (x - 1\tfrac{1}{3} \cdot x^2) + \frac{r}{V} \qquad\qquad (5)^4$$

[1] *Quesnay* (1757), p. 504 (E).
[2] *Philosophie rurale*, vol. ii, p. 368.   [3] Ibid., p. 369 (M).
[4] Translating this formula into the concepts of modern economics, r/V is the rate of return

which will evidently produce more rapid growth than the earlier formula appropriate to the institutions of eighteenth-century France. Quesnay estimated that these, together with the other factors that held back the growth of agriculture in France reduced the growth that could follow from a given increase in the profitability of agriculture by nine-tenths.[1] Clearly in North American conditions, the maximum rate at which population and farm animals can be expanded is likely to act as the effective constraint on growth, for the rate of capital accumulation produced by the above formula is likely to exceed any physically sustainable rate of growth.

This insight into what is achievable with the institutions of a new economy concludes the present account of Quesnay's theory of economic growth. It is an interesting, powerful, and highly original theory, and it focuses attention on causes of growth and decline which are arguably of real importance. Moreover, no economist since has set out a growth model with plausible assumptions (once these are understood) where agriculture plays such a crucial role.

Quesnay and his successors

Quesnay's successors developed concepts which would have allowed him to express his argument more clearly. In particular, the adoption of Smith's division of the categories of income into wages the return to labour, profits the return to capital, and rent the return to land, would have allowed Quesnay to say what he had to say much more comprehensibly. In his theory wages and the normal profits of both farmers and artisans are always expressed as a single total. They are already separated by Turgot in his *Réflexions sur la formation et la distribution des richesses* of 1770, but Turgot followed Quesnay in supposing that the normal profits of industry are a cost and not a taxable surplus.[2] It is perfectly plausible that this was largely the case in France in 1770—though industrial profits certainly began to provide a surplus, i.e. a *net product*, in some countries in the course of the nineteenth century, and they may well have provided one in England in the late eighteenth century. Quesnay's theories would have been taken more seriously if it had been appreciated that he was simply assuming that industry provided no taxable surplus, and not that

on *total* farm capital, so the rate of growth of agricultural capital is assumed to equal the rate of profit that results from agricultural investment, plus a further term in x which depends on whether demand trends favour agriculture relative to other sectors. Leaving aside the term that depends on x, the formula simply states that the rate of growth equals the rate of profit, which is what modern theory would say if all profits are reinvested once the subsistence needs of farmers have been met as Quesnay assumes, and provided that the constraint which Quesnay explicitly recognizes does not limit growth to some lower rate.

[1] *Philosophie rurale*, vol. ii, p. 370.

[2] See sections XCIX and XCVI in R. L. Meek's translation of the 1788 edition (*Turgot on Progress, Sociology and Economics*, translated and edited by Ronald L. Meek, Cambridge University Press, 1973, pp. 180 and 178).

it made no economic contribution to production which is another meaning of the word 'sterile'. It would also have been helpful if Quesnay had been able to answer the criticisms of his theory which followed from Ricardo's theory of rent. According to this, no rent accrues at the margin of cultivation, and given sufficient competition, an addition to agricultural and industrial investment must then produce the same total return, for agricultural capital will produce no return in addition to the normal profits that farmers receive.[1] Quesnay's response to this might well have been that agricultural output is principally a return to capital, and landlords must in all practical cases be able to obtain part of the return on this *once leases expire.* Then marginal industrial investments will yield wages and entrepreneurial returns, while marginal agricultural investments will yield wages, entrepreneurial returns, and an addition to rents on the expiry of leases, so agricultural investment must generally yield more. He would only have conceded the relevance of Ricardo's theory to a country where there was no need for farmers to invest at the margin of cultivation in any way that improved their farms in the course of their leases. These were not the conditions of eighteenth-century France where agricultural expansion meant taking the capital-intensive methods of *la grande culture* to land which was not being efficiently farmed. Thus Ricardo's assumptions are appropriate to a country where all the land that can be farmed by efficient capital-intensive methods is already being so farmed, while Quesnay assumes a country where there is still scope for the extension of these methods. This is often a more appropriate assumption than that of a fully stocked agriculture, and a particular case can be made for Quesnay's assumptions along these lines.

It is therefore arguable that Quesnay's theory of economic growth deserves serious attention. It is obviously of considerable historical interest for the light it throws on the underlying causes of the French Revolution, and for its undoubted influence on Smith (who met Quesnay in 1766, and would have 'inscribed' *The Wealth of Nations* to him if he had not died two years before its publication[2]), and through him, on Malthus, Ricardo, and their successors. Quesnay's influence on Marx is also important, for only Quesnay before him formulated a precise scheme of reproduction where attention was focused above all on the production of a surplus and its expenditure. That is not, however, all that can be learnt from his theory of economic growth. Quesnay analysed the problems involved in achieving growth in an economy where land was not

---

[1] David Ricardo, *Principles of Political Economy and Taxation, Works and Correspondence*, edited P. Sraffa, Cambridge, 1951, vol. i, chapters 2 and 24.

[2] Dugald Stewart, 'Account of the life and writings of Adam Smith, LLD', *The Works of Adam Smith*, London, 1812, vol. v, p. 470.

scarce in the sense that there was much land in use that was producing
negligible rates of return because of the low capital intensity of the methods
of production in use. These are precisely the conditions today in many
developing countries, which have mostly adopted policies similar to Col-
bert's of favouring industries that can hardly produce a surplus at the
expense of agriculture which can. The failures of these policies in the
twentieth century would have surprised Quesnay no more than their failure
in his own time.

Exeter College, Oxford