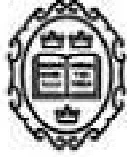

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Cambridge Journal of Economics 1998, **22**, 79–89

Adam Smith's theory of tax incidence: an interpretation of his natural-price system

Takuo Dome*

Ricardo criticised Smith's statement that taxes levied on raw produce, necessities, wages, and profits would fall on rent. Ricardo thought that these taxes would fall on profits. This paper examines Smith's theory of tax incidence in a Ricardo–Sraffa system of price determination. Consequently, the difference between Smith and Ricardo is attributed to two facts: (1) that Smith's system contains rent as an endogenous variable, giving the rate of profits exogenously; and (2), that Ricardo's system does not contain rent, making the rate of profits endogenous.

1. Introduction

In Chapter II of Book V of the *Wealth of Nations* (1776, hereafter WN), Adam Smith discussed the subject of taxation extensively. Ricardo, in writing the *Principles of Political Economy and Taxation* (1817, hereafter *Principles*), followed Smith's chapter on taxation in the order in which several types of taxes were examined. However, Ricardo thought that Smith's theory of tax incidence was based on a misleading theory of rent. He said the following in the introduction to the *Principles*:

In 1815, Mr. Malthus, in his 'Inquiry into the Nature and Progress of Rent', and a Fellow of University College, Oxford, in his 'Essay on the Application of Capital to Land', presented to the world, nearly at the same moment, the true doctrine of rent; without a knowledge of which, it is impossible to understand the effect of the progress of wealth on profits and wages, *or to trace satisfactorily the influence of taxation on different classes of the community; particularly when the commodities taxed are the productions immediately derived from the surface of the earth.* Adam Smith, and other able writers to whom I have alluded, not having viewed correctly the principles of rent, have, it appears to me, overlooked many important truths, which can only be discovered after the subject of rent is thoroughly understood. (*Principles*, pp. 5–6; emphasis added)[1]

Ricardo's main objection to Smith's conclusion regarding the incidence of taxation was that Smith considered taxes levied on raw produce, necessities, wages, and profits as falling entirely or partly on rent. Ricardo thought that these taxes would fall on profits. How does this difference come about? Is it because, as Ricardo thought (*Principles*, p. 225), Smith did not have a theory of differential rent?

Smith's theory of tax incidence has been referred to by several scholars. Compared with Ricardo's, it was often regarded as 'superficial' (James Mill, 1816, Sraffa, 1951–55, Vol.

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[1] Page numbers concerning the *Principles* always refer to the Sraffa edition (1951).

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7, p. 106), 'incomplete' (Peacock, 1975, p. 565), based on 'undependable economic reasoning' (Shoup, 1960, p. 14), demonstrating 'the somewhat disorderly flow of ideas and examples' (Lynn, [1976], 1984, p. 442), and reflecting 'inconsistencies inherent in various parts of Smith's distribution theory' (Musgrave, 1976, p. 309). These references, however, were not made as a result of examining Smith's statements on tax incidence in a theoretically consistent framework.

The purpose of this paper is to give a consistent model which meets Smith's statements on tax incidence in his *Wealth of Nations*.[1] The model is based on the interpretation that, in Chapter II of Book V of the *Wealth of Nations*, Smith discussed the effects of various taxes on the system of natural order—namely, the natural-price system. Such an interpretation has never been examined on the basis of a formal price theory.

For this purpose, I use, with some modifications, the Sraffian three-sector model which I made to demonstrate Ricardo's theory of tax incidence (Dome, 1992). The difference between Smith and Ricardo concerning the conclusion of tax incidence will be clearly shown by the contrast in assumptions with respect to the natural-price system: Smith's system of price determination contains rent as an endogenous variable, giving the rate of profits and the wage basket exogenously. Ricardo's system does not contain rent in the price equations, making the rate of profits an endogenous variable. This paper concludes that, by examining Smith's theory of tax incidence, we can position Smith in the Ricardo–Marx–Sraffa line.[2]

2. Assumptions and the model

In order to demonstrate Ricardo's theory of tax incidence, I devised the following system of price determination (Dome, 1992):

$$1 = (1 + t_1)\{1 + (1 + t_p)\, r\}\{a_{11} + a_{21}\, p_2 + (1 + t_w)\,(b_1 + b_2\, p_2)\, l_1\}, \tag{1}$$

$$p_2 = (1 + t_2)\{1 + (1 + t_p)\, r\}\{a_{12} + a_{22}\, p_2 + (1 + t_w)\,(b_1 + b_2\, p_2)\, l_2\}, \tag{2}$$

$$p_3 = (1 + t_3)\{1 + (1 + t_p)\, r\}\{a_{13} + a_{23}\, p_2 + (1 + t_w)\,(b_1 + b_2\, p_2)\, l_3\}. \tag{3}$$

Equations (1), (2) and (3) demonstrate cost-price equations with respect to the sectors of raw produce, necessities, and luxuries, respectively. The production of raw produce uses land, but land is not used in the production of necessities and luxuries. Rent is paid to landlords, but, on the basis of the theory of differential rent, it does not appear in equation (1). Subscripts 1, 2, and 3 refer to raw produce, necessities, and luxuries, respectively. The price of raw produce is chosen as the *numéraire*: p_2 and p_3 show the natural prices of necessities and luxuries, respectively, in terms of raw produce. The input coefficient of commodity i ($i = 1, 2, 3$) and that of labour into sector j ($j = 1, 2, 3$) are denoted by a_{ij} and l_j, respectively. The natural rate of profits and the natural wages per unit of labour are shown by r and $b_1 + b_2 p_2$, respectively: b_1 and b_2 show what is called the 'wage basket'—the quantities of raw produce and necessities consumed by a unit of labour. The rates of

[1] For Smith's statements concerning the subject of taxation in his *Lectures on Jurisprudence* (1762–63 and 1766), see pp. 529–35 in Meek, R. L., Raphael, D. D. and Stein, P.G. (eds), 1978, *The Glasgow Edition of the Works and Correspondence of Adam Smith*, vol. 4: this shows that he did not develop the theory of tax incidence in the lectures. In the *Theory of Moral Sentiments* (1759), Smith did not directly refer to the issue of taxation.

[2] This interpretation follows Christensen (1979), who demonstrates that 'Smith's "natural prices" are production prices in the Sraffian sense' (p. 107).

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tax levied on raw produce, necessities, and luxuries are shown by t_1, t_2, and t_3, respectively; t_p and t_w denote tax rates imposed on profits and on wages, respectively. Equations (1), (2) and (3) determine three unknowns—r, p_2, and p_3—when b_i $(i = 1, 2)$, a_{ij} l_j, t_j $(i = 1, 2, 3, j = 1, 2, 3)$, t_p, and t_w are exogenously given.[1]

Let us now construct the Smithian natural-price system on the basis of the above Ricardo–Sraffa system. Smith defined the natural price of a commodity as composed of the natural rates of wages, profits and rent (WN, p. 72).[2] The natural rate of wages is regulated by two factors: the demand for labour, and the natural price of subsistence of labour (WN, p. 864). The subsistence of labour—the wage basket in our terms—depends on the dynamic demand for labour. Smith said that the 'demand for labour, according as it happens to be either increasing, stationary, or declining; or to require an increasing, stationary, or declining population, regulates the subsistence of the labourer, and determines in what degree it shall be, either liberal, moderate, or scanty' (WN, p. 864). This means that, by assuming that the growth rate of the demand for labour is constant, we can fix the wage basket; consequently, wages per unit of labour depend only on the price of necessities.[3] Thus, on the basis of the constant growth rate of demand for labour, we can apply the fixed-wage-basket assumption to the Smithian system.

Regarding the natural rate of profit, Smith thought that it was 'every where regulated by the quantity of stock to be employed in proportion to the quantity of the employment, or of the business which must be done by it' (WN, p. 848). This suggests that, if the proportion between the aggregate quantity of capital and the aggregate demand for capital is not affected by the prices of individual commodities, the natural rate of profits is treated as constant in the price system. Thus, in contrast to the Ricardian system, the natural rate of profits in the Smithian system can be given from the outside of the system. Because the rate of profits and the wage basket are independently determined, the system does not demonstrate a reciprocal relationship between the real wage rate and the rate of profits.[4] However, as will be shown later, only this treatment of profits can justify Smith's conclusion that taxes on raw produce, necessities, wages, and profits will *not* fall on profits.

That both the wage basket and the rate of profits are exogenously given may make the system of equations over-determinate. This problem can be avoided if natural rent enters into the price components, and if it is determined endogenously in the system. These assumptions do not conflict with Smith's definition of natural rent: the surplus part in the natural price of raw produce; in other words, the residual of the price after profits and wages at their natural rates are subtracted. He wrote as follows:

RENT, considered as the price paid for the use of land, is naturally the highest which the tenant can afford to pay in the actual circumstances of the land. In adjusting the terms of the lease, the landlord

[1] The equations in my 1992 paper are different from equations (1), (2), and (3) in the following respects: subscripts 1, 2, and 3 referred to necessities, raw produce, and luxuries, respectively; the price of necessities—not the price of raw produce—was chosen as the *numéraire*; the tax rate on profits was shown as a percentage of profits including taxes. I am indebted to Erreygers (1995) for the modification with respect to the tax rate on profits in the present paper.

[2] Page numbers concerning the *Wealth of Nations* refer throughout to the Glasgow Edition (1976).

[3] Rosenbluth (1969, pp. 313–14) shows a Smithian model of wage determination in the long run: wages depend on the growth of demand for labour and the Malthusian population mechanism.

[4] Kurz (1980–81, p. 271) interprets Smith's theory of profit as based on the surplus approach as in Sraffa's, showing that Smith's natural rate of profits is determined endogenously in the natural-price system. This interpretation, however, cannot solve the under-determination problem when we consider rent as an endogenous variable.

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endeavours to leave him no greater share of the produce than what is sufficient to keep up the stock from which he furnishes the seed, pays the labour, and purchases and maintains the cattle and other instruments of husbandry, together with the ordinary profits of farming stock in the neighbourhood... This portion, however, may still be considered as the natural rent of land, or the rent for which it is naturally meant that land should for the most part be let. (WN, p. 160)

That rent is determined in the natural-price system under a given rate of profits and the fixed wage-basket makes the system of equations determinate. This can also explain Smith's following conclusion with respect to the roles of profits, wages and rent in the determination of natural prices:

Rent, it is to be observed, therefore, enters into the composition of the price of commodities in a different way from wages and profit. High or low wages and profit, are the causes of high or low price; high or low rent is the effect of it. (WN, p. 162)[1]

By adopting the above treatment of wages, the rate of profits, and rent, and by considering that, compared with Ricardo, Smith did not refer to the input–output relationship between commodities, we can obtain the following Smithian natural-price system as a modified Ricardian system:[2]

$$1 = (1 + t_1)[\{1 + (1 + t_p)\, r\}(1 + t_w)(b_1 + b_2 p_2)\, l_1 + (1 + t_R)\, R], \qquad (1')$$

$$p_2 = (1 + t_2)\{1 + (1 + t_p)\, r\}(1 + t_w)(b_1 + b_2 p_2)\, l_2\,, \qquad (2')$$

$$p_3 = (1 + t_3)\{1 + (1 + t_p)\, r\}(1 + t_w)(b_1 + b_2 p_2)\, l_3\,. \qquad (3')$$

Equations (1′), (2′) and (3′) show cost-price equations with reference to the sectors of raw produce, necessities, and luxuries, respectively. The notation in equations (1′) − (3′) follows that in equations (1) − (3), but two new symbols are added: R denotes the natural rate of rent per unit of raw produce; and t_R shows the tax rate levied in proportion to rent. The formal difference between equations (1′) − (3′) and equations (1) − (3) is that equations (1′) − (3′) do not have the input coefficients of commodities (a_{ij}) which appeared in equations (1) − (3);[3] additionally, equation (1′) contains rent (R) while rent does not appear in equation (1). Equations (1′), (2′) and (3′) determine three unknowns—R, p_2, and p_3—when r, b_i ($i = 1, 2$), l_j, t_j ($j = 1, 2, 3$), t_p, t_w and t_R are exogenously given.

It must be stressed that, in our Smithian model, the natural rate of profits (r) as well as

[1] Fine (1983) demonstrates that Smith's notion of rent is a Physiocratic one—absolute rent—rather than Ricardo's differential rent. Fine thinks that, because of landownership, 'capitalists must pay a rent to use land and this is the source of Smith's rent as a determining component part of price' (p. 138). I agree with Fine in regarding Smith's concept of rent as absolute rent. However, absolute rent does not always have to be price-determining; it can be price-determined. Although it seems controversial whether rent in Smith is price-determining or price-determined, this paper, on the basis of this quotation, assumes rent as a price-determined component.

[2] Christensen (1979, p. 103) shows the Smithian natural-price system (including rent) in a Sraffian framework. However, because Christensen does not assume the rate of profits and wages as exogenous variables, he regards the system as under-determinate. See also Dome (1994, pp. 13–14).

[3] This demonstrates that Smith did not consider the relationship of the 'production of commodities by means of commodities' in discussing the incidence of taxation. In this case, it is assumed that every commodity is produced without using raw material and manufactured instruments: raw produce is produced only by land and labour; necessities and luxuries are produced by labour alone. That Smith's system of equations lacks the input coefficients of commodities does not influence the substance of the following discussion.

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the wage basket (b_1 and b_2) is given whereas the natural rent per unit of raw produce (R) is endogenously determined. The price of necessities (p_2) is determined exclusively in equation (2′), given the values of the rate of profits and the wage basket. Equations (1′) and (3′) determine rent (R) and the price of luxuries (p_3), respectively, r, p_2 and $b_1 + b_2 p_2$ being known. Thus, although rent appears as a component in the price equation of raw produce, it does not contribute to the determination of prices: it is determined passively by the price of necessities, the wage basket, and the given rate of profits.[1] The determination of rent is the most important characteristic in our Smithian model: this will be a key for us to understand the subsequent discussion with respect to Smith's theory of tax incidence.

In the following sections, by using the method of comparative statics, I shall examine how a change in tax rates—t_1, t_2, t_3, t_w, t_p, and t_R—influences endogenous variables—R, p_1, and p_2—in equations (1′) – (3′).[2] I shall demonstrate that the results obtained in our Smithian model coincide completely with Smith's conclusion with respect to the incidence of taxes.

3. Taxes on commodity flows

3.1. Tax on raw produce

Smith said that taxes levied on raw produce 'are in reality taxes upon the rent; and though they may be originally advanced by the farmer, are finally paid by the landlord' (WN, pp. 836–7). He did not state that a tax on raw produce would be shifted to the price of raw produce. Our model shows the following result with respect to a change in the tax rate on raw produce:

$$\mathrm{d}R/\mathrm{d}t_1 < 0, \tag{4}$$

$$\mathrm{d}p_2/\mathrm{d}t_1 = 0, \tag{5}$$

$$\mathrm{d}p_3/\mathrm{d}t_1 = 0. \tag{6}$$

Thus, an increase in the tax rate on raw produce decreases rent, leaving the prices of necessities and luxuries unaltered: this result coincides with Smith's conclusion. We can easily demonstrate that rent decreases in direct proportion to the increase in the tax on

[1] According to Gee (1981), there has been a neoclassical interpretation of Smith's theory of rent that is fundamentally confused, but which is an early preparation for Ricardo's theory of differential rent—for example, see Buchanan (1927), Douglas (1928), Blaug (1964), Hollander (1973), and Samuelson (1977). Gee demonstrates a different model in which Smithian rent is determined: $R = D/(bL)$ where R, D, b, and L denote the rent share, demand for luxuries, labour productivity for luxuries, and the total number of labourers, respectively; in this equation, D determines R. Gee concluded that, in Smith's system, the rent share is determined exclusively by landlords' demand for luxuries. However, this interpretation of rent does not fit for Smith's discussion of tax incidence: for he did not think that a change in landlords' demand for luxuries caused by various taxes—for example by a tax on luxuries—would influence the rent share. Differing from the neoclassical approach, and Gee's macro-expenditure approach, this paper proposes the third way—a Sraffian approach—to the determination of rent.

[2] In order to concentrate the analysis on the effects on prices and rent, I shall not consider that a change in tax rates may change the quantity of production of each commodity. It must be noted, however, that Smith admitted the following possibilities: that a tax on luxuries would discourage their production (WN, p. 897); that a tax levied on owners of land and capital would retard improvement of the land and remove capital to foreign countries (pp. 927–8); and that a tax on wages would reduce the demand for labour (p. 865). These imply that taxation may change the production level of an individual commodity as well as the aggregate level of production in the long run.

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raw produce.[1] These consequences are attributed to the fact that p_2 is determined exclusively in equation (2′): hence p_2 is not affected by any change in equation (1′). Because p_2 does not change, p_3 in equation (3′) is unaltered.

Ricardo criticised Smith's conclusion regarding a tax on raw produce. Ricardo thought that such a tax would raise the price of raw produce, increase wages, and reduce profits (*Principles*, p. 184). Thus the final payers of the tax on raw produce are capitalists of all sectors. Landlords incur the burden of the tax only as consumers. Ricardo thought that Smith's erroneous conclusion was caused by his not having observed the following fact: 'since much capital is employed on the land which pays no rent, and since it is the result obtained by this capital which regulates the price of raw produce, no deduction can be made from rent' (*Principles*, p. 225). This criticism can apply to Smith's conclusions with respect to taxes on necessities, wages, and profits as well as tax on raw produce.

3.2. Tax on necessities

According to Smith, taxes imposed on consumption of necessities increase wages of labour, and, consequently, raise all prices of manufactures: rent thereby decreases. He said that '[t]hey fall heaviest upon the landlords, who always pay in a double capacity; in that of landlords, by the reduction of their rent; and in that of rich consumers, by the increase of their expence' (WN, p. 873). Our model supports this conclusion regarding tax on necessities. The effect of an increase in the tax rate on necessities is shown as follows:

$$dR/dt_2 < 0, \quad (7)$$

$$dp_2/dt_2 > 0, \quad (8)$$

$$dp_3/dt_2 > 0. \quad (9)$$

From the above result, we can say that an increase in the tax rate on necessities reduces rent, raising the prices of necessities and luxuries—i.e., the prices of manufactures. Equation (2′) shows that an increase in t_2 is shifted to the price of necessities.[2] Wages per unit of labour in terms of raw produce ($b_1 + b_2 p_2$) increase because of the increment in the price of necessities. The increase in wages decreases rent in equation (1′), and raises the price of luxuries in equation (3′). Thus, as Smith said (WN, p. 871), a tax on necessities produces the same effect as a direct tax on wages.

Landlords have to incur the burden of the tax in the form of a reduction of nominal rent and a decrease in the real purchasing power of rent. Capitalists—profit-receivers—also incur the burden of the tax although their profits are constant: they can buy fewer necessities and luxuries because of the rise in the prices. Labourers are not influenced by such taxes, for their wages are compensated in proportion to an increase in the price of necessities. Thus the 'middling and superior ranks of people, if they understood their own interest, ought always to oppose all taxes upon the necessities of life, as well as all direct taxes upon the wages of labour' (WN, p. 873).

[1] From our operations, we may obtain $-(1 + t_R)\,dR = dt_1/(1 + t_1)$. The left hand side of this equation shows the amount of decrease in rent (including a direct tax on rent) per unit of raw produce, and the right hand side shows the amount of increase in the tax on raw produce per unit.

[2] We can prove that $dp_2 > dt_2 \cdot p_2/(1 + t_2)$. This means that the price of necessities increases by more than the increase in the amount of the tax per unit of necessities. Smith noticed this relationship, noting that '[a] tax upon those articles necessarily raises their price somewhat higher than the amount of the tax, because the dealer, who advances the tax, must generally get it back with a profit'(WN, p. 871).

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3.3. Tax on luxuries

'Taxes upon luxuries have no tendency to raise the price of any other commodities except that of the commodities taxed' (WN, p. 873). Our model brings out the same result as follows:

$$dR/dt_3 = 0, \tag{10}$$

$$dp_2/dt_3 = 0, \tag{11}$$

$$dp_3/dt_3 > 0.^1 \tag{12}$$

The above result is obtained because our model does not contain luxuries in the wage basket. In contrast to our assumption, Smith thought that labourers consume luxuries as well as raw produce and necessities (WN, p. 871). However, he did not think that a change in the price of luxuries would increase the wages of labour. Consequently, his conclusion is the same as ours. The burden of the tax on luxuries is exclusively on the consumers of those luxuries. Ricardo followed Smith completely with respect to the incidence of a tax on luxuries (*Principles*, pp. 243–4).

4. Taxes on income flows

4.1. Tax on wages

Smith did not think that a tax levied on wages would be paid by labourers: it would be paid first by their employers. The employers of labourers, if they are manufacturers, shift the burden of the tax in the form of an increase in the price of manufactures. If they are farmers, however, they do not raise the price of raw produce; they pay less rent to the landlords. Thus Smith reached the conclusion that the burden of a tax on wages would be incurred by consumers and landlords (WN, pp. 864–5). Our model shows the following result with respect to an increase in the tax rate on wages:

$$dR/dt_w < 0, \tag{13}$$

$$dp_2/dt_w > 0, \tag{14}$$

$$dp_3/dt_w > 0. \tag{15}$$

The result shown in (13) – (15) is the same as that in (7) – (9): rent decreases; the price of necessities rises; and the price of luxuries increases. Thus, an increase in the tax on wages has the same qualitative effect as an increase in the tax on necessities.[2] However, the process by which this result has been obtained is different in each case. An increase in t_w raises p_2 in equation (2′). In equation (1′), R is squeezed by the increases in t_w and p_2. Equation (3′) demonstrates that p_3 rises because of the increases in t_w and p_2. Thus, in contrast to the case of an increase in the tax on necessities, an increase in the tax on wages affects rent and the price of luxuries in two ways: the direct effect of the increase in the tax rate; and the indirect effect by way of an increase in the price of necessities. Smith did not refer to the indirect effect. Landlords incur the burden of the tax on wages most heavily. They pay the tax on wages and the resulting increase in the price of necessities in the production of raw produce; they have to pay the tax also as consumers of necessities and luxuries.

[1] More exactly, we can show that $dp_3 = dt_3 \cdot p_3/(1 + p_3)$. The price of luxuries increases just by the increase in the amount of tax per unit of luxuries.

[2] Smith thought that capitation taxes levied upon the lower ranks of people had the same effect as a direct tax on wages (WN, p. 869).

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Ricardo was opposed to Smith's conclusion with respect to the incidence of a tax on wages. Ricardo thought that, in the production of raw produce as well as of necessities and luxuries, a tax on wages would be passed on to the price, not to rent. The increase in the prices of necessities and raw produce decreases the natural rate of profits. Thus, a tax on wages falls on profits (*Principles*, p. 226).

4.2. Tax on profits

Smith thought that profits were composed of two parts: the interest of the capital owners; and the compensation of the capital users for the risk and trouble of employing capital. He did not think that the latter part was taxable. Hence, unless a tax imposed on profits is not paid from interest, it is passed on to the prices of manufactures and to rent (WN, p. 847).[1] Let us assume that taxes on profits are not paid from interest, then our model gives the following results:

$$dR/dt_p < 0, \tag{16}$$

$$dp_2/dt_p > 0, \tag{17}$$

$$dp_3/dt_p > 0. \tag{18}$$

From the above result, we can say that an increase in a tax on profits has the same qualitative effect as an increase in taxes on wages and on necessities: rent decreases; and prices of necessities and luxuries increase. This coincides with Smith's conclusion, though he did not always consider the influence on rent and the price of luxuries by way of the increase in the price of necessities caused by a tax on profits.

4.3. Tax on rent

Smith took it for granted that taxes on rent were paid by landlords (WN, pp. 828–36). By his definition of rent—the residual of the price of raw produce after subtracting sufficient means to maintain the stock together with the ordinary profits—landlords cannot shift the burden of the tax to the farmers. Our model demonstrates the following result:

$$dR/dt_R < 0, \tag{19}$$

$$dp_2/dt_R = 0, \tag{20}$$

$$dp_3/dt_R = 0. \tag{21}$$

Thus, an increase in the tax rate on rent decreases rent, but does not change the prices of necessities and luxuries.[2] Ricardo's conclusion concerning a land tax levied in proportion to rent is exactly the same as Smith's (*Principles*, p. 173). It must be noted, however, that the same conclusion is derived from different assumptions with respect to rent. To Ricardo, rent of a land is defined as the difference in productivity between the land and the marginal land where no rent is paid: landlords of the marginal land do not pay the tax levied in proportion to rent; the rate of profits is determined on the marginal land; landlords of superior lands have to pay the tax on rent in order to keep the rate of profits

[1] Smith admitted that interest could pay a tax on profits. However, he thought that interest was unsuitable as a tax base because the amount of capital stock which an individual possessed could hardly be ascertained, and because capital stock could easily be removed to foreign countries (WN, p. 848).

[2] We obtain $-dR = dt_R \cdot R/(1 + t_R)$. This means that rent decreases just by the increase in the amount of the tax.

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equal between lands; thus a tax imposed in proportion to rent is not shifted to profits. Smith's conclusion, though, is not based on the theory of differential rent.[1]

5. Conclusion

We can summarise the results which have been obtained from our Smithian model as follows: (i) a tax on raw produce decreases rent, keeping the prices of necessities and luxuries unaltered; (ii) taxes on necessities, on wages, and on profits reduce rent, raising the prices of necessities and luxuries; (iii) a tax on luxuries increases their price, but keeps nominal rent and the price of necessities unchanged; (iv) a tax proportional to rent reduces rent, maintaining the prices of necessities and luxuries. These results coincide completely with Smith's conclusions with respect to the incidence of various taxes. From results (i) – (iv), we can say that all taxes, except a tax on luxuries, reduce rent. Because landlords are the main consumers of luxuries, a tax on luxuries—which increases the price of luxuries—is paid mainly from rent. Thus, Smith reached the conclusion that the main taxpayers of the country are landlords.

As Peacock (1975, p. 562) suggests, Smith did not make clear which kind of tax he thought most desirable. However, considering the results derived from our model, we may conclude that Smith would have preferred taxes on luxuries, for taxes on raw produce and rent—which decrease rent—may impinge on the improvement of land (WN, pp. 833 and 837); taxes on necessities, wages and profits—which increase wages—may decrease the growth of demand for labour—and hence retard the population growth of the country (WN, pp. 865 and 873).[2]

Ricardo followed Smith with respect to results (iii) and (iv): it must be noted that Ricardo derived result (iv) from a different definition of rent. Ricardo did not accept results (i) and (ii). He replaced these with the following: (*a*) a tax on raw produce (necessities) decreases the rate of profits, raising the price of raw produce (necessities); (*b*) taxes on profits and on wages reduce the rate of profits, leaving all prices unchanged.[3] Thus, taxes on raw produce, necessities, profits, and wages fall on profits, not rent: landlords incur the burden of these taxes only as consumers. Because Ricardo regarded profits as the main resources for capital accumulation, he did not support taxes which reduce profits.

Thus, Smith and Ricardo reached the same conclusion with respect to the incidence of taxes on luxuries and rent: they differed in their opinions concerning the incidence of other taxes. How did they arrive at these different conclusions? As was shown in section 2 of this paper, the Ricardian system—the system of equations (1) (2) and (3)—does not contain rent in the components. This fact signifies that all taxes except the direct tax on

[1] This difference becomes explicit when they examine the incidence of a fixed land tax. Smith thought that a fixed land tax would be paid by landlords (WN, p. 828). Ricardo said that, because such a tax was imposed on rent of the marginal land, it would fall on profits (*Principles*, p. 181).

[2] In the letter to Sir John Sinclair of Ulbster in January 1786, Smith showed that he preferred taxes on luxuries to taxes on necessities. He said as follows: 'I dislike all taxes that may affect the necessary expenses of the poor. They, according to circumstances, either oppress the people immediately subject to them, or are repaid with great interest by the rich, *i.e.* by their employers in the advanced wages of their labour. Taxes on the *luxuries* of the poor, upon their beer and other spirituous liquors, for example, as long as they are so moderate as not give much temptation to smuggling, I am so far from disapproving, that I [l]ook upon them as the best of sumptuary laws' (Mossner and Ross, 1977, p. 327).

[3] In my 1992 paper, I demonstrated the sufficient conditions for Ricardo's conclusions to be satisfied. Erreygers (1995) extends my conditions into necessary and sufficient conditions.

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rent do not influence rent in terms of the *numéraire*. The rate of profits in the Ricardian system is endogenously determined. Any change which increases the production cost of 'basic goods' reduces the uniform rate of profits. Consequently, an increase in taxes on raw produce, necessities, and wages, as well as the direct tax on profits, lowers the rate of profits.

The Smithian system—shown by equations (1′), (2′), and (3′)—gives the rate of profits exogenously. This fact immediately signifies that the rate of profits is not affected by any change occurring in the system. Equation (1′) has rent as an endogenous variable: the price of raw produce is normalised; the price of necessities is determined in equation (2′) alone; the price of luxuries has nothing to do with equation (1′). For these reasons, any change which increases the production cost (including profits) of raw produce reduces rent in terms of the *numéraire*. Thus, an increase in taxes on raw produce, necessities, wages, and profits, as well as the direct tax on rent, decreases rent.

We may conclude that the difference in conclusions with respect to the incidence of taxation between Smith and Ricardo is caused by the difference between their natural-price systems. Smith's theory of tax incidence is consistent—as is Ricardo's theory—as long as his presumptions concerning price determination are accepted.[1]

By examining Smith's and Ricardo's theory of tax incidence in two consistent models, equations (1) - (3) and equations (1′) - (3′), we can demonstrate the alterations Ricardo made to Smith's natural-price system. First, Ricardo, by the theory of differential rent, banished rent from the price equation of raw produce. Second, Ricardo made the rate of profits an endogenous variable; it was regarded as an exogenous variable in the Smithian system. Third, Ricardo considered an input–output relationship between commodities—shown by a_{ij} in the Ricardian system—more consciously than Smith. Following Ricardo, Sraffa (1960) formalised more explicitly the relationship of the 'production of commodities by means of commodities'. Looking at these differences from the opposite side, Smith's system of price determination is regarded as a preliminary stage towards the Ricardo–Sraffa system. Thus, we can rescue Smith from the tradition of supply–demand balance, and position him in the genealogy of Quesnay, Ricardo, Marx, and Sraffa. The analysis of Smith's theory of tax incidence reinforces this viewpoint.

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[1] Dome (1997) demonstrates that one of the reasons why Malthus could not write an independent chapter on taxation in his *Principles of Political Economy* (1820) was that he attempted but failed to maintain Smith's conclusion of tax incidence—taxes relating to land would ultimately fall on rent—by using Ricardo's assumption, i.e., the theory of differential rent.

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