

Ramsey taxation means land-value taxation

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Abridged from "Ramsey and Pigou: crypto-Georgists" posted on the LVRG blog. This version minimizes the mathematics.

In 1902, the Congregationalist Cambridge mathematician Arthur Stanley Ramsey married Mary Agnes Wilson, the socialist suffragette daughter of the Vicar of Horbling. They had two sons and two daughters. The younger son, Arthur Michael Ramsey, born on 14 November 1904, became the 100th Archbishop of Canterbury. The elder, Frank Plumpton Ramsey, born on 22 February 1903, was an atheist.

Frank Ramsey formally studied mathematics but diversified into philosophy and economics. Among economists he is famous for proving that if the tax system is to raise a given revenue with minimum deadweight, each commodity should be taxed in inverse proportion to its price-elasticity of demand (Ramsey, 1927). That is unfortunate because the cited paper does not contain any such result. It is the more unfortunate because Ramsey himself could not correct the record, having died on 19 January 1930 at the age of 26.

This was Ramsey's original statement (Ramsey, 1927, p.56):

For infinitesimal taxes ... the tax ad valorem on each commodity should be proportional to the sum of the reciprocals of its supply and demand elasticities.

Then he spelt out the implication (pp.56–7):

If any one commodity is absolutely inelastic, either for supply or for demand, the whole of the revenue should be collected off it. This is independently obvious.... If there are several such commodities the whole revenue should be collected off them...

He gave no examples. But, while there is no commodity for which the demand is absolutely inelastic, there is one obvious commodity for which the supply is absolutely inelastic, namely land — provided of course that the taxable criterion of "supply" is the existence of the land and not its allocation to any particular purpose.

Ramsey not only formulated a rule that leads directly

to a "single tax" on land, but also anticipated the so-called Laffer curve in cases where the "single tax" is not employed. Moreover, his rule was to be applied after any externalities had been internalized by means of appropriate taxes and bounties.

One of the few scholars trying to set the record straight is Mason Gaffney (2009, pp.375–6). Another is Joseph Stiglitz (1986, pp.403–4). But the first to get the story right — because he posed the problem that Ramsey solved — was A.C. Pigou. In Chapter VIII of *A Study in Public Finance*, under the heading "Taxes and Bounties to correct Maladjustments", Pigou (1947, p.94) sets the scene:

"Ramsey not only formulated a rule that leads directly to a "single tax" on land, but also anticipated the so-called Laffer curve in cases where the "single tax" is not employed."

Of these maladjustments there are two principal causes. The first is that, in respect of certain goods and services, the return at the margin which resources devoted to making them yields [sic] to their makers is not equal to the full return which the community as a whole receives ... In other words, the value of the marginal private net product of resources so employed is greater or less than the value of the marginal social net product.

That is, the production of certain goods and services causes what we would now call negative or positive externalities. Pigou continues:

The second cause is that in respect of certain goods and services, the ratio, so to speak, between people's desire and the satisfaction which results from the fulfilment of desire is greater, or less, than it is in respect of other goods and services.

The "second cause" is more controversial (and not mentioned by Ramsey). As an example, Pigou cites excessive discounting of future costs and benefits.



Pictured: Frank Plumpton Ramsey

Be that as it may, Pigou concludes (p.99):

When maladjustments have come about ... it is always possible, on the assumption that no administrative costs are involved, to correct them by imposing appropriate rates of tax on resources employed in uses that tend to be pushed too far and employing the proceeds to provide bounties, at appropriate rates, on uses of the opposite class.

This mixture of what we would now call Pigovian taxes and bounties (subsidies) is assumed to be in place in Pigou's next chapter, which deals with Ramsey's contribution. But before we hear it second-hand from Pigou, let's get it straight from Ramsey. I quote his introduction (Ramsey, 1927, p.47–8):

THE problem I propose to tackle is this: a given revenue is to be raised by proportionate taxes on some or all uses of income, the taxes on different uses being possibly at different rates; how should these rates be adjusted in order that the decrement of utility may be a minimum? I propose to neglect altogether questions of distribution and considerations arising from the differences in the marginal utility of money to different people... Further I shall suppose that, in Professor Pigou's terminology, private and social net products are always equal or have been made so by State interference not included in the taxation we are considering...

In the first segment (pp.48–52), Ramsey begins:

(1) I suppose there to be altogether n commodities on which incomes are spent and denote the quantities of them which are produced in a unit of time by $x_1, x_2 \dots x_n$ The quantities ... can be measured in any convenient different units.

He defines u , a function of the x 's, as "the net utility of producing and consuming (or saving) these quantities of commodities," and asserts:

(3) If there is no taxation stable equilibrium will occur for values of the x 's which make u a maximum....

This of course depends on the assumption that externalities have been eliminated. He then supposes that taxes are levied on the respective commodities at the rates $\lambda_1, \lambda_2 \dots \lambda_n$ per unit (not ad valorem), yielding the total revenue R , and defines the problem: given R , choose the λ 's so that "the values of the x 's ... shall make u a maximum."

Assuming that " R and the λ 's can be regarded as infinitesimals", he shows that "the production of each commodity should be diminished in the same proportion" by the taxes (my emphasis).

He then considers "the case of a given revenue to be raised by taxing certain commodities only." Under the same assumption of infinitesimal revenue, he finds that "as before the taxes should be such as to reduce in the same proportion the production of each taxed commodity."

In §9 and Part II of the paper (pp.52–5), Ramsey drops the assumption of infinitesimal revenue:

I shall assume that the utility is a ... quadratic function of the x 's ... for a certain range of values ... such that there is no question of imposing taxes large enough to move the production point (values of the x 's) outside this range. If we were concerned with independent commodities, this assumption would mean that the taxes were small enough for us to treat the supply and demand curves as straight lines.

Using an n -dimensional geometric argument, he concludes:

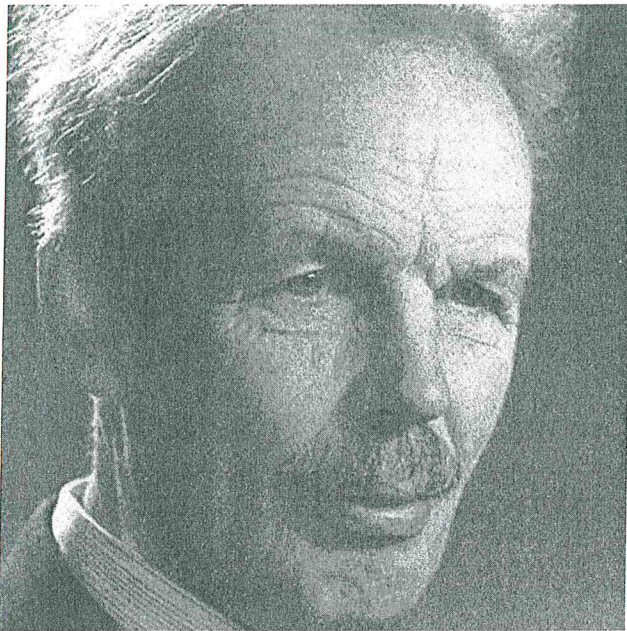
The taxes should be such as to diminish the production of all commodities in the same proportion.

And this result is now valid not merely for an infinitesimal revenue but for any revenue which it is possible to raise at all.

The maximum revenue will be obtained by diminishing the production of each commodity to one-half of its previous amount...

Revenue falls if we increase the tax rates beyond that point. Thus Ramsey anticipates the Laffer curve — if the taxes are such that production is indeed suppressed.

He then shows that if the taxes on some commodities are predetermined while the taxes on the remainder are left to be optimized, the italicized statement (above) applies to the remainder.



Pictured: A.C. Pigou

Now comes the part that is so often misquoted (Ramsey, 1927, pp.55–8):

(15) I propose now to explain what our results reduce to in certain special cases. First suppose that all the commodities are independent and have their own supply and demand equations....

For infinitesimal taxes ... the tax ad valorem on each commodity should be proportional to the sum of the reciprocals of its supply and demand elasticities.

(16) It is easy to see

(1) that the same rule ... applies if the revenue is to be collected off certain commodities only, which have supply and demand schedules independent of each other and all other commodities, even when the other commodities are not independent of one another.

(2) The rule does not justify any bounties...

(3) If any one commodity is absolutely inelastic, either for supply or for demand, the whole of the revenue should be collected off it....

(17) Let us next take the case in which all the commodities have independent demand schedules but are complete substitutes for supply

We can imagine this case as that of a country in which all commodities are produced at constant returns by the application of one kind of labour only....

For this case Ramsey obtains the same “rule”, except that all the different elasticities of supply are replaced

by a single “elasticity of supply of things in general”. He continues:

In this case we see that if the supply of labour is fixed (absolutely inelastic...) the taxes should be at the same ad valorem rate on all commodities.

(19) If some commodities only are to be taxed As before we see that of two commodities that should be taxed most which has the least elasticity of demand, but that if the supply of labour is absolutely inelastic all the commodities should be taxed equally.

Thus, under doubly unrealistic conditions of supply — perfect fungibility and perfect inelasticity — Ramsey’s reasoning leads to a flat consumption tax.

Here it should be noted that the supply of labour cannot be fixed as the supply of land is, and not only because workers can work more or fewer hours. Even if workers are taxed not for working but for merely existing — by a poll tax — they can emigrate or die or reduce their rate of reproduction. Land can do none of these.

If we assume that all supplies are perfectly elastic, Ramsey’s equations imply that the tax rate on each commodity is inversely proportional to the elasticity of demand. But Ramsey does not consider this obviously unrealistic assumption; the last-quoted statement notes a qualitative inverse relationship between the tax rate and the elasticity of demand, but not a precise inverse proportionality.

Pigou (1947, pp.106–8) outlines Ramsey’s assumptions and concludes:

Then ... the optimum system of proportionate taxes yielding a given revenue is one that will cut down the production of all commodities and services in equal proportions....

On the assumption ... that the demand and supply schedules are all completely independent, a very simple formula, built upon the elasticities of these independent demand and supply schedules in respect of the quantities that would be produced and sold in the absence of any taxation (beyond the taxes considered in the last chapter), can be found.

Remember that “the taxes considered in the last chapter” are those needed to internalize externalities. Pigou now gives a formula indicating that the tax rate on each commodity is proportional to the sum of the reciprocals of the elasticities of supply and demand (except that the “sum” has become a difference because, under Pigou’s sign convention, the elasticity of demand is normally negative). Then he remarks (p.108):

If the elasticities of all the supplies are infinite ... the rates of tax on them must be inversely proportional to their elasticities of demand.

Thus it is Pigou, not Ramsey, who states the unrealistic special case for which Ramsey is remembered. Pigou immediately adds a more realistic case, which Ramsey also mentions, but which has been curiously forgotten:

If there is any commodity for which either the demand or the supply is absolutely inelastic, the formula implies that the rate of tax imposed on every other commodity must be nil, i.e. that the whole of the revenue wanted must be raised on that commodity.

The one commodity that meets this criterion is land; in the economic context, land is that factor of production whose supply is beyond the influence of economic agents, and there is no commodity whose demand is beyond their influence. Thus

Ramsey's results imply that, in the words of Joseph Stiglitz (1986, p.568), "While a direct tax on land is nondistortionary, all the other ways of raising revenue induce distortions."

References

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